Bank Management

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Bank Management, Eighth Edition

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Dedication

To Susan, Michala and Andy for all the joys of family.
Timothy W. Koch

To my family, Becky, Cassy, Erin, Jeff and Weston for their never-ending support and encouragement.
S. Scott MacDonald

Contents

Chapter 1

Chapter 2

Chapter 3

Preface

The world of banking has changed dramatically since 2007 when many large financial institutions around the world failed and were bailed out by their central governments. The United States and global economies subsequently fell into recession. Millions of Americans lost their jobs, and household net worth plummeted with the decline in housing and the value of investments. The ongoing recovery continues to be slow and painful for many. Not surprisingly, the reputations of many banks and the banking industry in general have suffered. Yet, if done correctly, banking is a critical driver of economic activity and a noble profession. It involves the processing of payments, accepting deposits and making loans, safekeeping documents and valuable items, providing guarantees and performance bonds, offering cash management, brokerage and insurance services, and providing securities underwriting and market-making services.

So, what caused a breakdown in the financial services industry leading to the recent financial crisis? In 2011, the National Commission on the Causes of the Financial and Economic Crisis in the United States published a report that said both senior management at large financial institutions and key government officials ignored warning signals and inadequately managed risks; and that the crisis was avoidable.[1] It attributed the crisis to: (1) risky lending via subprime mortgages; (2) trading activities at large institutions; (3) unregulated derivatives markets; and (4) problems with lending via repurchase agreements, among other factors. In response, the U.S. Congress passed the Dodd–Frank Wall Street Reform and Consumer Protection Act in June 2010 (commonly labeled the Dodd–Frank Act), which has produced and continues to produce numerous changes in the regulation of financial firms. The global crisis has similarly brought about changes in regulations at financial firms in other industrialized countries.

One of the most unusual results of the crisis and subsequent pressures from the new regulatory environment is that the largest institutions appear to be benefiting financially more than smaller institutions. For example, from 2000 to 2013, the five largest banks in the United States increased their share of total U.S. banking assets from 27.5 percent to 46.6 percent.[2] In addition, regulators have been slow to charter new banks, and many smaller bank managers and owners routinely protest that the impact of new consumer regulations is to reduce lending and raise their deadweight costs, thereby making it more difficult to compete with other organizations.

How did we get where we are today? Commercial banks in the U.S. started as firms that focused on payment processing, the storage of financial documents and valuable items, and eventually moved into lending to individuals and businesses. They were largely unregulated until the Great Depression when more than 600 banks failed from 1921–1929. From 1930 to 1933, more than 9,000 banks suspended operations. With lack of confidence in the financial system, customers attempted to convert bank deposits to cash, thereby creating "runs on banks." The Banking Act of 1933, now commonly labeled the Glass–Steagall Act, established the Federal Deposit Insurance Corporation (FDIC) responsible for insuring customer deposits at banks. It also separated commerce from banking activities. As such, commercial banks focused on accepting deposits, making loans and holding the

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[1] *The Financial Crisis Inquiry Report*, Final Report of the National Commission on the Causes of the Financial and Economic Crisis in the United States, Public Affairs, January 2011.

[2] Pierce, Hester and Robert Greene, "The Decline of U.S. Small Banks (2000–2013)," www.mercatus.org, February 24, 2014.

loans in portfolio. Investment banks focused on making markets, underwriting securities, and facilitating mergers and acquisitions. As large firms grew in size, they moved into other types of financial businesses. The Bank Holding Company Act formally identified businesses in which commercial bank holding companies might engage after receiving regulatory approval. Over time, Congress authorized commercial banks to move into investment banking, insurance underwriting, and other once-prohibited services, deeming the risks acceptable. Many large investment banks similarly made loans and held large amounts of the loans and securities in portfolio funded largely by short-term repurchase agreements. Then, the global financial crisis hit.

In 2008, the United States lost more than 2.5 million jobs. Large private firms once thought to be the leaders of growth are now principally owned by federal governments. Quasi-private agencies, such as the Federal National Mortgage Association (FNMA) and Federal Home Loan Mortgage Corporation (FHLMC), are effectively owned by the U.S. government. Lehman Brothers failed. Other large financial institutions effectively failed and were collapsed into stronger, surviving institutions. Thus, Bank of America acquired Countrywide and Merrill Lynch. JPMorgan Chase acquired Bear Stearns and Washington Mutual. Wells Fargo acquired Wachovia. Goldman Sachs and Morgan Stanley, once premier investment banks, converted to financial (bank) holding companies to get access to borrowings from the Federal Reserve. Other noncommercial banks, such as American Express, The Hartford, GE Capital, and MetLife also became financial holding companies so that they could borrow from the Federal Reserve. In 2014, Congress still had not decided what to do with Fannie Mae and Freddie Mac, who then dominated the mortgage market. From 2008 to 2010, governments flooded the markets with liquidity, recognizing that many credit markets were no longer functioning effectively. Asset securitizations dried up as the originate-to-distribute model fell out of favor. Financial institutions, businesses, and individuals started and continue to deleverage by which they pay down debt. While economic growth eventually turned positive, the pace has been slow relative to historical norms.

Given the extreme problems of financial institutions and general atmosphere of fear, the U.S. Congress authorized a Troubled Asset Relief Program (TARP)—Capital Purchase Program through which the federal government bought preferred stock in qualifying financial institutions. While this helped stabilize large financial institutions, the global economy still suffered. By 2009, the Obama administration and Congress had approved a massive stimulus plan involving tax cuts and increased government spending in an effort to jump-start consumer and business spending. Importantly, the policies were designed to raise consumer and business spending and confidence, which had eroded with recent events. Governments in China, the United Kingdom and throughout the industrialized world implemented similar types of stimulus plans.

Today, the banking industry across the world has permanently changed. Investment banks, as traditionally structured, no longer exist as independent organizations. The Dodd–Frank Act imposes a wide range of new regulations that continue to be developed and implemented. Given excessive financial leverage, governments in the industrialized world approved Basel III, which served to increase capital requirements at banks. As such, the nature of bank risk taking has changed. Lending decisions have been refocused on a borrower's ability and willingness to repay, because the model of originating and then selling loans broke down. Finally, the financial industry is again consolidating.

This book examines the impacts of the changing competitive environment on commercial banks, banking services, and to a lesser degree the entire financial services industry. Upon completing the book, the reader will better understand how banks make a profit and the risks associated with managing a bank's balance sheet. It will address the mechanics of and issues associated with making loans, buying and selling securities, competing for deposits, accessing purchased liabilities, and building the capital base. It also addresses related activities involving securitization and the use of financial derivatives. In response to issues raised during the financial crisis, it demonstrates the consequences of making bad loans, operating with excessive leverage, and inadequate liquidity. The analysis provides a framework for developing effective strategies to ensure the proper balance between management's profit targets and allowable risk taking.

Audience

Bank Management is designed for use in upper division undergraduate or master's level banking and financial institutions courses at universities, as well as training programs for professional bankers. As prerequisites, students should be familiar with elementary accounting, basic interest rate and bond pricing concepts, and basic macroeconomics. The book is well suited for broad-based instructional purposes in bank training programs, because it emphasis how decisions are made and the consequences of different types of decisions. For someone new to banking, the book describes the range of banking activities and demonstrates how bank managers make financial decisions. For practitioners, it presents traditional decision models and explains how decisions in one area affect performance and opportunities in other areas. This book therefore provides a comprehensive view of balance sheet management with an emphasis on the trade-offs between profitability and risk.

About *Bank Management*

The book focuses on decision making and offers a unique approach to understanding commercial bank management. Key chapters address the specific aspects of an issue or problem, explain how a financial model or decision framework applies, and then demonstrate the application of the model or framework using sample data analysis. The reader not only observes how certain factors influence credit, investment, funding, and pricing decisions, but also develops an appreciation of the trade-offs between return and risk. Several Microsoft Excel templates, which include various models and applications using sample data, are available to users. End-of-chapter cases, questions, and problems provide an opportunity to test the reader's understanding of important issues and data analysis.

After reading *Bank Management,* the reader should have a solid foundation in the key issues confronting managers today, a familiarization with the basic financial models that are used to formulate decisions, and an understanding of the strengths and weaknesses of data analysis. The text and numerous applications help the reader to recognize the trade-offs involved in making financial decisions and to develop the logical thought processes needed to reach reasonable conclusions.

New Features of the Eighth Edition

The eighth edition of the book builds on the topics and features of earlier editions, with several important changes:

- A complete regulatory update has been applied throughout the book. In particular, the book examines the many programs evolving from the financial crisis that focus on providing liquidity to the banking system as well as key provisions of the Dodd–Frank Act and Basel III. Included are discussions of the Troubled Asset Relief Program (TARP–CPP), the Temporary Liquidity Guarantee Program (TLGP), and the

Term Securities Lending Facility (TSLF). It discusses recent decisions of the Consumer Financial Protection Bureau (CFPB) and their implications, as well as other provisions of the Dodd–Frank Act.

- It examines the role that periodic stress testing under the reglators' Comprehensive Capital Analysis and Review (CCAR) plays in influencing bank capital decisions.
- A complete discussion of the changing landscape of the financial services industry—including the evolution of investment banks, mortgage lenders and life insurance companies.
- An analysis of the subprime mortgage crisis, its impact on financial institutions and the economy, and regulatory responses.
- A discussion of the originate-to-distribute model and reasons it is out of favor.
- A description of credit default swaps, how firms use them to hedge and speculate, as well as a discussion of the role they played in increasing financial leverage and risk to financial institutions and the financial system.
- A summary of Citigroup's holding company structure and financial data.
- A detail analysis and comparison of various tradition and non tradition banking business models using data from Goldman Sachs Group, Goldman Sachs Bank, Mutual of Omaha Bank and BWW Bank of North America.
- An updated and comprehensive evaluation of commercial bank performance and the impact this has on the analyst's job in evaluating performance; a direct comparison of PNC Bank's financial performance in 2013 versus peer institutions as well as important contrasts with the performance of community banks.
- An evaluation and comparison of PNC Bank's financial performance before, during and after the financial crisis of 2008–2009.
- An analysis of the Dodd–Frank Act impact on not allowing banks to rely exclusively on credit ratings when making security investment decisions.
- New data and analysis on international banking and the role and size of U.S. banking institutions abroad, as well as the ownership and composition of foreign banking institutions in the United States.
- This book remains the only text that focuses on cash-flow analysis as part of the lending decision. It introduces a comprehensive procedure for generating cash-based income statements, explains how to interpret the results, and provides an approach to forecasting a potential borrower's future performance.

Organization of the Book

While the unifying theme of the book is risk management, the material is divided into six parts. As a lead-in to each chapter, the text will describe a current issue or provide an example of a key topic discussed in the chapter. This introduction reinforces the risk focus by emphasizing that although managers make both good and bad decisions, the consistent application of finance theory and models should lead to a better understanding of the trade-off between risk and return.

Part I, Overview of the Banking Industry and Regulation, provides background information related to bank management, the regulatory environment, and current banking trends. Initially, it provides a critique of the multitude of factors influencing the financial crisis of 2008–2010. It examines the organizational structure of small banks and large bank holding companies and describes different models of banking including a discussion of industrial loan companies. It describes the current regulatory environment including key provisions of the Dodd–Frank Act and Basel III and explains the impact of government policies to provide emergency liquidity and stress test financial performance and viability.

Part II, Evaluating Bank Performance, examines the basic risk and return features of banks and how analysts evaluate performance. Chapter 3 introduces bank financial statements and presents the traditional DuPont model for evaluating bank performance using financial ratios from the Uniform Bank Performance Report (UBPR) to analyze the strengths and weaknesses of bank performance over time and versus peer institutions. It provides the foundation and building blocks for understanding how banks make a profit and the trade-offs involved in balancing credit risk, liquidity risk, market risk, operational risk, reputational risk, legal risk, and solvency risk. Chapter 4 documents recent strategies and trends in controlling noninterest expense relative to noninterest income to help meet efficiency objectives. Chapter 5 documents differences in nontraditional banking organizations by focusing on the performance of Goldman Sachs, Mutual of Omaha Bank, and BMW Bank, organizations that were once purely an investment bank, insurance company, and automobile manufacturer/finance company, respectively.

Part III, Managing Interest Rate Risk, demonstrates how banks measure and manage interest rate risk. Chapter 6 provides background information on the pricing of securities, total return analysis to investors, and the determinants of interest rates. Chapter 7 introduces GAP analysis and the use of earnings sensitivity analysis to assess the potential impact of interest rate and balance sheet changes on net interest income. Chapter 8 describes duration gap analysis and the use of sensitivity analysis to assess the potential impact of interest rate and balance sheet changes on the economic value of stockholders' equity. The discussion emphasizes the impact of embedded options and the necessity behind incorporating sensitivity analysis to assess the impact of such options on profits and risk. Attention is paid to the possible impact of rising rates on bank earnings and risk. Chapter 9 describes the basic features of financial futures, forward contracts, interest rate swaps, and interest rate caps and floors and explains how banks use them to both hedge and speculate. Emphasis is directed toward understanding the models, data output, and strategies to improve performance.

Part IV, Managing the Cost of Funds, Capital, and Liquidity, describes the features of bank liabilities, regulatory capital requirements, and overall liquidity analysis. It presents a procedure for estimating the marginal cost of funds that is used in making investment decisions and pricing assets. It also explains how banks meet legal reserve requirements and manage cash assets, and it develops a model for estimating liquidity needs and planning for temporary cash deficiencies as well as longer-term liquidity needs. A key section describes the importance and nature of contingency funding plans at banks. Chapter 12 documents risk-based capital requirements and outlines strategies for obtaining new external capital. It introduces features of Basel III that will alter the largest institutions' capital requirements starting in 2015 and smaller institutions' capital requirements at later dates. Finally, it describes federal government stress-testing efforts to evaluate the adequacy of bank capital.

Part V, Managing Credit Risk, addresses how banks manage credit risk. It initially describes basic credit analysis principles and the characteristics of different types of loans. Subsequent chapters present a procedure for estimating a business borrower's cash flow from operations and the basic credit scoring models applied to individual borrowers. Considerable emphasis is placed on interpreting financial statements and generating cash flow estimates to determine repayment prospects. Given the recessionary environment of 2008 and beyond, some of the discussion focuses on the deterioration of asset quality at banks and the potential impacts on loan workouts. As part of credit risk management practices, the discussion introduces credit default swaps and explains how they may be used to speculate and hedge credit risk.

Part VI, Managing the Investment Portfolio and Special Topics, describes the role of fixed-income securities in helping a bank meet profit and risk objectives. In response to Dodd–Frank Act provisions, it discusses how banks should now use information provided by credit rating agencies in making investment decisions. It identifies the basic objectives of a bank's investment portfolio and the nature of investment policy guidelines, and explains the basic features of taxable and tax-exempt securities that banks buy. It then introduces various strategies related to choosing security maturities, the composition between taxable and tax-exempt securities, and purchases or sales timed to take advantage of the business cycle. It explains the impact of embedded options on security pricing and the risk-return trade-off to investors of callable bonds and mortgage-backed securities with significant prepayment risk. The final chapter describes recent trends in global banking activities and the management of foreign exchange risk.

Each chapter of *Bank Management* concludes with a series of discussion questions and problems that require the student to apply the decision models introduced in the chapter. Excel templates can be used to generate and address additional problems as well as provide a useful tool for future analysis.

Web Site

The product-support Web site, located at www.cengagebrain.com, contains the PowerPoint slide presentation, Instructor's Manual, and Spreadsheet Templates.

Instructor's Manual and Test Bank

A comprehensive Instructor's Manual and Test Bank accompany *Bank Management* and can be found on this title's companion website at www.cengagebrain.com. These supplements provide teaching objectives and outlines for each chapter and offer detailed answers to end-of-chapter questions and problems. Finally, multiple choice questions are provided, with answers.

Lecture Presentation Software

Microsoft PowerPoint™ presentations are also available on the companion Web site to those professors who wish to incorporate multimedia in the classroom. This multimedia presentation allows the student to explore the almost unlimited number of different financial situations that banks face on a daily basis. Furthermore, it provides the instructor a method by which he or she can integrate a financial analysis spreadsheet template directly into the class presentation. Many tables and diagrams are featured in the lecture software package.

Spreadsheet Template

Microsoft Excel templates are available for those who wish to use microcomputers to perform and extend the data analysis presented in the book. The templates provide a generic decision model for applications related to analyzing bank performance and key financial ratios, and cash flow from operations for nonfinancial firms. The templates also provide a full range of decision models with data for key problems and cases in the text. Students can use the templates to analyze historical balance sheet and income statement data and conduct "what if" analysis. This allows the user to quickly examine a range of outcomes rather than just simple, static solutions. The templates cover topics including bank performance analysis, duration analysis, risk-based capital requirements and planning, credit analysis, and customer profitability analysis.

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Timothy W. Koch is Professor of Finance at the University of South Carolina (USC) and President of the Graduate School of Banking at Colorado. He received a B.A. degree in mathematics from Wartburg College and a Ph.D. in economics from Purdue University. Prior to USC, he taught at Baylor University and Texas Tech University. In addition to college teaching, Dr. Koch serves as President of the Graduate School of Banking at Colorado. He also serves as faculty advisor to the Graduate School of Bank Investments and Financial Management offered at the University of South Carolina. From 2009 to 2010, he served on the FDIC's Advisory Committee on Community Banking, along with senior managers of community banks from throughout the United States. Finally, Dr. Koch is a member of the Board of Directors of The Independent Bankers Bank (TIB).

Dr. Koch's research and writing focuses on bank risk management, performance analysis, the pricing of financial futures and fixed-income securities, and public finance. He has published in a wide range of academic journals, including the *Journal of Finance, Journal of Financial & Quantitative Analysis, Journal of Money, Credit and Banking, Journal of Futures Markets, National Tax Journal, Journal of Banking and Finance, Journal of Economics and Business, Journal of Fixed Income, Journal of Financial Research, Journal of Macroeconomics, Journal of Portfolio Management,* and the *Municipal Finance Journal*. He has served as Treasurer of the Financial Management Association and President of the Eastern Finance Association and Southern Finance Association. He recently completed a book, *Community Banking: From Crisis to Prosperity*, that focuses on strategies for community banks to thrive in the future.

S. Scott MacDonald is President and CEO of the Southwestern Graduate School of Banking (SWGSB) Foundation, Director of the Assemblies for Bank Directors, and Adjunct Professor of Finance at the Edwin L. Cox School of Business, Southern Methodist University. He received his B.A. degree in economics from the University of Alabama and his Ph.D. from Texas A&M University. Dr. MacDonald joined the Southern Methodist University faculty in 1997 and took over as director of the SWGSB Foundation in 1998. Prior to joining SMU, he was an Associate Professor of Finance and Director of the Texas Tech University School of Banking.

Dr. MacDonald spends the majority of his time working directly with the financial services industry: serving as Director of the Southwestern Graduate School of Banking; conducting bank director education programs through the Assemblies for Bank Directors and the new Certified Community Bank Director program; serving as a frequent speaker, seminar leader and strategic planning facilitator; and working as a consultant to various banking organizations. Dr. MacDonald has also served as an expert resource witness before the Texas state senate; a past chairman of the board of directors of a Texas Financial Institution; and as a past board member of the North Texas Chapter of the Risk Management Association.

Dr. MacDonald is the author of articles in academic journals such as the *Journal of Financial Economics,* the *Journal of Business,* the *Journal of Futures Markets,* the *Review of Futures Markets, Quarterly Journal of Business and Economics,* and the *Journal of Money, Credit and Banking.* He is also the author of professional curriculum materials for industry-sponsored seminars and schools in the financial services industry, as well as the recipient of numerous teaching and research awards.

1 Banking and the Financial Services Industry

More than 75 years ago, the Glass–Steagall Act created three separate lines of business within the financial services industry—commercial banking, investment banking, and insurance. The Act's primary purpose was to separate commerce from banking in order to reduce conflicts of interest among business managers and encourage the smooth functioning of markets. At that time, commercial banks primarily accepted demand deposits and made loans to businesses. Investment banks were largely involved in underwriting securities, which helped governments and businesses sell newly issued bonds and stocks to the public, facilitated mergers and acquisitions among companies, and helped individuals buy and sell securities. Insurance companies, in turn, accepted premiums and underwrote insurance policies for individuals and businesses. The McFadden Act of 1927 let states write their own rules regarding the extent to which a commercial bank could branch within and outside its home state, and the Bank Holding Company Act of 1956 limited banks to specific types of business activities.

Commercial banks have long been one of the most highly regulated businesses in the United States. In order to start a bank, investors must select an experienced management team and board of directors and have a business plan that explains the bank's business strategy and justifies why a new bank is needed. The group must then present its plan to bank regulators for approval. A newly formed commercial bank can choose to obtain a charter from either its home-state bank regulator or the federal government via the Office of Comptroller of the Currency (OCC).[1] This dual chartering process fosters competition among regulators in terms of how much regulation they impose on a commercial bank. To the extent that one regulator is perceived to be more lenient than another, groups will gravitate to the one with the more "lax" oversight. Having a large number of banks to regulate, in turn, better justifies the regulator's existence. Thus, the chartering process has created a system of many small banks that operate in limited geographic markets and only a few large institutions that operate across the United States and globally.

For many years, the United States dominated global financial and economic activity. Large U.S. financial firms, located predominantly in New York City (Wall Street),

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[1] The Office of Thrift Supervision (OTS) chartered savings and loans prior to the financial crisis, but this agency was folded into the OCC by the Dodd–Frank Act of 2010.

aggressively expanded into new lines of business with new product offerings, financial innovations (e.g., the use of derivatives, which allowed firms to dramatically alter their risk management practices), and new delivery methods. Many firms expanded their operations throughout the world in product and service areas far beyond traditional lending and deposit gathering. The economic power of the United States grew even more because the U.S. dollar served as the currency of choice for global transactions and central bank reserves. Economic policymakers, politicians, and regulators followed three basic tenets to achieve sustained economic growth: the pursuit of free trade, deregulation of financial services, and macroeconomic stability. As a result, U.S. firms grew accordingly.

Not surprisingly, other countries followed suit. In October 1986, the United Kingdom deregulated its financial institutions and markets to better compete with Wall Street firms. London subsequently became a booming financial center with a concentration of global financial services businesses. Many of the world's largest institutions, such as HSBC (formerly the Hongkong and Shanghai Banking Corporation) and the Royal Bank of Scotland (RBS), were headquartered in London and developed extensive global operations. Japan, China, Singapore, Russia, and many other emerging markets developed their own successful stock exchanges. These actions produced long periods of sustained economic growth. Then, things changed with the financial crisis that appeared in 2007.

Global Financial Crisis of 2007–2009

Beginning in mid-2007, the U.S. and global economies began to weaken following a series of crises related to problem mortgages and other loans and the resulting difficulties this situation created for financial institutions that played a role in these markets.[2] In order to help more borrowers qualify for mortgages, and motivated by the search for greater fee income, many lenders designed home loans that did not require borrowers to make sufficiently large monthly principal and interest payments. For example, in many cases, home mortgage loans were purposely designed for, and made to, individuals whose income was insufficient for making the minimum payments that would eventually pay off the loan. The expectation was that either incomes would increase over time or the property value would rise sufficiently to cover future payments. In addition, many lenders originated mortgages with the intent to sell them soon after loan closings (the process was labeled the *originate-to-distribute (OTD)* approach), such that the loan originator did not retain the credit risk. If the loan went bad, the buyer of the mortgage would bear the loss and not the mortgage originator.

As home prices started to decline, many institutions involved in housing finance began to realize losses from home mortgage defaults. Initially, several small mortgage banks failed. Following these failures, national mortgage lenders, such as Countrywide and Washington Mutual, began to experience large waves of borrowers defaulting on their loans. Many of these borrowers were high risk because their incomes did not cover the payment amount that would have repaid the obligated principal and interest. Such borrowers were labeled "*subprime*" borrowers and the questionable mortgages carried names like interest-only (IO), Alt A, or option adjustable-rate mortgages (option

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[2] Mortgages are associated with loans secured by residential or commercial real estate. Obtaining a mortgage is how most individuals and businesses finance the purchase of property.

ARMs).[3] Some of these mortgages offered the borrower an extremely low initial teaser rate, such as 1.5 percent, as well as the option to pay each month only the interest calculated at this low rate. The monthly interest payment did not even cover the contractual "principal-plus-interest" required to pay off the mortgage. The result was that the outstanding loan balance increased each month (a phenomenon labeled "negative amortization"). With the sustained drop in housing prices, institutions throughout the world were soon reporting large asset write-downs in which they formally recognized that loans on their balance sheets were worth much less than the amounts reported. These write-downs, in turn, depleted the lenders' capital and forced them to either sell assets or obtain external capital (new equity and subordinated debt) to replace capital lost from the write-downs. Many of the largest institutions reacted by restricting credit availability to businesses and individuals. Even when loans were made, the terms were increasingly strict, requiring higher down payments and the elimination of teaser rates.

This situation led to a dramatic restructuring of financial markets and institutions throughout the world as many foreign-based institutions bought the bad mortgages originated in the United States. In March 2008, Bear Stearns collapsed and was absorbed by JPMorgan Chase. This event was followed by the failure of Lehman Brothers and the effective failures of Countrywide, Washington Mutual, and Wachovia, which were absorbed by Bank of America, JPMorgan Chase, and Wells Fargo, respectively. Given the interconnected nature of financial markets, many healthy participants were unwilling to lend to any firm at any price because they could not accurately assess the risk of loss in the near-term. Liquidity largely disappeared.

In order to address the crisis, the U.S. government took the following actions from September through December of 2008:

- Placed two government-sponsored enterprises (GSEs), Fannie Mae and Freddie Mac, into conservatorship—thereby effectively making them fully operated by the U.S. government. These firms supported the housing market and origination of mortgages. Banks that owned preferred stock issued by these firms wrote the value of their investments down to zero.
- Loaned American International Group (AIG) over $150 billion, effectively taking ownership of the insurance company.
- Insured money market mutual funds against default.
- Authorized Bank of America to acquire Merrill Lynch.
- Approved Goldman Sachs, Morgan Stanley, MetLife and American Express to convert to bank holding companies (BHCs) over a weekend.
- Authorized the Federal Reserve to purchase commercial paper directly from companies such as General Electric.
- Increased Federal Deposit Insurance Corporation (FDIC) deposit coverage per account for domestic deposits to $250,000 and provided unlimited coverage for noninterest-bearing business deposits. The increase to $250,000 was temporary through 2009, but was extended so that this coverage amount exists currently.

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[3] Subprime mortgages are loans made to borrowers with low credit scores and thus exhibit a higher-than-average risk of default. These mortgages are referred to as "exotic" mortgages and are discussed later in detail. As the name suggests, IOs required a borrower to repay only interest until some future date. Alt A loans were also called low-documentation or no-documentation loans because the lender did not collect information on the borrower's income or outstanding debt to other lenders when deciding whether to approve the loan. Option ARMs allowed borrowers to select how much they wanted to repay each month from a very low amount that might be just a portion of the interest owed to a fully amortizing amount. One lender called these loans "Pick-a-Pay" loans. Each of these types of loans is generally riskier than traditional mortgage loans.

- Passed the Troubled Asset Relief Program (TARP)–Capital Purchase Program (CPP), which allowed financial institutions to sell preferred stock to the U.S. Treasury.
- Purchased $125 billion of preferred stock in nine large U.S. banks under the TARP–CPP program.
- Loaned large amounts to large U.S. financial institutions through the Federal Reserve discount window and via other liquidity facilities with the intent of providing liquidity and unfreezing financial markets.
- Authorized large financial institutions and nonfinancial firms to sell bonds that were FDIC-insured.
- Allowed hedge funds to borrow from the Federal Reserve.

During this time, large institutions were less willing to make unsecured loans to other institutions because they did not know which institutions were really solvent. In response, interbank interest rates, such as the London Interbank Offer Rate (LIBOR), rose sharply, and the spread between LIBOR and Treasury rates reached record highs.[4] Many institutions stopped new commercial and consumer lending, eliminated home equity lines, and tightened terms on renewals. Governments around the world lowered interest rates, which did not solve the asset and liquidity problems. Governments subsequently kept pumping liquidity into the system—"helicopter money," as Milton Friedman called it—trying to stimulate lending and spending. In short, credit markets were not functioning normally. The U.S. and other countries fell into recession.

Clearly, the banking system relies on confidence. During the events of 2007–2009, confidence eroded—effectively creating an environment where institutions were hesitant to take on credit risk. Government policymakers pursued two avenues to shore up confidence and induce large institutions to start lending. First, they used TARP funds to assist both healthy and problem institutions. The intent behind the government's action of buying stock in banks was to help banks clean up their balance sheets and start lending. Unfortunately, many banks simply wrote down more problem assets, thereby offsetting the newly raised capital with charge-offs, or used the funds to buy problem institutions. For example, PNC Bank announced the purchase, with government assistance, of National City Bank for approximately $4 billion—at the same time that it accepted almost $8 billion in preferred stock funding from the Treasury.

Fundamentally, the U.S. government was trying to find a floor for housing values. Exhibit 1.1 documents the drop in the average price of a home from the peak price to the lowest price from January 2006 to December 2013 for several large U.S. metropolitan areas. While most communities experienced housing price declines of less than 20 percent from their peak prices in 2005 or 2006 to their lows in 2010–2011, home price declines in Las Vegas, Miami, and Phoenix approached 51 percent to 62 percent. Dallas and Denver fared the best with only single-digit losses. Not surprisingly, foreclosures reached historically high levels in markets that experienced a sharp run-up in housing prices later followed by sharp declines. To help keep people in their homes, the U.S. Congress and the FDIC promoted loan modifications for troubled home-loan borrowers. In essence, they were encouraging lenders to forbear on foreclosures in which people

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[4] Following the financial crisis, bank regulators in the United Kingdom, European Union (EU), and United States charged many large institutions with 'fixing' LIBOR to their advantage. LIBOR is a benchmark rate for banks that lend unsecured funds to other institutions. It is based on a daily survey of rates collected by the British Bankers' Association. The accusation was that many of the surveyed institutions intentionally provided quotes that benefited their in-house derivatives traders or specific positions that were tied to LIBOR pricing. Many of these banks have paid substantial fines for their roles in the LIBOR fixing.

EXHIBIT 1.1 Maximum Decline in Average Prices of Existing Homes across Selected Metropolitan Areas from Peak Prices Through December 2013

Metropolitan Area	Peak Price Index Date	Lowest Price Index Date	Duration (Days)	Maximum decline from peak	Annualized Percent Change from Peak
NV-Las Vegas	Aug-2006	Mar-2012	2039	–61.7%	–17.1%
AZ-Phoenix	Jun-2006	Sep-2011	1918	–55.9%	–15.5%
FL-Miami	Dec-2006	Apr-2011	1582	–51.2%	–16.5%
MI-Detroit	Dec-2005	Apr-2011	1947	–49.3%	–12.7%
FL-Tampa	Jul-2006	Feb-2012	2041	–48.0%	–11.6%
FL-Tampa	Jul-2006	Feb-2012	2041	–48.0%	–11.6%
CA-San Francisco	May-2006	Mar-2009	1035	–46.1%	–21.6%
CA-San Diego	Nov-2005	Apr-2009	1247	–42.3%	–16.0%
CA-Los Angeles	Sep-2006	May-2009	973	–41.9%	–20.2%
GA-Atlanta	Jul-2007	Mar-2012	1705	–39.5%	–10.7%
IL-Chicago	Sep-2006	Mar-2012	2008	–39.1%	–9.0%
MN-Minneapolis	Sep-2006	Mar-2011	1642	–38.2%	–10.6%
DC-Washington	May-2006	Mar-2009	1035	–33.9%	–14.5%
WA-Seattle	Jul-2007	Feb-2012	1676	–32.9%	–8.7%
OR-Portland	Jul-2007	Mar-2012	1705	–30.8%	–7.9%
NY-New York	Jun-2006	Mar-2012	2100	–27.1%	–5.5%
OH-Cleveland	Jul-2006	Feb-2012	2041	–23.7%	–4.8%
NC-Charlotte	Aug-2007	Jan-2012	1614	–20.2%	–5.1%
MA-Boston	Sep-2005	Mar-2009	1277	–20.1%	–6.4%
TX-Dallas*	Jun-2007	Feb-2009	611	–7.1%	–11.2%
CO-Denver	Aug-2006	Feb-2009	915	–6.2%	–14.3%

*The price index for Dallas, as of December 2013, exceeded its peak price in February 2009.

Source: S&P/Case-Shiller 20-City Composite Home Price Index, January 2006–December 2013, http://us.spindices.com/indices/real-estate/sp-case-shiller-20-city-composite-home-price-index.

would lose their homes due to their failure to make promised principal and interest payments. Any drop in foreclosures brings the supply of housing closer to demand and thereby slows the decline in housing values.

Impact on Banks and the Banking Environment

A credit crisis affects every individual and business because it ultimately affects the overall U.S. and global economy. Still, the impact varies across institutions and geographic markets. Generally, the problems with mortgage defaults and declining home prices are greatest in geographic markets that experienced the greatest run-up in prices during boom times. These markets are largely those with favorable demographic trends evidenced by rising populations. Areas with slower growth, such as much of middle and rural America, did not experience a housing boom and did not, therefore, experience high rates of foreclosures. Similarly, while many of the largest banks that operate in national and international markets realized large losses from the problem mortgage assets, smaller banks operating only in local markets generally did not. These smaller banks typically target loans to small businesses, individuals, and the agricultural industry and hold these loans in portfolio. Consequently, they largely avoided the problems faced by the largest institutions: subprime mortgages, private-label mortgage backed securities, loans to private equity firms involved in leveraged buyouts, credit default swaps, and speculative real estate loans. However, many small banks took significant losses on commercial real estate loans and some were forced to write down investments in preferred stock issued by Fannie Mae and Freddie Mac.[5]

One result of the financial crisis was a dramatic change in the structure and operations of U.S. banks. By the end of the TARP implementation, the federal government owned stock in many U.S. firms. The nature of competing firms also changed substantially. At the beginning of 2008, the United States was home to five of the largest global investment banks: Bear Stearns, Goldman Sachs, Lehman Brothers, Merrill Lynch, and Morgan Stanley. By the end of the year, only Goldman Sachs and Morgan Stanley were independent—and they had converted to BHCs (actually *financial holding companies*, which are discussed later in the chapter). Similarly, the TARP program continues to reduce the number of independent commercial banks as it encourages consolidation for the banks with TARP preferred stock outstanding. The federal government's bailout of AIG further demonstrated how federal assistance was provided to large insurance companies, as well as to automakers, including General Motors and Chrysler, and Ford, and firms such as GE. Not surprisingly, the federal government has been accused of choosing "winners" and "losers" in this context throughout the financial crisis.

Many individuals who did not speculate on housing during the early 2000s argued against the federal government bailout of Wall Street speculators at taxpayer expense. From August 2007 through April 2010, the Federal Reserve provided direct loans, guarantees, and lines of credit to a variety of financial institutions exceeding $1 trillion, which Bloomberg estimated provided $13 billion in income to the recipients.[6] When the federal government put Fannie Mae and Freddie Mac into conservatorship, it added over $5 trillion to debts for which taxpayers were responsible. Where does the financing come from? Clearly, the financial burden will be borne by future generations in the form of higher interest rates on Treasury borrowing and ultimately higher taxes.

The global impact is also significant. When foreign governments and policymakers examined U.S. actions, they saw large budget deficits, large trade deficits, failing financial institutions, and uncertainty about the value of the dollar. Asset write-downs and loan charge-offs in the U.S. led to similar problems in other countries with the fortunes of all inevitably linked. In late 2008, the governments of Great Britain, Germany, and Iceland purchased stock in large financial institutions in their home countries and frequently guaranteed these same firms' debt. Unfortunately, these guarantees forced the government of Iceland to effectively go bankrupt in October 2008, because it was unable to pay off its debts. These circumstances were repeated in many other countries as problem loans produced significant losses and declining bank capital.

This chapter analyzes the operations of banks and compares them generally with those of other financial services firms. It describes how banks differ in terms of the geographic and product markets in which they operate and in terms of their customer focus and delivery channels for offering financial services. In doing so, it examines different banking business models that reflect different ownership structures and market strategies.

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[5] Fannie Mae and Freddie Mac were GSEs that carried Aaa ratings because the federal government was perceived (incorrectly) to guarantee dividend and interest payments on their preferred stock. As noted, Fannie Mae and Freddie Mac are now under conservatorship of the federal government.

[6] See Ivry, Bob, Bradley Keoun, and Phil Kuntz, "Secret Fed Loans Gave Banks $13 Billion Undisclosed to Congress," November 27, 2011, www.bloomberg.com/news/2011-11-28.

How Do Banks Differ?

For many years, the United States has had a multi-tiered commercial banking system including global banks, super-regional banks, and community banks. The biggest firms, such as Bank of America, Citigroup, and JPMorgan Chase, represent global institutions with a wide array of products and services for government, business, and individual customers. They effectively combine commercial and investment banking and often offer a wide range of insurance and other financial services as well. Super-regional banks are smaller in size and market penetration, but have extensive operations in specific regions of the country. These banks generally have limited global operations and offer fewer nontraditional banking services. While they may do some investment banking, they typically target niche markets. Within this group, Wells Fargo, PNC, and U.S. Bancorp are among the dominant players today. The final tier consists of banks that operate in limited geographic markets within the United States. Some of these banks, such as BB&T and, offer many different types of financial products and services and are expanding across the United States and have every intent to become national banks. Others are much smaller and generally compete in limited trade areas, such as the same state or county. This latter group is commonly labeled community banks and are typically much smaller in size. In general, community banks focus on lending to small commercial businesses, individuals, and firms involved in agriculture. They grow at modest rates such that the bulk of their funding comes from deposits held by the same businesses and individuals. Community banks focus on the importance of relationships between bank employees, customers, and shareholders. In fact, many community banks have a strong linkage between owners, managers, and employees because they operate as S Corporations or mutuals and allow employee ownership via employee stock ownership plans (ESOPs).[7] Finally, most community banks emphasize that they make decisions locally such that customers do not have to wait for someone located out of market to make the final decision regarding whether or not a loan is made.

The recent credit crisis has sharply altered the banking landscape. Many regulators and analysts expect the number of independent banking organizations to fall sharply given the loan problems associated with subprime and other mortgages and commercial real estate. Among the largest institutions, the U.S. no longer has any "pure" (large) investment banks. Bear Stearns and Lehman Brothers effectively failed; Merrill Lynch was sold to Bank of America, and both Goldman Sachs and Morgan Stanley converted to BHCs. Chapter 17 documents how similar events occurred globally as foreign governments bought stock in (bailed out) the largest banks in their home countries and saw others merge. Clearly, banking assets are increasingly concentrated in fewer distinct organizations.

Trends in the Structure of U.S. Banks

During the past 20 years, the number of distinct U.S. banking organizations has declined. The banking industry has consolidated as managers seek economies of scale and scope and use technology to offer products and services to a wide range of customers across different geographic markets. Exhibits 1.2 and 1.3 document changes in the number of FDIC-insured banking organizations and the assets under their control. The FDIC insures commercial bank deposits and serves as one of the major bank regulatory organizations. An independent bank is one that operates as a single organization that accepts deposits and makes loans. It is not organized as part of a holding company and typically

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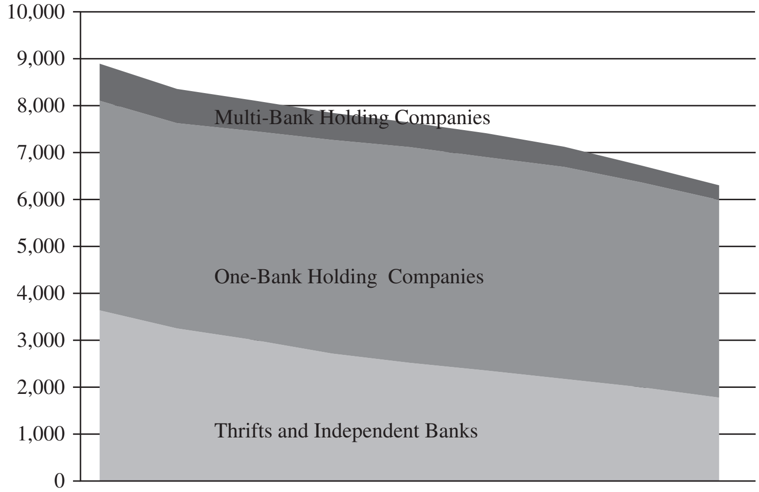
[7] Koch (2014) provides a detailed description of community banks and their operations and presents strategies they should follow to thrive in the future.

EXHIBIT 1.2 **Number of FDIC-Insured Banking Organizations 1997–2013**



	Dec-97	Dec-99	Dec-01	Dec-03	Dec-05	Dec-07	Dec-09	Dec-11	Dec-13
Multi-Bank Holding Companies	789	731	652	576	524	509	429	359	312
One-Bank Holding Companies	4,468	4,372	4,449	4,551	4,597	4,547	4,517	4,364	4,210
Thrifts and Independent Banks	3,636	3,253	3,005	2,717	2,520	2,354	2,176	1,998	1,779

*Includes thrifts owned by unitary thrift holding companies or multi-thrift holding companies.

Source: FDIC Quarterly Banking Profile, Fourth Quarter 2013, www.fdic.gov.

offers services in a limited geographic market, such as a city or county, and thus is generally small compared with other financial services companies. At the end of 2013, the U.S. had 1,779 independent banks and thrifts in operation. Thrifts are firms regulated by the OCC and were initially organized to emphasize mortgage lending to individuals. The exhibits demonstrate that more firms operate as one-bank holding companies and that multi-bank holding companies control the majority of the banking system's assets.

Bank Holding Companies. A bank holding company is essentially a shell organization that owns and manages subsidiary firms. Any organization that owns controlling interest in one or more commercial banks is a **bank holding company (BHC)**.[8] Control is defined as ownership or indirect control via the power to vote more than 25 percent of the voting shares in a bank. Prior to the enactment of interstate branching, the primary motivation behind forming a BHC was to circumvent restrictions regarding branching and the products and services that banks could offer. Today, the primary motives are to minimize costs and broaden the scope of products the bank can offer. The holding company obtains financing from stockholders and creditors and uses the proceeds to buy stock in other companies, make loans, and purchase securities. The holding company is labeled the

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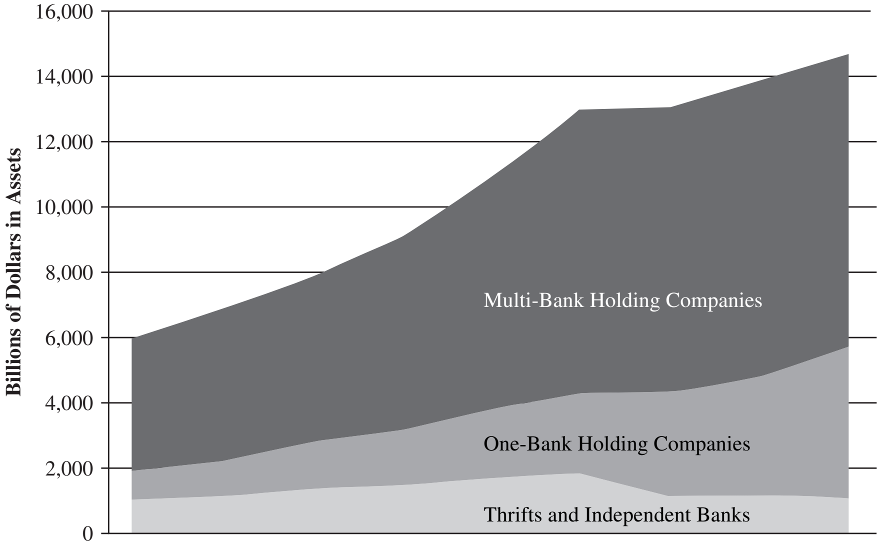
[8] A BHC does not have to be a financial services holding company as defined by federal legislation. See the description of financial services holding companies that follows.

EXHIBIT 1.3 **Asset of FDIC-Insured Banking Organizations 1997–2013**



	Dec-97	Dec-99	Dec-01	Dec-03	Dec-05	Dec-07	Dec-09	Dec-11	Dec-13
Multi-Bank Holding Companies	4,062	4,642	5,063	5,873	7,053	8,719	8,732	9,062	8,979
One-Bank Holding Companies	907	1,070	1,374	1,694	2,056	2,409	3,173	3,600	4,604
Thrifts and Independent Banks	1,075	1,172	1,433	1,508	1,771	1,907	1,182	1,230	1,140

Includes thrifts owned by unitary thrift holding companies or multi-thrift holding companies.

Source: FDIC Quarterly Banking Profile, Fourth Quarter 2013, www.fdic.gov.

parent organization and the operating entities are the *subsidiaries.* If the parent owns at least 80 percent of a subsidiary's stock, it files a consolidated tax return.

One-bank holding companies (OBHCs) control only one bank and typically arise when the owners of an existing bank exchange their shares for stock in the holding company. The holding company then acquires the original bank stock. *Multi-bank holding companies (MBHCs)* control at least two commercial banks. Large organizations generally form OBHCs or group a number of independent banks in an MBHC because they want to control a bank and provide traditional banking services. More importantly, many of these organizations want to combine the bank's capabilities with the financial activities of their nonbank subsidiaries in order to better compete nationwide.

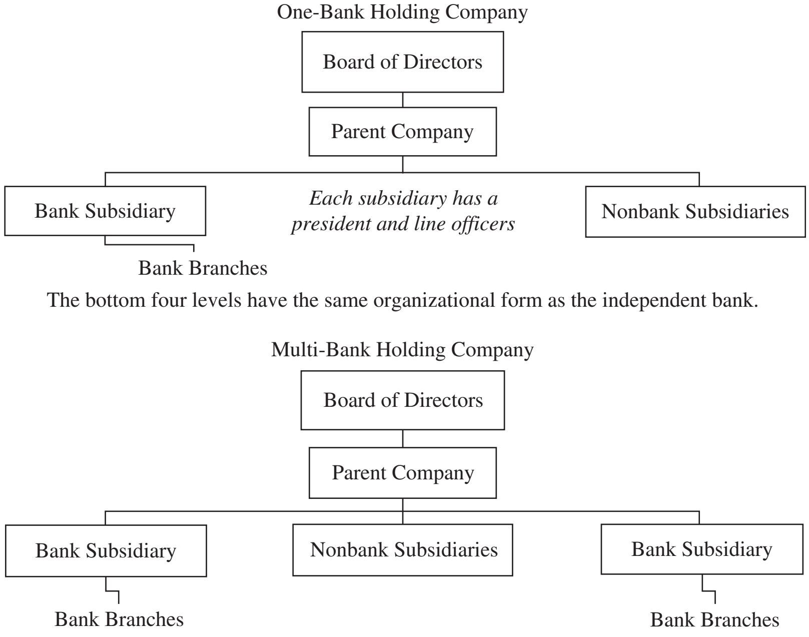
Exhibits 1.2 and 1.3 demonstrate that over 4,200 OBHCs operated in the U.S. at year-end 2013 and controlled more than $4.6 trillion in assets—or roughly $1.1 billion per holding company. The MBHC structure differs slightly. The substantive difference is that the parent corporation owns more than one commercial bank subsidiary. Prior to the advent of interstate banking, this enabled the banking organization to compete in different geographic markets. Even within this structure, operating styles may vary. Some MBHCs operate as closely knit units with the management of each subsidiary bank reporting daily to key personnel either at the lead bank or the parent company. In this case, the subsidiaries are effectively branches. Important decisions must be approved by authorities outside the local community, so that local bank officers have only limited autonomy. Local bank loan officers, for example, might have to get all loans over $100,000 approved by a regional holding company credit officer located in a different community who oversees all lending decisions. This process has the advantage of guaranteeing uniformity in loan decisions. It also has disadvantages related to perceptions that local authorities have limited powers. Decisions are too often delayed and subsequently relayed to customers too late. Not surprisingly, well-run community banks play on their local autonomy and "special" community focus.

Other MBHCs allow managers of subsidiary banks to retain key decision-making authority and essentially operate quasi-independently as long as performance is strong. It is more difficult for these firms to realize economies of scale—consider the inability to run a single marketing and advertising program—and thus some of the benefits of size are lost. The advantage, however, is that such banks typically retain close ties to their communities and realize the associated benefits. Exhibits 1.2 and 1.3 show that there were fewer than 312 MBHCs in December 2013, but these organizations controlled almost $9 trillion, or 61 percent, of the commercial banking system's assets.

Exhibit 1.4 outlines the simple organizational structure of both an OBHC and an MBHC. Consider first the OBHC. At the top is the board of directors for the parent organization that owns controlling interest in the subsidiaries. This board operates much like the board for an independent bank, except that its responsibilities now extend to all lines of business in which the entire organization is involved. In an OBHC, the subsidiary bank normally operates like an independent bank. The only difference is that business decisions must now be reconciled with the objectives and decisions associated with the nonbank subsidiaries. Bank officers are represented on the board, as are officers of the nonbank subsidiaries. In general, nonbank firms have fewer senior officers than banks.

The Bank Holding Company Act of 1956 assigned regulatory responsibility to the Federal Reserve for these companies, while leaving the supervision of banks within

EXHIBIT 1.4 Organizational Structure of Bank Holding Companies


One-Bank Holding Company

The bottom four levels have the same organizational form as the independent bank.

Multi-Bank Holding Company

holding companies in the hands of their traditional regulators. The Gramm–Leach–Bliley Act also gave regulatory responsibility over *financial holding companies (FHCs)* to the Federal Reserve. Like commercial banks, BHCs are heavily regulated by states and the federal government. The Bank Holding Company Act stipulates that the Board of Governors of the Federal Reserve System must approve all holding company formations and acquisitions. Approval is normally granted unless there is evidence that the acquisition will substantially lessen competition in the local banking market. The Federal Reserve examines ownership or control of less than 25 percent on a case-by-case basis to determine whether effective control exists.

Under current regulation, BHCs can acquire nonbank subsidiaries that offer products and services closely related to banking. This presumably limits speculation and thus overall risk. Many insurance companies, finance companies, and general retail firms have formed OBHCs to operate banks as part of their financial services efforts.

Financial Holding Companies. The Glass–Steagall Act effectively separated commercial banking from investment banking. However, it left open the possibility of banks engaging in investment banking activities through a Section 20 affiliate so long as the bank was not "principally engaged" in these activities. In 1987, commercial banks received permission from the Federal Reserve to underwrite and deal in securities, and five banks quickly set up the necessary Section 20 subsidiaries. The Fed resolved the issue of "principally engaged" initially by allowing banks to earn only 5 percent of the revenue in their securities affiliates, which increased to 10 percent in 1989 and 25 percent in 1997. Pursuant to the Securities Act of 1933 and the Securities Exchange Act of 1934, these so-called Section 20 subsidiaries were required to register with the SEC as broker-dealers and are subject to all the rules applicable to broker-dealers. Transactions between insured depository institutions and their Section 20 affiliates are restricted by the Federal Reserve Act.

The Gramm–Leach–Bliley Act of 1999 repealed the restrictions on banks affiliating with securities firms under the Glass–Steagall Act and allowed affiliations between banks and insurance underwriters. While preserving the authority of states to regulate insurance, the act prohibited state actions that have the effect of preventing bank-affiliated firms from selling insurance on an equal basis with other insurance agents. The law created a new financial holding company that was authorized to engage in underwriting and selling insurance and securities, conducting both commercial and merchant banking, investing in and developing real estate, and performing other "complementary activities."

Financial holding companies (FHCs) are distinct entities from BHCs. A company can form a BHC, an FHC, or both. The primary advantage to forming an FHC is that the entity can engage in a wide range of financial activities not permitted in the bank or in a BHC. Some of these activities include insurance and securities underwriting and agency activities, merchant banking, and insurance company portfolio investment activities. Activities that are "complementary" to financial activities also are authorized. The primary disadvantage to forming an FHC, or converting a BHC to an FHC, is that the Fed may not permit a company to form an FHC if any one of its insured depository institution subsidiaries is not well capitalized or well managed, or did not receive at least a satisfactory rating in its most recent Community Reinvestment Act (CRA) exam.[9] Most importantly, if any one of the insured depository institutions or affiliates of an FHC received less than a satisfactory rating in its most recent CRA exam, the

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[9] The U.S. Congress enacted the Community Reinvestment Act in 1977 to help ensure that lenders made credit available in the same communities, or trade areas, in which they conduct other business, such as deposit collection.

appropriate federal banking agency may not approve any additional new activities or acquisitions under the authorities granted under the act.

An FHC can own a bank or BHC or a thrift or thrift holding company. Each of these companies owns subsidiaries, while the parent financial holding company also owns other subsidiaries directly. The structure is similar to that of a BHC's relationship to its subsidiaries but there is one more layer of management and thus control. As commercial banks consolidate with other financial institutions, both domestically and abroad, this type of organization is expected to become more prevalent. Alternatively, we may see nonfinancial companies affiliate with banks in this type of structure. Exhibit 1.5 demonstrates a general form of an FHC in which a BHC and thrift holding company are owned by an FHC. Each of these holding companies owns subsidiaries, while the parent FHC also owns subsidiaries.

The specific organizational form, permissible activities, and stream of cash flows between a holding company and its subsidiaries are described in the following sections. Subsequent sections document regulatory restrictions regarding bank products offered, geographic markets served, and pricing.

Holding Company Financial Statements. MBHC expansion enables banks to diversify their operations by competing in different geographic and product markets. Diversification reduces the risk of failure by stabilizing earnings. The parent company typically coordinates the operating strategies for the entire organization and provides services for which it charges fees. It assists bank subsidiaries in asset and liability management, loan review, data processing, and business development and may provide debt and equity funding. It also provides strategic planning, project analysis, and financing for nonbank subsidiaries.

The consolidated financial statements of a holding company and its subsidiaries reflect aggregate or consolidate performance. Exhibits 1.6 and 1.7 contain the consolidated balance sheet and income statement for Citigroup and its bank and nonbank subsidiaries. The parent, Citigroup, is a financial holding company that owns many bank and nonbank subsidiaries and holding companies. The consolidated balance sheet represents the aggregate ownership of the individual assets of the subsidiaries, while the income statement is a compilation of income and expense sources of Citigroup and its subsidiaries. The primary asset holdings are loans and investments plus trading account assets. Loans are made to businesses, foreign governments, and individuals, while

EXHIBIT 1.5 Organizational Structure of Financial Holding Company

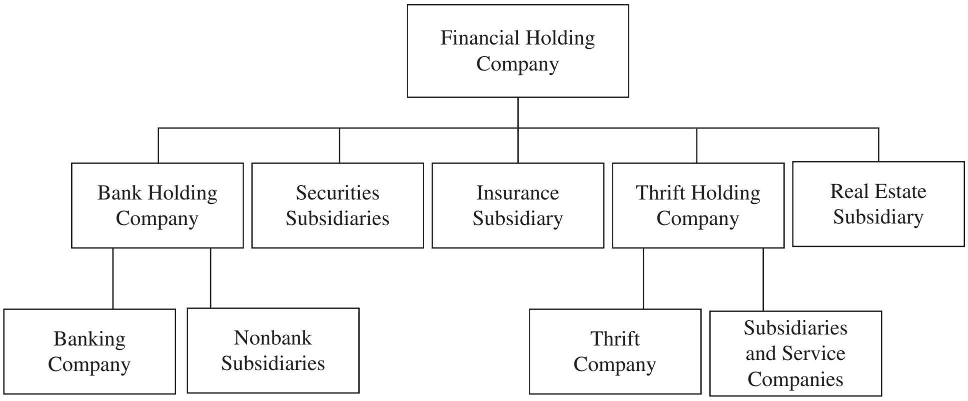


EXHIBIT 1.6 **Consolidated Balance Sheet: Citigroup and Subsidiaries ($ millions)**

	December 31, 2012	December 31, 2013
Assets		
Cash and due from banks (including segregated cash and other deposits)	$ 36,453	$ 29,885
Deposits with banks	102,134	169,005
Fed funds sold and securities borr'd or purch under agree. to resell	261,311	257,037
Brokerage receivables	22,490	25,674
Trading account assets	320,929	285,928
Total Investments	312,326	308,980
Loans, net of unearned income		
Consumer	408,671	393,831
Corporate	246,793	271,641
Allowance for loan losses	(25,455)	(19,648)
Total loans, net	630,009	645,824
Goodwill and other intangible assets (other than MSRs)	31,370	30,065
Mortgage servicing rights (MSRs)	1,942	2,718
Other assets	145,696	125,266
Total assets	**$ 1,864,660**	**$ 1,880,382**
Liabilities		
Noninterest-bearing deposits in U.S. offices	$ 129,657	$ 128,399
Interest-bearing deposits in U.S. offices	247,716	284,164
Total U.S. Deposits	377,373	412,563
Noninterest-bearing deposits in offices outside the United States	65,024	69,406
Interest-bearing deposits in offices outside the United States	488,163	486,304
Total International Deposits	553,187	555,710
Total deposits	930,560	968,273
Fed funds purch and securities loaned or sold under agree. to repurch.	211,236	203,512
Brokerage payables	57,013	53,707
Trading account liabilities	115,549	108,762
Short-term borrowings	52,027	58,944
Long-term debt	239,463	221,116
Other liabilities (2)	67,815	59,935
Total liabilities	**$ 1,673,663**	**$ 1,674,249**
Equity		
Stockholders equity		
Preferred stock	$ 2,562	$ 6,738
All common stock, paid-in capital and retained earnings	204,230	218,392
Treasury stock	(847)	(1,658)
Accumulated other comprehensive income (loss)	(16,896)	(19,133)
Total common equity	**$ 186,487**	**$ 197,601**
Total Citigroup Stockholders equity	**$ 189,049**	**$ 204,339**
Noncontrolling interests	1,948	1,794
Total equity	**190,997**	**206,133**
Total liabilities and equity	**$ 1,864,660**	**$ 1,880,382**

Source: Citigroup Annual Report 2013.

EXHIBIT 1.7 **Consolidated Statement of Income: Citigroup and Subsidiaries ($ millions)**

	Full Year 2012	Full Year 2013
Revenues		
Interest revenue	$ 67,298	$ 62,970
Interest expense	20,612	16,177
Net interest revenue	46,686	46,793
Commissions and fees	12,732	13,113
Principal transactions	4,781	7,121
Administrative and other fiduciary fees	4,012	4,089
Realized gains (losses) on investments	3,251	748
Other-than-temporary impairment losses on investments and other assets (1)	(4,971)	(535)
Insurance premiums	2,395	2,280
Other revenue (2)	242	2,757
Total noninterest revenues	22,442	29,573
Total revenues, net of interest expense	**69,128**	**76,366**
Provisions for Credit Losses and for Benefits and Claims		
Net credit losses	14,231	10,463
Credit reserve build/(release)	(3,773)	(2,859)
Provision for loan losses	10,458	7,604
Policyholder benefits and claims	887	830
Provision for unfunded lending commitments	(16)	80
Total provisions for credit losses and for benefits and claims	11,329	8,514
Operating Expenses		
Compensation and benefits	25,119	23,967
Premises and Equipment	3,266	3,165
Technology/communication expense	5,829	6,136
Advertising and marketing expense	2,164	1,888
Other operating	13,596	13,199
Total operating expenses	49,974	48,355
Income from Continuing Operations before Income Taxes	7,825	19,497
Provision (benefits) for income taxes	7	5,867
Income from Continuing Operations	**7,818**	**13,630**
Discontinued Operations (3)		
Income (Loss) from Discontinued Operations	(109)	(242)
Gain (Loss) on Sale	(1)	268
Provision (benefits) for income taxes	(52)	(244)
Income (Loss) from Discontinued Operations, net of taxes	(58)	270
Net Income before Noncontrolling Interests	**7,760**	**13,900**
Net Income attributable to noncontrolling interests	219	227
Citigroup's Net Income	**$ 7,541**	**$ 13,673**

Source: Citigroup Annual Report 2013 investments include government, corporate, foreign, and municipal bonds. At the end of 2013, Citigroup also owned a significant amount of trading account assets, which are generally securities, commodities and other assets held for short periods of time for speculative purposes. The firm's objective is to profit from selling the assets—securities, currencies, etc.— at higher prices than those originally paid. The primary liabilities are deposits and short-term borrowings. Equity capital represents the other principal source of funding. Exhibit 1.7 documents the typical revenue stream for banks, which includes interest revenue net of interest expense and noninterest (fee) income. Operating expenses for people and facilities costs represent the bulk of noninterest expense. Chapter 3 presents a detailed discussion of bank revenue and expense items.

In practice, the parent company (Citigroup) acts as a clearing company with a relatively simple balance sheet consisting of loans and equity investments financed by debt and equity. In addition to managing the overall operations, the parent will purchase loans (investments and advances) from a bank subsidiary (Citibank) when a credit exceeds the maximum legal loan size permitted a single member bank. These loan participations may be distributed to other banks in the holding company or kept by the parent. Finally, the parent advances funds to subsidiaries through the purchase of notes and receivables or equity. The equity investment represents the value of subsidiary stock at the time of purchase. These assets are financed by short-term debt, long-term debt, and BHC stockholders.

While the consolidated financial statements of a holding company and its subsidiaries reflect aggregate performance, it is useful to examine the parent company's statements alone. Exhibit 1.8 contains the *parent company only* income statement. Note that the net income figure is the same as that of Exhibit 1.7, but the information is presented from the parent's ownership view. The parent's (Citigroup) net income is derived from dividends, interest, management fees from equity in bank and nonbank subsidiaries in excess of operating expenses, interest paid on holding company debt, and other revenues. The parent company also reports equity in undistributed income of subsidiaries. Accounting requires the parent company to declare, as income, the unrealized gains in the equity of a consolidated subsidiary regardless of whether the income is actually paid (distributed) to the parent. In 2013, Citigroup's net income of just $13.6 billion was relatively small for the institution's size and came primarily from dividends from subsidiaries.

The parent typically pays very little in income tax (Citigroup actually received a tax benefit), because 80 percent of the dividends from subsidiaries is exempt. Taxable income from the remaining 20 percent of dividends and interest income is small relative to revenue and deductible expenses. Under IRS provisions, each subsidiary actually pays taxes quarterly on its taxable income. With a consolidated tax return, however, the parent company can use taxable income from its subsidiaries to offset its loss. Thus, the parent could report a noncash tax benefit representing the reclamation of tax overpayments by subsidiaries.

Organizational Structure

Banks obviously differ in their basic organizational structure as well as in the lines of business that they enter. Independent banks have less flexibility compared with BHCs. Even BHCs differ in terms of the number of banks under the holding company umbrella and in terms of the number and breadth of activities engaged in by their nonbank subsidiaries. Some banks have chosen to emphasize the nontraditional banking components along with their banking operations. BB&T, for example, has entered the insurance business aggressively and now has one of the largest insurance operations of any type of

EXHIBIT 1.8 Condensed Consolidating Statement of Income for Citigroup's Parent Company: 2013

In millions of dollars	Citigroup parent company
Operating Income	
Income from bank subsidiaries and associated banks, excluding equity in undistributed income	
Dividends	$ 0
Interest revenue	93
Management and service fees	0
Other	–3,199
Total	–3,106
Income from nonbank subsidiaries and associated banks, excluding equity in undistributed income	
Dividends	844
Interest revenue	2,914
Management and service fees	0
Other	–176
Total	3,582
Income from subsidiary holding companies and associated holding companies, excluding equity in undistributed income	
Dividends	12,200
Interest revenue	214
Management and service fees	0
Other	0
Total	12,414
Securities gains/(losses)	–17
All other operating income	3,907
Total operating income	16,780
Operating Expenses	
Salaries and employee benefits	187
Interest expense	5,623
Provision for loan and lease losses	0
All other expenses	963
Total operating expenses	6,773
Income (loss) before taxes and undistributed income	10,007
Applicable income taxes	–1,637
Extraordinary items, net of tax effect	0
Income (loss) before undisturbed income of subsidiaries and associated companies	11,644
Equity in undistributed income (losses) of subsidiaries and associated companies	
Bank	0
Nonbank	–15
Subsidiary holding companies	2,044
Net income (loss)	$13,673

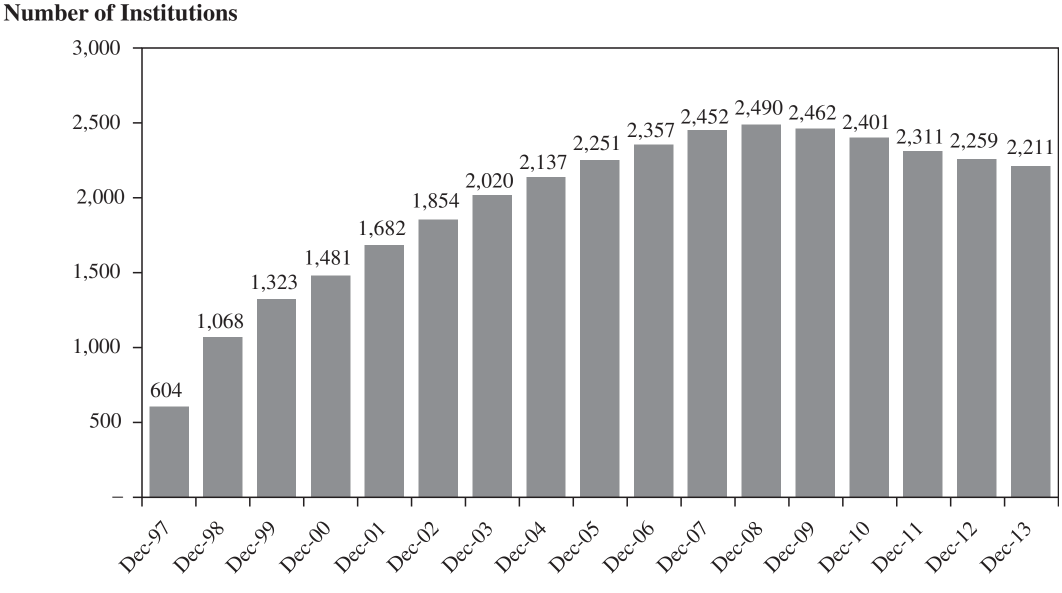
Source: FFIEC, Bank Holding Company Reports, http://www.ffiec.gov/nicpubweb/nicweb/Top50Form.aspx financial services company. Mutual of Omaha and State Farm, two traditional insurance companies, have each decided to enter the commercial banking business by buying and operating midsized banks with the intention of growing their commercial banking business.

S Corporation Banks

Banks also differ in terms of their federal income tax treatment. In 1997, the U.S. Congress passed legislation that allowed commercial banks that met fairly restrictive criteria to choose to operate as S Corporations (S Corps) for income tax purposes. In contrast with C Corporations (C Corps), S Corps have favorable tax treatment, because a qualifying firm does not pay corporate income tax. The firm allocates income to shareholders on a pro rata (percentage of ownership) basis, and each individual owner pays tax at personal tax rates on the income allocated to them. The primary limitation to qualifying for S Corp status is a requirement that the underlying bank must have no more than 100 shareholders.[10] Given the opportunity to avoid double taxation at the firm and individual level, many closely held banks have chosen S Corp status. Exhibit 1.9 documents that 2,211 banks filed taxes as S Corps at year-end 2013.

Cyree, Hein, and Koch (2014) document that a commercial bank's choice of S or C Corp status affects operating performance and management's risk tolerance. As demonstrated in Chapter 3, the avoidance of corporate income taxes improves a firm's overall profitability because S Corp banks do not pay federal income taxes. With the limited number of shareholders, S Corps often have ownership that is concentrated within a

EXHIBIT 1.9 **Number of Subchapter S Corps 1997–2013**



Source: FDIC Quarterly Banking Profile, Fourth Quarter 2013, www.fdic.gov.

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[10] Current stipulations are generous because they allow family members to constitute one shareholder.

family or a small group of investors, such as bank managers, directors, and employees. Concentrated ownership may, in turn, reduce agency problems and subsequently improve risk management practices. With a limit on the number of shareholders, S Corps are generally smaller in terms of asset size and market value than their C Corp counterparts.[11] Managers are more likely owners and may monitor risks more closely. The closer monitoring may lead to greater operating profits, ceteris paribus. The essential point is that one cannot compare the performance of S Corp banks with C Corp banks in aggregate financial terms.

Financial Services Business Models

What constitutes a bank varies across countries. The early definition within the U.S. for regulatory purposes stipulated that a commercial bank was an entity that both accepted demand (noninterest-bearing) deposits and made loans to businesses. A firm that did only one of these or none of these avoided regulation as a bank. The principal advantage of being a depository institution (commercial bank, savings bank, or credit union) has long been access to FDIC deposit insurance (credit unions are insured by the National Credit Union Association [NCUA]). In response to the financial crisis, Congress increased deposit insurance to $250,000 per account for both the FDIC and NCUA. Banks that joined the FDIC's Temporary Liquidity Guarantee Program could also purchase unlimited deposit insurance for noninterest-bearing transactions accounts.

The FDIC charges banks a premium for the insurance, which ensures qualifying deposit holders that the FDIC will guarantee the principal amount of each deposit up to the maximum allowed. Thus, if a bank fails, the government will pay the deposit holder.[12] Since the introduction of FDIC deposit insurance, no depositor has realized a loss on insured deposits. The existence of deposit insurance allows depository institutions to pay low rates on insured deposits and ensures that such deposits are relatively stable in times of crisis. This value was demonstrated in October 2008 when Goldman Sachs, Morgan Stanley, and American Express chose to become BHCs. These conversions gave the firms immediate access to the Federal Reserve's discount window (emergency) borrowing and enabled them to pursue a longer-term strategy of increasing their funding via insured deposits.

The primary disadvantage of operating as a bank (or BHC) is that the firm is subject to regulation as a bank. Access to deposit insurance necessitates federal government monitoring of a bank's operations to ensure that management does not assume excessive risk. Banks are subject to safety and soundness exams, which address whether banks are effectively managing their risks, as well as compliance exams, which address whether the firms are appropriately serving customers. Prior to 2008, investment banks avoided regulation as banks, which allowed them to operate with substantially lower equity capital per dollar of risk assets and enter lines of business not generally available to commercial banks. The combined effect was greater financial leverage and business operations in many high-risk areas such as proprietary trading. Thus, prior to becoming BHCs, U.S. investment banks had substantially different balance sheets and income statements compared with even the largest commercial banks.

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[11] Berle and Means (1932), Jensen and Meckling (1976), and subsequent researchers note that concentrated ownership mitigates the negative consequences associated with the separation of firm ownership from control.

[12] In practice, bank regulators typically find a healthy bank that assumes the deposit liabilities of a failed bank such that insured deposits are transferred to the acquiring bank. The FDIC then pays uninsured depositors a fraction of their uninsured balance on the basis of the liquidation or sale value of the failed bank's net assets.

Transactions Banking versus Relationship Business Models

One of the primary reasons that banks exist is the fact that it is costly to bring depositors and borrowers together. Neither borrowers nor lenders have sufficient independent information about the riskiness of the opposite party participating in a loan transaction; therefore, a bank, as an intermediary, can play a role in mitigating the lack of precise information. Banks thus facilitate transactions by reducing costs and increasing the amount of information available. This banking function serves as the first differentiator between basic models underlying the conduct of banking business. If the primary function of an intermediary is to gather, analyze, and disseminate information, large institutions that can realize economies of scale and scope are better equipped to reduce the associated costs than smaller institutions are. They may also have better access to valuable information because of their broader market penetration. Consequently, they may be better able to facilitate transactions and do so at a lower average (and marginal) cost.

If larger banks can offer banking services at lower cost, why do so many community banks exist and perform well, at least historically? One common explanation is that large banks emphasize transactions banking while smaller banks focus on relationship banking.[13] **Transactions banking** involves the provision of transactions services such as checking accounts, credit card loans, and mortgage loans that occur with high frequency and exhibit standardized features. Because the products are highly standardized, they can be critiqued mechanically and require little human input to manage. For example, the decision to make a credit card loan is typically based on an individual's credit score. This score reflects the individual's personal financial condition (income, debt outstanding, record of on-time and late loan payments, etc.) and can be readily used to grade the riskiness of the borrower. If the credit-scoring model is reasonably good, the scores will accurately forecast losses on the credit card loans. Lenders that generate sufficient volumes of transactions for these standardized products can offer them globally with limited investment in human capital. Thus, the transactions model encourages the use of technology to offer standardized products at prices low enough to discourage small firms from offering the same products. Banks that emphasize transactions banking are generally large and compete across extensive geographic and product markets. Importantly, assets with standardized features can be securitized if the loan originator and rating agencies can successfully assess the underlying credit risk. The process of securitization is described later in the chapter.

Relationship banking, as the label suggests, emphasizes the personal relationship between the banker and customer. For example, the key feature of a loan that is relationship driven and not transactions driven is that the lender adds real value to the borrower during the credit granting process. In addition to the provision of funds, the lender may provide expertise in accounting, business, and tax planning. Many smaller companies' financial statements are not standardized, and management lacks the financial expertise needed to borrow directly (issue bonds) in the financial markets. Loans to these firms are more difficult to credit score because they are not standardized. Generally, the lender is personally familiar with the individuals and/or business who are requesting the loan and is also directly familiar with the property or equipment being financed or the purpose behind other uses of proceeds. With relationship loans, lending institutions generally charge higher rates and often hold the loans in portfolio. They also aggressively market noncredit products and services to such customers in order to lock in the relationship.

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[13] Sharpe (1990), Diamond (1991), and Rajan (1992) emphasize this distinction. Hein, Koch, and MacDonald (2005) describe the underpinnings of transactions banking versus relationship banking and provide data to support the "uniqueness" of community banks along the relationship dimension.

The familiarity between borrower and lender and the convenience of completing transactions without beginning the information search anew encourages both the bank and customer to maintain the relationship over time.[14] Borrowers will pay for the assurance that funds will be advanced as they are needed with minimal repetitive negotiations. They want decisions to be made locally. Individuals who work in the banking industry know that customers often follow their favorite banker, either a lender or customer service representative, when the banker moves to a new bank after an acquisition or job change. The customer feels comfortable with the existing relationship and does not want to educate a new banker about his or her firm or individual financial condition.

Transactions banking is not necessarily a substitute for relationship banking and vice versa, and neither model is inherently better. It is natural that the largest banks emphasize transactions in many lines of business. Consider the data for Citigroup in Exhibit 1.6. At the end of 2013, Citigroup had almost $1.9 trillion in assets. What impact will a new $4 million loan have on the bank's net income going forward? The bank can better justify making such a "small" loan if it can credit score the loan and thus not dedicate much in human capital to the transaction. Increased size leads toward a lesser focus on relationships and greater focus on the volume of transactions.

Recent events, however, have demonstrated a serious flaw in one aspect of the transactions banking model. One of the appealing features of the transactions model is a firm's ability to securitize the underlying assets created. **Securitization** refers to the process of pooling a group of assets with similar features—for example, credit card loans or mortgages—and issuing securities that are collateralized by the assets. An investment bank or similar entity, such as Fannie Mae or Freddie Mac, issues securities with the cash flows from the assets pledged to make the debt service payments. The securities are sold to investors who receive the cash flows from the loans net of servicing, guarantee, and trust fees. The entire process adds liquidity to the market, because the loan originators regularly repeat the process knowing that investors will demand the securities.

The recent credit crisis demonstrated that this **originate-to-distribute (OTD)** approach to lending separated loan origination from ownership. The flaw is that lenders who originated the loans knew they would not own the loans long-term. They were, therefore, less concerned about the quality of the assets originated. Lenders were typically paid according to the volume of loans originated and were not penalized if borrowers defaulted on the loans. In order to grow their business and continue originating loans, lenders increasingly made loans to less qualified borrowers. The rating agencies, such as Moody's, S&P, and Fitch, were effectively partners with the loan originators and security underwriters, because they would not receive any fees without a successful securitization. As such, they applied defective risk assessment models and awarded ratings that proved to be wildly optimistic, making it easier to sell the securities to uninformed investors. When the underlying assets defaulted at higher-than-expected rates, investors in the securities did not receive the promised payments. The net result is that liquidity largely dried up for most securitizations. Large institutions that originated many of the low-quality assets and ended up holding large amounts in their portfolio, were forced to subsequently write down the assets, thereby taking losses that depleted their capital. Banks that focused on relationship banking avoided this problem.

The pursuit of relationship banking does not necessarily generate lower costs. If a bank is truly providing value beyond that of simply providing the customer needed

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[14] In their analysis of community banking, DeYoung, Hunter, and Udell (2004) focus on bankers having access to "soft information" acquired through personal contact with the borrower. The description of relationship banking in the text emphasizes that a lender may be additionally providing real value to the borrower, as well as funds.

funds, the customer will be willing to pay for the service. Community banks that offer relationship banking services are more likely to find profit-making opportunities regardless of their asset size, as competition for these services is likely to be limited. Analysts generally agree that as banks increase in size, such banks increasingly emphasize transactions banking.

Universal Banking

The term universal banking refers to a structure for a financial services company in which the company offers a broad range of financial products and services. Originally centered in Western Europe, universal banks combined traditional commercial banking that focused on loans and deposit gathering with investment banking. Universal banks thus underwrote securities, advised on mergers and acquisitions, managed investment assets for customers, took equity positions in companies, bought and sold assets for a speculative profit, offered brokerage services, and made loans and accepted deposits. The presumed advantage of universal banking is the ability to cross-sell services among customers. Participation in diverse products and services would presumably increase the information advantage and allow the bank to serve customers more efficiently and at better prices.

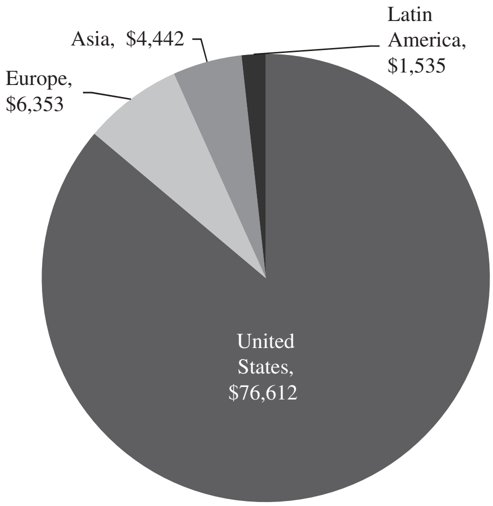
There is no consensus on whether universal banking is successful. The U.S. firms that tried to achieve this goal of a "one-stop financial supermarket" have not outperformed more traditional competitors. In addition to its commercial banking operations, Citigroup once owned Salomon Smith Barney, an investment bank; Travelers, a large insurance company; and Associates Corp., a large finance company—only to eventually sell each of these nonbank subsidiaries because aggregate performance did not improve. Deutsche Bank in Germany has long operated a similar range of businesses with at best only stable performance.

Some large U.S. banking organizations appear to be following the universal banking model. For example, Bank of America and JPMorgan Chase have consistently made acquisitions of firms offering different products and services. In the past few years, Bank of America acquired U.S. Trust, LaSalle Bank, Countrywide Financial, a large mortgage lender, and Merrill Lynch, an investment bank with the greatest number of retail brokers. The latter two acquisitions were distressed sales in 2008, as both Countrywide and Merrill Lynch got into difficulty tied to mortgage defaults, large asset write-downs, and corresponding liquidity problems. JPMorgan Chase acquired Washington Mutual and Bear Stearns during the financial crisis, along with other organizations.

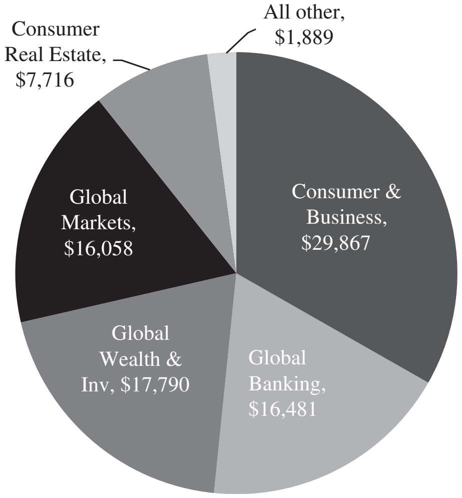
Exhibit 1.10 presents Bank of America's total revenues for four geographic segments (United States, Europe, Asia and Latin America) and five business segments:

- **Consumer & Business Banking (CBB)**
  CBB is comprised of Deposits, Card Services, and Business Banking. This line of business offers a range of credit, banking, and investment products and services to consumers and businesses. The customers and client network reach coast-to-coast with 32 states and the District of Columbia. The network includes approximately 5,500 banking centers, 16,300 ATMs, nationwide call centers, and online and mobile platforms.
- **Consumer Real Estate Services (CRES)**
  CRES operations include Home Loans and Legacy Assets & Servicing. Ongoing loan production activities and the CRES home equity loan portfolio not included in the Legacy Assets & Servicing owned portfolio are the responsibility of Home Loans.

EXHIBIT 1.10 Line of Business Revenue and Profitability for Bank of America in 2013



Total Revenues from Business Segments ($ millions)



Source: 2013 Annual Report, Bank of America.

Legacy Assets & Servicing is responsible for all mortgage servicing activities related to loans serviced for others and loans held by the bank.

- **Global Banking**

  Global Banking includes Global Corporate and Global Commercial Banking, as well as Investment Banking. This segment provides a wide range of lending-related products and services including commercial loans, leases, commitment facilities, trade finance, real estate lending, asset-based lending, and direct/indirect consumer loans.

- **Global Wealth & Investment Management *(GWIM)***

  GWIM consists of two primary businesses: Merrill Lynch Global Wealth Management (MLGWM) and Bank of America Private Wealth Management (U.S. Trust).

MLGWM's advisory business provides a high-touch client experience through a network of financial advisors focused on clients with over $250,000 in total investable assets. MLGWM provides tailored solutions to meet clients' needs through a full set of brokerage, banking, and retirement products.

- **All Other**
  consists of ALM activities, equity investments, liquidating businesses, and other. ALM activities encompass the whole-loan residential mortgage portfolio and investment securities, interest rate and foreign currency risk management activities, including the residual net interest income allocation, gains/losses on structured liabilities, and the impact of certain allocation methodologies and accounting hedge ineffectiveness.

While the vast majority of Bank of America's total revenue is generated inside the United States, almost 14 percent is generated in Europe, Asia, and Latin America. One of its current objectives is to expand its reach outside the U.S. Bank of America generates the largest share of revenue in traditional banking services: CBB (33 percent) and CRES (8.6 percent). Revenues via the Global Wealth and Investment Management areas follow. Traditional commercial banks have historically found competing in the investment banking and wealth management business to be challenging. Recalling our history, commercial banks were not legally allowed to offer investment-banking services in the 1980s. This was a period of rapid growth and expansion in mutual funds and the number of households making direct equity investments in stocks and bonds. By the mid-1990s, commercial banks began offering wealth management services (through Section 20 Glass–Steagall companies), but investment banks and investment companies were already entrenched in wealthy households. The competitive environment made it difficult for commercial banks to break into these markets. Thus, many of the largest institutions began to acquire investment companies to allow them to compete in these markets.

Whether the universal banking model works is still an open question. Critics argue that management cannot successfully operate such widely diverse lines of business in which each has different cultures and methods for compensating key employees. These firms may be Too Complex to Succeed. No universal banking institution either in the U.S. or globally has demonstrated consistently strong performance. The primary benefit may be that such firms become "Too Big to Fail," or TBTF, and thus effectively guarantee their existence in times of crisis. Such perceptions are widely held since the credit crisis of 2007–2009, when the federal government essentially decided which firms would be survivors—that is, which firms were closed or acquired by other institutions with government assistance (Bear Stearns, Lehman Brothers, Washington Mutual, National City, Merrill Lynch, Wachovia), which firms could accept TARP funding, which firms were allowed to issue FDIC-insured debt, and which firms were able to sell assets to or received guarantees from Treasury.

Too Big to Fail Banks

The financial crisis led the Federal Reserve and U.S. Treasury to take unique steps to prevent an economic collapse. As discussed previously, one strategy involved providing emergency credit to institutions that faced serious funding problems. Another involved injecting capital into banks to strengthen their balance sheets. Generally, the institutions that received the greatest loans, guarantees, and equity investments were the nation's largest institutions. At the same time, bank regulators allowed many smaller banking organizations that found themselves in trouble to fail, thereby wiping out stockholders' investments and generating losses to the FDIC insurance fund.

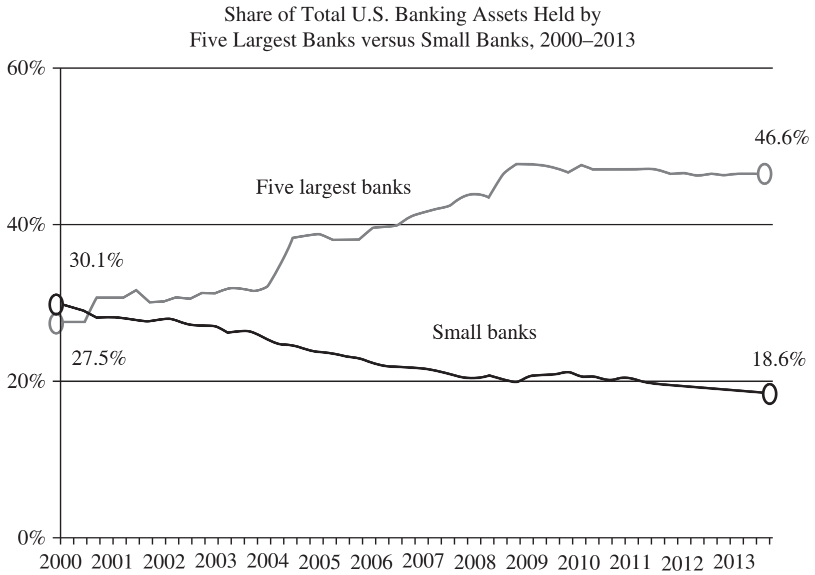
Market participants and analysts quickly labeled the largest firms receiving the greatest and immediate government aid as "Too Big to Fail" or TBTF. Regulators and government officials argued that these firms were too connected to other large firms, and a failure would lead to a collapse of the global financial system and ultimately to a severe global recession. Smaller organizations were presumably less important economically and thus did not receive the same type and amount of assistance. The TBTF label is now viewed as a negative by many analysts and individuals, implying that the federal government decided who would survive and who would fail, and TBTF firms got unfair and undeserved aid. Clearly, stockholders, bondholders and senior managers of TBTF firms have benefited from the treatment.

In 2010, Congress passed the Dodd–Frank Act, which addressed a wide range of problems associated with the financial crisis. Part of the Act attempts to address TBTF institutions by creating a resolution process by which TBTF institutions that get in trouble in the future will be resolved (actually dissolved) by mandatory requirements that stipulate how to liquidate them. Many market participants believe that TBTF firms will never be allowed to fail through anything resembling liquidation.

Since the onset of the financial crisis, the largest banks have captured a greater share of financial assets. Heather Peirce and Robert Greene demonstrate in Exhibit 1.11 that the five largest U.S. banks— JPMorgan Chase, Bank of America, Citibank, U.S. Bank, and Wells Fargo— increased their share of total banking assets from 30.1 percent in 2000 to 46.6 percent in 2013. Banks with less than $10 billion simultaneously reduced their market share of assets from 27.5 percent to 18.6 percent.[15] Even though they are TBTF, they are winning the long-term battle over size by continuing to grow at a rapid rate.

Numerous studies have also argued that TBTF firms continue to have an implicit government guarantee, which produces lower borrowing costs and lower operating costs.

EXHIBIT 1.11



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[15] See Peirce, Hester and Robert Greene, "The Decline of US Small Banks (2000–2013), February 24, 2014, www.mercatus.org/publication/decline-us-small-banks-2000-2013.

For example, a series of research studies published by economists at the Federal Reserve Bank of New York in 2014 concluded that the five largest U.S. banks had a funding advantage of roughly 0.31 percent over smaller organizations through 2009 and similarly had lower operating costs.[16] The Dodd–Frank Act attempts to address this in part by creating a Financial Stability Oversight Council that identifies specific large firms that are systemically important financial institutions (SIFIs) and imposing new requirements and costs on them. These firms, which can be identified online, are deemed to represent a threat to financial stability if they get into financial distress. Presumably, government watchdogs will regularly monitor the performance of SIFIs and impose sanctions as necessary.

Different Channels for Delivering Banking Services

Suppose that you are among a group of individuals who want to start a new (de novo) bank. One of the critical decisions that you will make is which customers your bank will target and how you will deliver banking products and services to them. Today, one of your choices will include offering services in the traditional manner via face-to-face visits between customers and the bank's tellers, customer service representatives, and loan officers either in a bank's home office or branches. Alternatively, you may offer many of the same services via automated teller machines (ATMs), the Internet, call centers, and mobile (cell phone) banking. Today, many companies offer systems that directly challenge traditional banking payment systems. Many stores now use iPhones and other smart devices for direct point of sale transactions. Starbucks, for example, offers Square Wallet, which allows you to pay with your smart phone. Starbucks Square Wallet links directly to a credit or debit card and provides digital receipts. It is just tap and go!

Each of these delivery channels requires a different investment to put the system in place, a different ongoing cost of operations, and different markets it will likely penetrate. Each also presents different opportunities for reaching out to new customers, reducing delivery costs, speeding up processing times, and offering new products or services. The choice of delivery channels and potential markets will reflect different geographic possibilities as well as different customer demographics. Will coastal retirees who focus on their daily account balances want mobile banking? Do college students want face-to-face discussions with bank officers?

Banks clearly choose a variety of delivery channels for different purposes: proactively to appeal to their targeted customers, and defensively to protect the bank from losing customers when key customers cannot access bank services as conveniently as they want. The following comparison of delivery channels demonstrates some of the key issues.

Branch Banking. Many banks have pursued strategies to expand their physical presence by operating extensive branch bank networks. A **branch bank** is a retail outlet in which customers can conduct their banking business either face to face with bank representatives, such as tellers and customer service representatives, or electronically via ATMs. The two most common types of branches are standalone brick-and-mortar buildings and in-store branches. Brick-and-mortar branches typically offer a complete set of banking services including loans, deposits, and money management/trust services. Often they have drive-up windows attached to help handle customer flow. In-store branches are typically located in retail outlets and offer a limited range of services. One popular type of in-store branch is located in supermarkets characterized by high-volume traffic.

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[16] Garbade (2014) presents a series of articles that examine the cost structure and risk profiles of large, complex banks throughout the financial crisis.

Automated Teller Machines. Most bank customers have used an ATM. Formally, ATMs are computerized telecommunications systems that offer limited bank services without direct human involvement. Customers generally have a plastic card encoded with an identifier that allows an individual to insert the card in the ATM to withdraw cash, make deposits, take advances on credit cards, and check account balances. Virtually all ATMs in the U.S. are connected to networks, which allow a user to conduct business with his or her bank regardless of where the user's bank is located. Typically, the bank that owns or hosts the ATM will charge a fee to the user for the access. Many banks will waive fees imposed by other banks to allow their customers the same access as the customers of the host bank.

Internet (Online) Banking. Most banks allow customers to access their account information and conduct routine banking business via secured Web sites. Typical services include account review, bill payment, wire transfer of funds, and applications for loans and new accounts. The primary appeal of Internet banking is its convenience, because customers can conduct their banking business virtually at any time and in any place that has Web access. The primary disadvantage of Internet banking is that thieves have had success in stealing account information from individuals and quickly depleting account balances.

Call Centers. Call centers are intended to benefit a bank's retail customers. A center consists of a centralized location designed for a bank's employees to receive and transmit calls. Banks use call centers primarily for handling customer inquiries and for telemarketing efforts and debt collection. Some banks provide customers 24-hour access to individuals who can resolve issues related to bank products and services. The advantage of such a system is convenience. Not all call centers are effective, however, when customer wait times are long and when customers do not receive the satisfaction they desire.

Mobile Banking. The use of cell phones and tablets to conduct banking business will speed up transactions processing and increase customer convenience. Imagine the increased convenience if you could review your deposit account activity, make loan payments, stop checks, and make small-denomination purchases with your cell phone instead of using a computer or having to go to an ATM. Mobile banking is the fastest growing delivery system for banking services.

Different delivery channels appeal to different types of customers. Typically, younger customers prefer channels that offer the greatest convenience such that they never have to enter a bank building. This benefits the bank by reducing labor costs and potentially represents a real source of fee income. Older customers, however, often prefer face-to-face contact, with the result that banks must provide both types of technologies. Not surprisingly, older customers generally have the largest deposit accounts and thus represent highly profitable relationships even after the high cost of the branch delivery system is taken into account.

Summary

The credit crisis of 2007–2009 dramatically altered the banking landscape. Large investment banks that focus on the underwriting of securities, brokerage services, and proprietary trading (typically by taking equity positions in businesses and specific assets) no longer exist as distinct organizations. Of the five major investment banks with long histories of banking activity in the U.S., only Goldman Sachs and Morgan Stanley still operate as standalone entities, and they are BHCs. Most of the largest

U.S. and global commercial banks, in turn, experienced serious asset-quality problems with mortgages, leveraged loans, and credit default swaps, such that they were forced to write down their assets, thereby depleting their capital. Banks' willingness to lend declined as they protected their capital. Governments around the world stepped in to bail out failing firms by buying preferred stock in banks and insurance companies and by buying problem assets. The credit crisis was truly global and slowed economic growth worldwide.

This chapter describes the changing banking environment in terms of how banks are organized and taxed. It also discusses different strategies that managers use to determine which products and services the bank will offer and what types of customers the bank will pursue. This chapter specifically identifies the organizational structure of BHCs versus independent banks, as well as the strategies generally tied to customers who want low-cost transactions (transactions banking) or a personal relationship with the bank's management (relationship banking). It concludes with a discussion of universal banking and the different channels available for delivering banking services.

Questions

1. Describe what happened to the following traditional investment banks in 2008–2009.
    a. Goldman Sachs
    b. Bear Stearns
    c. Morgan Stanley
    d. Lehman Brothers
    e. Merrill Lynch
2. Define the following terms and explain why they were important during the housing and credit crisis of 2007–2009.
    a. Securitization
    b. Subprime loan
    c. Asset write-down
3. Explain how a OBHC differs from a MBHC. How do each of these differ from a financial services holding company?
4. What is the specific federal income tax treatment of an S Corp bank? How are stockholders taxed?
5. Define transactions banking and relationship banking. Which types of financial institutions most aggressively pursue each of these business models? Explain why.
6. Use the information in Exhibit 1.10 to explain what amounts and proportions of Bank of America's earnings come from each different line of business. Which lines of business likely produce the most predictable or stable earnings? Why?
7. Provide three reasons why the number of independent commercial banks might fall sharply over the next few years.
8. List and describe the different channels that banks use to deliver banking services. For each, describe the characteristics of the customers who will likely be active users of services in that channel.

Activities

1. Obtain a summary of the terms of the TARP–CPP. Identify how much the federal government invested in the stock of different banks. How many banks ultimately sold stock to the government? What conditions were imposed on the participating banks?
2. The S&P/Case-Shiller Index summarizes changes in housing values across 20 large metropolitan areas. Examine the most recent data and determine to what extent housing values have changed in the different markets during the past 12 months. Determine to what extent housing values increased in the same markets on an annual basis from 2001 through 2006. Describe the relationship between the change in housing values before 2007 and the change after 2007.
3. The credit crisis of 2007–2009 and the aftereffects were truly global. Identify actions that the federal governments of the following countries took in response to capital deficiencies and problem loans at large financial institutions during that period.
   a. United Kingdom
   b. United States
   c. Germany
   d. Iceland
   e. Select two emerging markets

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Government Policies and Regulation

Depository institutions are among the most highly regulated firms in the nation. Because the FDIC ensures certain types of deposits, depository institutions must meet minimum regulatory standards so as not to operate with excessive risk. If a bank's risky positions are profitable, stockholders and managers reap the benefits. However, if a bank fails, the FDIC must pay insured depositors, typically at a loss to the insurance fund. The primary benefit of insured deposits is that depository institutions gain access to relatively inexpensive funds that they then lend to businesses, individuals, and governmental units. Insured deposits are quite stable and do not generally disappear during difficult times.[1]

Historically, federal government policymakers have also focused on depository institutions as the primary conduit of monetary policy. When policymakers want to influence the macroeconomy, they often adjust the money supply and alter short-term interest rates, such as the federal funds rate, to increase or decrease credit availability. Such actions make their way through the financial system.

This chapter introduces the goals and functions of depository institution regulation. It then examines the role and impact of the Federal Reserve System (Fed) in influencing bank operations and the macroeconomy. Finally, it describes general trends in federal legislation affecting different financial institutions and the financial system.

Because of the recession that ended in June 2009 and the associated banking and housing crisis, the federal government has dramatically altered its regulatory relationship with financial institutions. For example, Fannie Mae and Freddie Mac are under the conservatorship of the Federal Housing Finance Agency (FHFA), with the U.S. Treasury owning a significant amount of senior preferred stock in both firms.[2,3] The historical relationship between the government and financial institutions is changing to reflect these new relationships and risks.

In order to understand depository institutions, one must understand their regulation. Barriers that once separated traditional commercial banking from other activities have disappeared. As functional differences among commercial banks, savings and loans, savings institutions, mutual savings banks, credit unions, investment banks, and

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[1] The authors want to thank William Chittenden for his assistance in updating portions of this chapter.

[2] http://www.fanniemae.com/portal/about-us/investor-relations/index.html

[3] http://www.freddiemac.com/investors/faq.html

insurance companies have disappeared, some important regulatory differences remain. Although the concepts and decision models presented in this book generally apply to most financial firms, the primary focus is on depository institutions, generally those firms that make loans and accept deposits. Thus, although the term *bank* often serves as an abbreviation for commercial banks and savings institutions, it incorporates other depository institutions such as credit unions as well as the behavior of other types of financial institutions. The term *bank* is less applicable to today's financial institutions because their business models vary much more than they did in the past. In this chapter and those that follow, every attempt will be made to apply the discussion to a variety of financial institutions and to use the term *bank* in its appropriate context.

Historical Bank Regulation

Over the last 100 years, the United States has suffered major financial crises that began in 1929, 1987, and 2007.[4] Each of these financial crises was followed by a flurry of new financial regulations. For example, in response to the large increase in the number of bank failures and resulting financial panic that followed the stock market crash in October 1929, the Federal Home Loan Bank Act of 1932, the Securities Act of 1933, the Banking Act of 1933 (commonly known as the Glass–Steagall Act), the National Housing Act of 1934, the Securities Exchange Act of 1934, the Federal Credit Union Act of 1935, and the Banking Act of 1935 were all signed into law.[5]

Under these various regulations, the United States developed a banking system with a large number of small depository institutions, a relatively short list of products and services they could offer, and narrow geographic areas in which they could compete. Each of these limitations was intended to reduce competition and speculation in the financial industry and thereby promote a safe, sound, and stable commercial banking system. Investment banks, by contrast, would work directly with businesses to arrange issues of stocks and bonds, to facilitate business combinations through mergers and acquisitions, and to help all customers buy and sell stocks and bonds.

Goals and Functions of Depository Institution Regulation

Depository institutions are the most heavily regulated financial institutions in the United States. This largely reflects the critically important role they play in the payments system and in providing credit to individuals and businesses, as well as the fact that they carry FDIC insurance (or comparable insurance through the National Credit Union Insurance Fund) on their deposits. Prior to the establishment of the Fed in 1913, private banks operated free of close government scrutiny. The frequency of abuses and large number of failed banks during the Great Depression forced the federal government to redesign its regulatory framework encompassing supervision and deposit insurance. Fundamentally, there are five reasons for depository institution regulation:

- To ensure the safety and soundness of depository institutions and financial instruments

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[4] Gordon, John Steel, "A Short Banking History of the United States," *The Wall Street Journal*, October 10, 2008.

[5] http://www.fdic.gov/about/learn/learning/when/1930s.html

- To provide an efficient and competitive financial system
- To provide monetary stability
- To maintain the integrity of the nation's payments system
- To protect consumers from abuses by credit-granting institutions

These five goals are obviously not independent. The primary purpose behind **safety and soundness** is to maintain domestic and international confidence, protect depositors and, ultimately, taxpayers, and maintain financial stability. With safety and soundness, a financial system provides for the efficient allocation of the nation's scarce resources, because the payments system is reliable, and institutions willingly extend credit that stimulates economic growth. This goal has traditionally been accomplished by limiting risk-taking at individual institutions, by limiting entry and exit, and by the federal government's willingness to act as a lender of last resort.

Providing an **efficient and competitive financial system** is related to safety and soundness. Regulation is designed to prevent undue concentration of depository institution resources that would be anticompetitive, yet allow firms to alter their product mix and delivery systems to meet economic and market needs. This goal has generally been accomplished by restricting mergers and acquisitions that reduce the number and market power of competing institutions. There are also limitations on the fraction of deposits that any one institution can control in a single state.

The third objective is that the Fed provides **monetary stability**. In particular, the Fed attempts to control the growth in the banking system's liquidity and hence the nation's money supply and influence the general level of interest rates by buying and selling government securities and targeting the federal funds rate. The fourth objective is to **maintain the integrity of the nation's payments system**. Thomas Hoenig, vice chairman of the Federal Deposit Insurance Corporation (FDIC), argues that the payments system revolves around banks. As long as regulators ensure that banks clear checks and settle noncash payments in a fair and predictable way, participants will have confidence that the payments media can be used to effect transactions. This is especially important given the trend toward electronic commerce with unregulated firms, such as PayPal, Square and Dwolla, capturing a rising share of payments.

The final objective is to **protect consumers from abuses by credit-granting institutions**. Historically, some individuals have found it difficult to obtain loans for reasons not related to their financial condition. Thus, regulations now stipulate that borrowers should have equal credit opportunities such that depository institutions cannot discriminate on the basis of race, gender, age, geographic location, and so on. Lenders must also report key borrowing and savings rates in a manner that allows meaningful comparisons and disclose why a borrower is denied a loan.

Three separate federal agencies, along with each state's banking department, issue and enforce regulations related to a wide variety of commercial bank activities. The federal agencies are the Fed, the FDIC, and the Office of the Comptroller of the Currency (OCC). The different regulatory groups' responsibilities overlap, but the agencies generally coordinate policies and decisions. The OCC also has similar responsibilities for savings and loan associations, while the National Credit Union Administration (NCUA) is the federal agency enforcing regulations for the credit union industry. The primary regulator for investment banks is the Securities and Exchange Commission (SEC). The SEC can regulate insurance companies as well, but the insurance industry does not have a federal government licensing agency. Rather, insurance companies are licensed and regulated by all 50 individual states. Following the financial crisis, Congress passed the Dodd-Frank Act in 2010 which created the Consumer Financial Protection Bureau (CFPB). The CFPB is independent of other government regulatory agencies and is charged with writing and enforcing consumer compliance regulations for both bank and nonbank firms.

Ensure Safety and Soundness and Provide an Efficient and Competitive System

Although the goals of safety and soundness and providing an efficient and competitive financial system are related, they are often at odds with each other. Much of the regulation to ensure safety and soundness is designed to accomplish this goal through supervision and examination, deposit insurance, and by the federal government's willingness to act as a lender of last resort. Regulations have similarly controlled when individuals can obtain new depository institution charters (start a new bank) and prevented depository institutions from offering products and services not closely related to banking. Depository institutions can, however, offer additional products by using a financial holding company. Before they can sell products or services, investment companies must register with the SEC, whereas insurance companies must be licensed in each state. Banking regulation historically attempted to prevent concentration of resources that would be anticompetitive by restricting mergers and acquisitions that reduce the number and market power of competing institutions. In today's competitive environment, these regulations are not binding. There are few restrictions on where financial companies can compete and what products they can offer.

Supervision and Examination

Regulators periodically examine individual depository institutions and provide supervisory directives that request changes in operating policies. The purpose is to guarantee the safety and soundness of the banking system by identifying problems before a depository institution's financial condition deteriorates to the point where it fails and the FDIC has to pay off insured depositors. The OCC and FDIC assess the overall quality of a commercial bank's condition according to a CAMELS system. The letters in CAMELS refer to: **c**apital adequacy, **a**sset quality, **m**anagement quality, **e**arnings quality, **l**iquidity, and **s**ensitivity to market risk, respectively.

Examiners spend most of their efforts appraising asset quality, management quality, liquidity risk and market risk.[6] The *asset quality* rating generally indicates the relative volume of problem loans and loan losses. Examiners review the terms and documentation on loans, particularly those with past-due payments, to determine the magnitude of likely loan losses. If repayment prospects are poor, regulators may force a depository institution to recognize the loss and build up loan-loss reserves in support of future losses. *Management quality* is assessed in terms of senior officers' awareness and control of a depository institution's policies and performance. Examiners carefully review the institution's policy statements regarding loans, investments, capital, and general budgeting to determine whether the institution is well run. Banks are expected to have robust corporate governance practices such that members of a depository institution's board of directors are expected to be involved in policy setting and review. *Liquidity risk* is evaluated in terms of the composition of funding, the availability of liquid assets to sell or use as collateral against new borrowings, and the effectiveness of the bank's contingency funding plan. *Sensitivity to market risk* considers management's ability to identify, measure, monitor, and control price risk. For most depository institutions, market risk is primarily composed of the sensitivity of their income and equity to changes in interest rates. Larger financial institutions, however, have active trading portfolios and some exposure to equities and off-balance sheet activities, so they are more sensitive to changes in exchange rates, commodity prices, and equity prices. These facets of risk are addressed in detail in subsequent chapters. *Capital adequacy* and *earnings strength* are determined primarily by key performance

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[6] Cocheo (1986) analyzes the steps in the typical examination process of a community bank and describes the basic questions and problems that arise.

ratios based on the composition and size of various balance sheet accounts and components of net income; for example, equity capital to total assets, return on equity, return on assets net interest margin and control over noninterest expense.

When an examination is completed, the regulatory staff makes a series of policy recommendations that address problems discovered. The recommendations may be informal advisories, a memorandum of understanding, consent order, cease and desist order or the imposition of civil money penalties. An **memorandum of understanding (MOU)** is a formal regulatory document that identifies specific violations and prescribes corrective action by the problem institution. A **consent order** stipulates that the bank should stop certain activities and pursue specific remedies to existing problems. A **cease and desist order (C&D)** is a formal legal document that orders a firm to stop an unfair practice under full penalty of law. Only the C&D has legal standing, but each type of recommendation notifies an institution if its house is in order. Finally, regulators may punish specific actions by imposing **civil money penalties** or fines.

New Charters

The United States operates using a **dual banking system**. Individual states, as well as the federal government, issue commercial bank, savings bank, and credit union charters. The OCC charters *national* commercial banks, whereas individual state banking departments charter *state* commercial banks and *state* savings institutions. The OCC also charters *federal savings banks* and *savings associations,* whereas individual state savings authorities charter *state savings banks*. Finally, the NCUA charters *federal credit unions,* whereas state credit union authorities charter *state credit unions*. Hence, groups interested in starting a *depository institution* have the option of starting a commercial bank, a savings bank, or a credit union and obtaining a charter from the OCC, NCUA, or the appropriate state authority.

The source of the charter determines how the institution is regulated (see the section below on "National versus State Charter"). Depository institutions (commercial banks, savings institutions, and credit unions) are regulated and supervised by five federal agencies (OCC, NCUA, FDIC, the Federal Reserve, and the Consumer Financial Protection Bureau), as well as many more than 50 state agencies—many states have separate commercial banking, savings, and credit union authorities, hence there are many more than 50 state depository supervising authorities. Although this is a complicated system, it allows for a separation of duties, as well as "competition" among the various regulatory agencies to produce a safe and efficient financial system.

National versus State Charter. Before issuing a new charter, the chartering agencies ensure that the new (de novo) bank will have the necessary capital and management expertise to ensure soundness and allow the bank to meet the public's financial needs. The agency that charters the institution is the institution's primary regulator with primary responsibility to ensure safety and soundness of the banking system. All banks obtain FDIC deposit insurance coverage as part of the chartering process. In addition, while national banks are regulated only by federal regulatory agencies, state-chartered banks also have a *primary federal regulator*. The Federal Reserve is the primary federal regulator of an FDIC-insured state bank that is a member of the Fed, while the primary regulator of state non-Fed-member banks is the FDIC. Regulatory agencies conduct periodic on-site examinations to assess a bank's condition and monitor compliance with banking laws. They issue regulations, take enforcement actions, and close depository institutions if they fail. In addition to granting charters, state bank agencies and the OCC conduct periodic examinations of their chartered banks, evaluate merger applications when the resulting firm is their chartered bank, and authorize branches where applicable. Exhibit 2.1 outlines the number and type of depository institutions by charter type.

EXHIBIT 2.1 **Number of Commercial Banks, Savings Institutions, and Credit Unions by Charter Class and Primary Federal Regulator, December 2013 (Thousands of Dollars)**

Charter Class	# Institutions	# Offices*	Deposits**	Primary Federal Regulator
Total banks and savings institutions	6,821	96,339	$9,825,301,000	
Commercial banks	5,876	87,597	8,988,241,000	
National charter	1,153	45,424	5,935,500,000	OCC
State charter	4,723	42,173	3,052,741,000	
Federal Reserve member	850	14,951	1,359,082,000	Fed
Federal Reserve nonmember	3,873	27,222	1,693,659,000	FDIC
Savings institutions	936	8,732	802,689,000	
Federal charter savings associations	497	4,702	540,755,000	OCC
State charter savings institutions	439	4,030	261,934,000	FDIC
U.S. Branches of Foreign Banks	9	10	34,371,000	
Credit unions	6,554	20,221	910,087	
National charter	4,105	11,298	485,500	NCUA
State charter	2,449	8,923	424,587	NCUA

*The number of offices is for June 2013, latest data availably at the time of the writing.

**Includes deposits in domestic offices (50 states and DC), Puerto Rico, and U.S. Territories.

Source: FDIC Quarterly Banking Profiles and NCUA Annual Reports.

Exhibit 2.2 summarizes the division of responsibilities for commercial bank regulators. A 1993 study by the Treasury Department estimated that two or more of these federal regulators supervise approximately 58 percent of commercial banks. Three or more regulators supervise 15 percent of the commercial banks, and there are even 2 percent of the commercial banks regulated by four regulators. Not surprisingly, many commercial bankers and legislators believe that this duplication is costly and provides little benefit.

With the removal of many regulations, the U.S. financial system has seen increasing competition among the various regulators. Within many states, community banks often believe they can get a better hearing from a state banking department than from a federal regulator because the state regulators better understand their local economy and market participants. The costs also differ to where the choice of regulator can affect an institution's total expenses. Thus, it is not unusual to see midsized and smaller commercial banks converting to where a state banking department is the primary regulator along with the FDIC. By contrast, in 2004 J.P. Morgan converted to a national charter from a New York state charter to have its entire operations under the regulatory auspices of the OCC.

Commercial Bank, Savings Institution, and Credit Union Charters. Because commercial banks were the only firms allowed to issue demand deposits, they dominated the payments system throughout the United States. As such, authorities closely regulated bank operations to control deposit growth and ensure the safety of customer deposits. Among other restrictions, government regulators required cash reserves against deposits, specified maximum interest rates depository institutions could pay on deposits, set minimum capital requirements, and placed limits on the size of loans to borrowers. Federal banking law further limited bank operations to activities closely related to banking and, in conjunction with state laws, prohibited interstate branching.

EXHIBIT 2.2 Commercial Banks and Their Regulators

	Type of Commercial Bank				
Type of Regulation	**National**	**State/Member**	**Insured State Nonmember**	**Noninsured State Nonmember**	**Bank Holding Companies**
Safety and Soundness					
Supervision and examination	OCC	Fed and state authority	FDIC and state authority	State authority	Fed
Deposit insurance	FDIC	FDIC	FDIC	State insurance or none	Not applicable
Chartering and licensing	OCC	State authority	State authority	State authority	Fed and state authority
Efficiency and Competitiveness					
Branching	OCC	Fed and state authority	FDIC and state authority	State authority	Fed and state authority
Mergers and acquisitions	OCC	Fed and state authority	FDIC and state authority	State authority	Fed and state authority
Pricing new products	Fed and state authority	Fed and state authority	Fed and state authority	Fed and state authority	Not applicable
Consumer protection	Fed	Fed and state authority	Fed, FDIC, and state authority	Fed and state authority	Not applicable

Historically, commercial banks, savings associations, and credit unions have each served a different purpose and a different market. **Commercial banks** mostly specialize in short-term business credit, but also make consumer loans and mortgages, and have a broad range of financial powers. Commercial banks are stock corporations whose primary purpose is to maximize shareholder wealth. Depository institutions accept deposits in a variety of different accounts and invest these funds into loans and other financial instruments. Their corporate charters and the powers granted to them under state and federal law determine the range of their activities.

Savings institutions (savings and loan associations and savings banks) have historically specialized in real estate lending; for example, loans for single-family homes and other residential properties. Savings institutions are generally referred to as "thrifts" because they originally offered only savings or time deposits to attract funds. They have acquired a wide range of financial powers over the past quarter-century and now offer checking accounts, make business and consumer loans and mortgages, and offer virtually any other product a commercial bank offers. Most savings institutions are owned by shareholders ("stock" ownership), but some are owned by their depositors and borrowers ("mutual" ownership). Savings institutions must maintain 65 percent of their assets in residential housing-related or other qualified assets to maintain their savings institution status. This is called the "qualified thrift lender" (QTL) test. Recent liberalization of the QTL test allowed thrifts to hold some nonhousing assets to meet this requirement.

The restrictive impact of the QTL test, as well as the savings and loan crisis of the 1980s that forced many institutions to close or merge with others at an extraordinary cost to the federal government, reduced the number of savings institutions from 3,677 in 1986 to 960 as of December 2013. Liberalization of the QTL in the 1990s brought a resurgence of interest in the thrift charter. As a result, many insurance companies and securities firms, as well as commercial firms, organized as a **unitary thrift holding company** in order to own a depository institution and bypass prohibitions in the Glass–Steagall Act and the Bank Holding Company Act.[7] This resurgence of interest stopped with the passage of Gramm–Leach–Bliley, which eliminated the issuance of new unitary thrift charters.

Credit unions represent another type of depository institution. They are nonprofit institutions with the original purpose of encouraging savings and providing loans within a community at low cost to their members. A "common bond" defines their members, although this common bond can be very loosely defined today. Hence, the differences between credit unions and other depository institutions are disappearing. Members of the credit union pool their funds to form the institution's deposit base, and these same members own and control the institution. All credit unions offer savings accounts or time deposits, while the larger institutions also offer checking and money market accounts. Credit unions were first chartered at the state level in 1909. By 1934, the federal government began to charter credit unions under the Farm Credit Association and created the NCUA in 1970. A dual credit union system, similar to banks, exists today as both states and the NCUA charter credit unions. Credit unions have similarly expanded the scope of products and activities they offer to include almost anything a commercial bank or savings association offers, including making home loans, issuing credit cards, and even making some commercial loans. Credit unions are exempt from federal taxation and sometimes receive subsidies in the form of free space or supplies from their sponsoring organizations. This tax-exempt status puts them at a competitive advantage over other financial institutions. Although credit unions tend to be much smaller than commercial banks or savings associations, there are several large credit unions.

Exhibit 2.3 lists the largest commercial banks, savings institutions, and credit unions as of December 2013. Clearly, commercial banks are the largest institutions by asset size, followed by savings institutions, while credit unions represent the smallest type of financial institutions.

Farm Credit System. The Farm Credit System (FCS) was created in 1916 to support the credit needs of agriculture in rural America. The FCS has changed in structure over the years, but is composed of its primary regulatory agency, the Farm Credit Administration, as well as 4 Farm Credit Banks (FCBs), 79 Agricultural Credit Associations (ACAs), 3 Federal Land Credit Associations (FLCAs), and 1 Agricultural Credit Bank (CoBank). The FCS is a government-sponsored enterprise (GSE) that effectively makes many types of loans to the agricultural industry as well as on land and homes in rural America. Specifically, the FCS provides credit and other services to the following:

- Agricultural producers and farmer-owned agricultural and aquatic cooperatives
- Agricultural processing and marketing activities
- Rural housing
- Farm-related businesses
- Rural utilities
- Foreign and domestic companies involved in international agricultural trade

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[7] Savings and loan associations and mutual savings banks are designated as thrift institutions. Nonbanking firms have entered banking by obtaining a unitary thrift charter that allows them to operate a federal savings bank. Included in this group are General Electric (GE) and USAA.

EXHIBIT 2.3 The Largest Commercial Banks, Savings Institutions, and Credit Unions by Charter Class, December 2013 (Millions of Dollars)

Commercial Banks

Rank	Federal Chartered (OCC)	Total Assets	Rank	State Charter*	Total Assets
1	JPMorgan Chase Bank NA (OH)	1,945,467	1	The Bank of New York Mellon (NY)	296,626
2	Bank of America NA (NC)	1,433,716	2	State Street Bank and Trust Company (MA)	239,051
3	Wells Fargo Bank NA (SD)	1,373,600	3	Branch Banking and Trust Company (NC)	179,126
4	Citibank NA (SD)	1,346,747	4	SunTrust Bank (GA)	171,262
5	U.S. Bank NA (OH)	360,478	5	Fifth Third Bank (OH)	128,186
6	PNC Bank NA (DE)	310,000	6	Regions Bank (AL)	116,609
7	Capital One NA (VA)	238,483	7	Goldman Sachs Bank USA (NY)	105,616
8	TD Bank NA (DE)	217,626	8	The Northern Trust Company (IL)	102,659
9	HSBC Bank USA NA (VA)	179,772	9	Ally Bank (UT)	98,737
10	FIA Card Services NA (DE)	158,290	10	Manufacturers and Traders Trust Company (NY)	84,362

Savings Banks

Rank	Federal Charter (OTS)	Total Assets	Rank	State Charter	Total Assets
1	Charles Schwab Bank (NV)	99,877	1	New York Community Bank (NY)	43,048
2	USAA Federal Savings Bank (TX)	62,867	2	Citizens Bank of Pennsylvania (PA)	29,099
3	E*TRADE Bank (VA)	45,085	3	Investors Bank (NJ)	15,583
4	Hudson City Savings Bank (NJ)	38,606	4	Apple Bank for Savings (NY)	11,647
5	American Express Bank FSB. (UT)	38,516	5	Eastern Bank (MA)	8,662
6	GE Capital Retail Bank (UT)	37,806	6	Northwest Savings Bank (PA)	7,905
7	People's United Bank (CT)	32,974	7	The Provident Bank (NJ)	7,487
8	OneWest Bank FSB (CA)	23,494	8	Emigrant Bank (NY)	6,432
9	Scottrade Bank (MO)	19,548	9	Berkshire Bank (MA)	5,646
10	EverBank (FL)	17,639	10	Ridgewood Savings Bank (NY)	5,133

Credit Unions

Rank	Federal Charter (OTS)	Total Assets	Rank	State Charter	Total Assets
1	Navy Federal Credit Union, (VA)	55,503	1	State Employees', (NC)	27,107
2	Pentagon, (VA)	16,841	2	Boeing Employees, (WA)	11,904
3	Schoolsfirst, (CA)	9,873	3	The Golden 1, (CA)	8,198
4	Security Service, (TX)	7,680	4	Alliant, (IL)	8,152
5	First Technology, (CA)	6,533	5	Star One, (CA)	6,601
6	America First, (UT)	5,878	6	San Diego County, (CA)	6,349
7	Randolph-Brooks, (TX)	5,717	7	Suncoast, (FL)	5,505
8	American Airlines, (TX)	5,569	8	Vystar, (FL)	4,948
9	Bethpage, (NY)	5,445	9	Citizens Equity First, (IL)	4,916
10	Alaska USA, (AK)	5,413	10	Delta Community, (GA)	4,500

*State-chartered banks that are not members of the Federal Reserve System; the primary federal regulator is the FDIC.

Source: The FDIC is the primary federal regulator of State-chartered banks that are not members of the Federal Reserve System.

For all practical purposes, FCBs have many of the same characteristics as depository institutions and compete directly with depository institutions for a wide variety of loans. However, they are not depository institutions because they do not accept transactions deposits. The Federal Farm Credit Banks Funding Corporation (FFCBFC) issues debt on behalf of the FCBs through the wholesale capital markets with the issuance of Farm Credit debt securities. Similar to credit unions, the range of permissible activities and products offered by FCBs has increased over time. Moreover, because of strategic alliances with commercial banks, the number of banking-type products has also increased. Today, many community bankers in rural areas view FCBs as having a competitive advantage because they are effectively funded at default risk-free Treasury rates, which lowers their borrowing costs, while they do not have to pay taxes on any profits.

Federal Deposit Insurance

Regulators attempt to maintain public confidence in depository institutions and the financial system through federal deposit insurance. The FDIC currently insures customer deposits up to $250,000 per depositor, per insured commercial bank and savings institution. Under a similar arrangement, almost all credit unions are insured by the National Credit Union Share Insurance Fund (NCUSIF), which the NCUA controls. The FDIC was created by the Banking Act of 1933 in response to the large number of bank failures that followed the stock market crash of 1929. Originally, the FDIC insured deposits up to $5,000. The OCC and NCUA require all national commercial banks and credit unions to acquire deposit insurance, while all state banking authorities require newly chartered state banks to join the FDIC and credit unions to join the NCUSIF before they can accept deposits from the public.

Deposit insurance has been especially important during times when the number of problem banks and bank failures increased. Following World War II, bank failures were negligible, given the heavy regulation of banking activities and strict policies regarding who could open and operate a bank. However, the number of commercial bank and thrift failures rose from under 50 in 1982 to 382 in 1990, only to fall to 6 in 1996, 0 in 2005 and 2006, and then up to 148 in 2009, peaking at 157 in 2010, and falling back down to 92 in 2011, 51 in 2012, and 24 in 2013.

Depository institutions find insured deposits very attractive. With FDIC or NCUSIF insurance, depositors with less than $250,000 in deposits for each account ownership category are assured that the federal government will guarantee the funds in the event that the bank fails. Deposit customers are thus willing to accept interest rates on insured deposits that are below the rates that banks would have to pay without FDIC insurance. Such deposits are generally more stable because customers don't withdraw the funds quickly when the economic climate changes or when an institution's financial condition changes.

Depository institutions pay premiums for insured deposits depending on the size of the FDIC's insurance reserve and the perceived quality of the institution. There once were two insurance funds under the FDIC: the BIF for commercial banks and the SAIF for savings and loans.[8] The Federal Deposit Insurance Reform Act of 2005 (FDIRA)

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[8] Congress passed the Financial Institutions Reform, Recovery and Enforcement Act of 1989 (FIRREA) largely to address problems in the thrift industry. The two insurance funds were established to maintain the appearance that commercial banks were distinguishable from savings and loans. In actuality, both funds were deficient at the time. Congress mandated an increase in premiums, with thrifts paying higher rates over time. Deposit insurance works because the federal government stands behind it with its full faith, credit, and taxing authority.

merged these two funds into the Deposit Insurance Fund (DIF). Prior to the FDIC Improvement Act of 1991, the FDIC assessed insurance premiums simply based on the dollar amount of domestic deposits. FDICIA required the FDIC to assign insurance premiums based on the risk assessment of the institution and to maintain the insurance fund at a minimum level of 1.25 percent of insured deposits. These risk-based premiums, however, were restricted by the size of the insurance fund. By 1994 (for BIF) and 1996 (for SAIF), the funds were well funded (over 1.25 percent). As a result, the vast majority of commercial banks paid no insurance premium from 1996 to the end of 2005. However, due to the increasing number of bank failures and the resulting drain on the DIF, the FDIC required insured institutions to pre-pay three years of deposit insurance premiums in 2009.

The FDIC acts as the primary federal regulator of state-chartered commercial banks that do not belong to the Fed. State commercial banks that are members of the Fed have that agency for their primary federal regulator. The FDIC cooperates with state banking departments to supervise and examine these institutions, and has considerable authority to intervene and prevent unsafe and unsound banking practices. The FDIC also has backup examination and regulatory authority over national and Fed-member banks.

The FDIC is the receiver of failed institutions. The chartering agency formally declares commercial banks and savings associations insolvent then names the FDIC as receiver. The FDIC either liquidates the insolvent firms or sells them to another insured depository. When a commercial bank or thrift fails, the government pays insured depositors the full amount of their account balance up to $250,000 for each account ownership category. Customers with uninsured deposits bear the risk that they will not recover the full value of their account balance. Historically, regulators have not allowed the largest institutions to fail in such a way that uninsured depositors have received de facto 100 percent deposit insurance. Regulators implicitly assume that large depository institution failures would seriously undermine public confidence in financial institutions and markets, so they generally prop up large depository institutions with federal aid or find a merger partner. The OCC and state banking authorities officially designate banks as insolvent, but the Federal Reserve and FDIC assist in closings. Frequently, the Fed extends credit to a problem bank until an ownership transfer occurs. The FDIC's liquidation staff handles the disposition of a failed bank's assets and liabilities.

Product Restrictions: Depository institutions versus nondepository institutions

The Federal Reserve regulates specific activities of commercial banks, bank holding companies, and financial holding companies (FHCs). Exhibit 2.4 is a general description of the types of regulation the Federal Reserve imposes on banks. In the area of safety and soundness, regulations take the form of restricting interlocking relationships among directors of banks and between banks and securities firms to ensure independence, and restricting the terms of loans to insiders, such as directors, bank officers, and shareholders. Exhibit 2.5 lists a brief, and somewhat incomplete, summary of permissible activities of national commercial banks. Because most states have provisions that allow state banks to engage in all activities permissible for national banks, the list of permissible activities for national banks is a strong guide for the banking system.

EXHIBIT 2.4 **Selected Federal Reserve Bank Regulations**

Reg.	Title
A	Extensions of Credit by Federal Reserve Banks
B	Equal Credit Opportunity
C	Home Mortgage Disclosure
D	Reserve Requirements of Depository Institutions
E	Electronic Fund Transfers
F	Limitations on Interbank Liabilities
G	Disclosure and Reporting of CRA-Related Agreements
H	Membership of State Banking Institutions in the Federal Reserve System
I	Issue and Cancellation of Federal Reserve Bank Capital Stock
J	Collection of Checks and Other Items by Federal Reserve Banks and Funds Transfers through Fedwire
K	International Banking Operations
L	Management Official Interlocks
M	Consumer Leasing
N	Relations with Foreign Banks and Bankers
O	Loans to Executive Officers, Directors, and Principal Shareholders of Member Banks
P	Privacy of Consumer Financial Information
Q	Capital Adequacy of Bank Holding Companies, Savings and Loan Holding Companies, and State Member Banks
R	Exceptions for Banks from the Definition of Broker in the Securities Exchange Act of 1934
S	Reimbursement to Financial Institutions for Providing Financial Records; Recordkeeping Requirements for Certain Financial Records
T	Credit by Brokers and Dealers
U	Credit by Banks or Persons other than Brokers or Dealers for the Purpose of Purchasing or Carrying Margin Stocks
V	Fair Credit Reporting
W	Transactions between Member Banks and Their Affiliates
X	Borrowers of Securities Credit
Y	Bank Holding Companies and Change in Bank Control
Z	Truth in Lending
AA	Unfair or Deceptive Acts or Practices
BB	Community Reinvestment
CC	Availability of Funds and Collection of Checks
DD	Truth in Savings
EE	Netting Eligibility for Financial Institutions
FF	Obtaining and Using Medical Information in Connection with Credit
GG	Prohibition on Funding of Unlawful Internet Gambling
HH	Designated Financial Market Utilities
II	Debit Card Interchange Fees and Routing
OO	Securities Holding Companies
PP	Definitions Relating to Title I of the Dodd–Frank Act
RR	Credit Risk Retention
TT	Supervision and Regulation Assessments of Fees
YY	Enhanced Prudential Standards

Source: Federal Reserve Bank, www.federalreserve.gov/regulations/default.htm.

EXHIBIT 2.5 Summary of Permissible Activities of National Banks for Their Subsidiaries

General Authority

Branching: loan offices and facilities

Consulting and financial advice: financial, investment, or economic

Corporate governance: reorganizational activities to streamline operations

Correspondent service: hold deposits for other banks and perform services

Finder activities: serve as a finder for certain goods

Leasing: engage in personal property leasing

Lending: make, purchase, sell, service, or warehouse loans or extensions of credit

Payment services: cash management and letters of credit

Other activities and services: borrow money and support services

Fiduciary, Insurance, and Securities Activities: may be granted at time of charter or subsequently

General: trust activities, employee benefit accounts, and real estate brokerage

Insurance and annuities activities: insurance underwriting, reinsurance, and title insurance

Securities activities: asset securitization, broker–dealer activities, clearing and execution services, closed-end mutual funds, derivatives activities, investment vehicle for bank clients, mutual fund activities, online securities trading, options contracts, private placement services, securities brokerage (secondary and primary markets), securities exchanges, securities lending, sweeps, transfer agent, and underwriting and dealing in government and municipal securities

Technology and Electronic Activities

Digital certification: act as a certification authority

Electronic bill payments: presentment, EDI services, electronic toll collections, merchant process of credit cards via Internet, and stored-value cards

Electronic commerce: commercial Web site hosting, electronic marketplace, electronic storage, facilitation of electronic commerce, hyperlinks between bank and third-party sites, virtual malls, and Web design and development services

Electronic correspondent services

Electronic storage and safekeeping

Internet access service

Internet and PC banking

Software development and production

Investments: a wide range of investments are permissible

Asset-backed securities, bank stock, bankers acceptances, corporate bonds (subject to 10 percent of capital surplus), collateralized mortgage-related investments, commercial paper, foreign government loans, housing investments, insurance investments, investment in limited liability companies, money market preferred stock, mutual fund shares (limited), small-business investments, stock in life insurance underwriter, trust preferred securities, and state and local bonds

Source: Office of Comptroller of the Currency, Activities Permissible for a National Bank, http://www.occ.gov/publications/publications-by-type/other-publications-reports/bankact.pdf.

Shortcomings of Restrictive Bank Regulation

Although regulation is designed to ensure the safety and soundness of the financial system, it cannot accomplish all of its goals. For example, regulation does not prevent bank failures. It cannot eliminate risk in the economic environment or in a bank's normal operations. It does not guarantee that bankers will make sound management decisions or act ethically. It simply serves as a guideline for sound operating policies.

Effective depository institution regulation is a delicate balance between the banking system's competitiveness and general safety and soundness concerns. Imposing barriers to entry and restricting the types of activities depository institutions can engage in clearly enhance safety and soundness, but also hinder competition. Hence, the historical approach of restricting the geographic and product scope of banking activities had three drawbacks:

1. It assumes that the markets for commercial bank products, largely bank loans and deposits, could be protected and that other firms could not encroach upon these markets. Not surprisingly, investment banks, hybrid financial companies (like General Electric and American Express), insurance firms, and others found ways to provide the same products as banks across different geographic markets. Similarly, commercial banks could not diversify their earnings and compete in the same product areas that investment banks and insurance companies could compete in.
2. It discriminated against U.S.-based firms versus foreign-based firms. For example, prior regulations prohibited U.S. commercial banks from underwriting (helping businesses issue new stock or bonds) securities for firms in the United States. By contrast, foreign banks are generally not restricted as to their domestic corporate structure and thus have long been able to circumvent U.S. restrictions on underwriting activities. Such restrictions place U.S. commercial banks at a competitive disadvantage.
3. Historical regulation has penalized commercial bank customers who do not have convenient access to the range of products they demand. In addition, such restrictions generally raise prices above those obtained in a purely competitive marketplace.

Maintaining Monetary Stability and the Integrity of the Payments System

The two objectives of depository institution regulation, *monetary stability* and *maintaining the integrity of the nation's payments system,* are generally the domain of the Fed. The Fed attempts to control the growth in the nation's money supply and maintain the efficient operation of the payments system. Monetary stability ensures that the growth in the money supply is kept in check such that the value of the nation's money is strong, predictable, and an effective means of making payment.

The Role of the Central Bank in the Economy: The Federal Reserve System

Congress created the Fed in 1913 to serve as the central bank of the United States and to provide the nation with a safe, flexible, and more stable monetary and financial system. The Fed controls the growth in the nation's money supply, sets reserve requirements, approves proposed mergers and new branches, and examines state member banks. It also makes loans to depository institutions, establishes consumer regulations, authorizes the formation of bank holding companies, and approves all holding company activities and acquisitions, regardless of how a depository institution was chartered. The Fed's role in banking and the economy has expanded over the years, but its primary focus has remained the same. The Fed's three fundamental functions are to do the following:

1. Conduct the nation's monetary policy
2. Provide and maintain an effective and efficient payments system
3. Supervise and regulate depository institution operations

All three roles have a similar purpose, that of maintaining monetary and economic stability and prosperity.

The Fed is a decentralized central bank, with Reserve Banks and branches in 12 districts across the country. The Fed is coordinated by a Board of Governors in Washington, D.C., whose members are appointed by the President of the United States and confirmed by the Senate for staggered 14-year terms. The seven members of the Board of Governors represent the main governing body of the Fed charged with overseeing the 12 District Reserve Banks and with helping implement national monetary policy.

The Federal Reserve also serves as the lender of last resort. When a depository institution loses funding sources, the Fed may make a discount window loan or loan under other programs to support operations until a solution appears. When Continental Illinois had trouble in 1984, for example, the Federal Reserve loaned it more than $4 billion until it effectively nationalized the bank. The same occurred with the Bank of New England in late 1990. Federal Reserve lending to financial institutions peaked at $1.5 trillion in December 2008 in response to the financial crisis. The Federal Reserve has historically shown a preference for working directly with depository institutions in the area of crisis management but has not limited itself solely to direct depository institution assistance. The Fed intervened in disputes related to the collapse of silver prices during the Hunt family's problems; junk bond financing of leveraged buyouts; the failure of securities dealers in repurchase agreements; and the failures of privately insured thrift institutions in Ohio and Maryland.[9] The Fed also intervened in the funding crisis faced by the FCS, the failure of the hedge fund Long-Term Capital Management, the failure of AIG, helping money market mutual funds not 'break-the-buck,' and most recently the failure of Bear Stearns (by making the company a direct loan, which was replaced by loan guarantees to J.P. Morgan Chase when it agreed to purchase Bear Stearns). Under different government programs, the Federal Reserve has also intervened in many other crisis situations. The Fed stood ready to provide liquidity to financial firms immediately following the September 11, 2001, terrorist attack on the World Trade Center. In most cases, the injured firm requests back-up financing from the Fed if a crisis worsens. In other cases, market participants simply need expert advice. As lender of last resort, the Federal Reserve has the resources and influence to advise management and prevent serious financial problems.

Monetary Policy. The Fed conducts monetary policy through actions designed to influence the supply of money and credit in order to promote price stability and long-term sustainable economic growth. The Fed has traditionally operated with three distinct permanent monetary policies. The following are the original permanent monetary policy tools:

- Open market operations
- Changes in the discount rate
- Changes in the required reserve ratio

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[9] During late 1979 and early 1980 the Hunt family cornered the silver market and the price of silver increased dramatically. By March 1980, however, the price of silver had collapsed and the Hunt brothers declared bankruptcy.

Open market operations are conducted by the Federal Reserve Bank of New York under the direction of the Federal Open Market Committee (FOMC). The sale or purchase of U.S. government securities in the "open market," or secondary market, is the Federal Reserve's most flexible means of carrying out its policy objectives. Through these transactions, which are carried out daily, the Fed can adjust the level of reserves in the banking system and thereby influence short-term interest rates and the growth of the money supply. Fed open market purchases of securities increase liquidity, hence reserves, in the banking system by increasing depository institution deposit balances at the Fed. Fed open market sales of securities decrease depository institution reserves and liquidity by lowering deposit balances at the Fed.

Historically, the Federal Reserve has concentrated on influencing short-term interest rates. However, in 2008, the Federal Reserve began a series of large-scale asset purchases (LSAPs) under its quantitative easing (QE) efforts. The Fed carries out LSAPs and QE by purchasing long-term Treasury securities or more recently, mortgage-backed securities. By purchasing a large quantity of long-term securities, the Fed essentially reduces the supply of long-term securities, driving up their price and forcing down long-term yields.[10] The Fed started the long anticipated tapering of purchases in 2014, when it reduced its monthly purchases of long-term securities by $5 billion to $10 billion monthly. It subsequently announced that it would stop the purchases effective in October 2014.

Changes in the discount rate directly affect the cost of reserve borrowing. When the Fed raises the discount rate, it discourages borrowing by making it more expensive. Fed decreases in the discount rate make borrowing less expensive. In October 2002, the Federal Reserve established a new discount rate policy in which the Fed would lend to most financial institutions under their primary and secondary credit programs at 1 percent and 1.5 percent over the current federal funds target rate. Previously, the Fed generally discouraged borrowing directly from the Fed and established the discount rate well below the current federal funds rate. Under the old policy, changes in the discount rate were infrequent and primarily were a signal of future policy toward monetary ease or tightness rather than a move to change a depository institution's borrowing activity. Under the new policy, the Fed does not "discourage" borrowing as it did in the previous policy. In its role as lender of last resort, depository institutions can borrow deposit balances, or required reserves, directly from Federal Reserve Banks—with the discount rate representing the interest rate that depository institutions pay.

Changes in reserve requirements directly affect the amount of legally required reserves that depository institutions are required to hold as an asset and thus change the amount of funds a depository institution can lend out. For example, a required reserve ratio of 10 percent means that a bank with $100 in demand deposit liabilities (DDAs) outstanding must hold $10 in legally required reserves in support of these deposits. Thus, the bank can lend only 90 percent of its DDAs. When the Fed increases (decreases) reserve requirements, it formally increases (decreases) the required reserve ratio, which directly reduces (increases) the amount of money a bank can lend per dollar of DDAs. Thus, lower reserve requirements increase bank liquidity and lending capacity while higher reserve requirements decrease bank liquidity and lending capacity. Changes in reserve requirement occur infrequently, with the last change occurring in 1992.

The Federal Reserve's Crisis Management Tools. To combat the liquidity crisis of late 2007, the Fed announced several new temporary monetary policy tools that, in a departure from its long-standing preference for working with depository institutions, were designed not only for depository institutions but for other financial and nonfinancial companies, as well. **Term auction facilities** were introduced as new monetary policy tools in late 2007 because of the liquidity crisis brought forth by the subprime mortgage problems. These new monetary policy tools include the **Term Auction Facility (TAF)**,

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[10] http://www.federalreserve.gov/faqs/what-are-the-federal-reserves-large-scale-asset-purchases.htm

the **Term Securities Lending Facility (TSLF)**, and the **Primary Dealer Credit Facility (PDCF)**. All three programs were discontinued in 2010. Although similar in effect, these three Federal Reserve liquidity tools were created to provide additional funding sources to address liquidity problems experienced by many large financial institutions during the 2007–2009 crisis. Some of the largest institutions found it extremely difficult to borrow during this period, as mortgage defaults caused market participants to question the value of asset-backed securities and the net worth of those institutions holding those securities. For a time, credit markets effectively shut down. As a result, firms that relied on commercial paper financing (such as GE) could not roll over their outstanding commercial paper when it matured. GE and similar firms were then allowed to borrow from the Federal Reserve directly or even issue debt that was guaranteed by the FDIC.

The three auction facilities differed primarily in terms of the types of collateral accepted, the duration of loans, the types of institutions having access to funding, and the cost to the borrower. The *TAF* allowed depository institutions (commercial banks and savings banks) to borrow for a fixed term, typically 28 days, against a variety of collateral that was normally accepted for discount window loans. With the TAF, bank reserves were increased (if they were not offset by open market operations at the same time) similarly to discount window borrowing. Effectively, the Fed was making a collateralized loan of bank reserves. The *TSLF* lent Treasury securities to primary dealers in exchange for other securities held by the dealers. The primary dealers could then borrow for up to 28 days using the Treasuries as collateral. The program freed up liquidity, because securities dealers found few takers for their other non-Treasury securities (primarily mortgage-backed securities) as collateral. Under the TSLF, bank reserves were not altered because loans were "bond for bond." The *PDCF* was an overnight collateralized loan facility that provided loans for up to 120 days to primary dealers in exchange for a broader range of collateral than that accepted with the TSLF. Because this facility was a borrowing of cash or bank reserves using bonds for collateral, it had the effect of increasing bank reserves if these borrowings were not offset by open market operations. The TSLF and PDCF programs were a departure from the Fed's historical preference for working with depository institutions, as these programs were open to primary dealers. They also made credit available for longer periods.

Discount window borrowing and these facilities differ in several important ways. First, the discount rate is set by the Federal Reserve, and no limit on the aggregate volume of loans is made on any given date. With the auction facilities, the dollar amount of funds to lend was determined in advance of each auction and the interest rate charged was determined from the auction. The TAF and PDCF had the secondary effect of increasing bank reserves and ultimately the monetary base if the bank reserves were not offset by open market operations. The TSLF program was simply a loan of securities with securities for collateral. Even if the Fed offset the reserve effect of TAF and PDCF with open market operations, these programs (including the TSLF program) still had a desired liquidity effect by allowing institutions to alter their balance sheets. Second, the Fed has generally opened the discount window only to depository institutions, as these are the institutions the Fed directly regulates. The TSLF and PDCF programs were interesting in that the Fed was lending directly to investment banks and other nonbank financial institutions, which they do not directly regulate. Finally, these facilities offered a source of term funds without the stigma attached to discount window borrowing.

The Role of Depository Institutions in the Economy. Commercial banks, as well as other depository institutions, play an important role in facilitating economic growth. On a macroeconomic level, they represent the primary conduit of Federal Reserve monetary policy. Bank deposits represent the most liquid form of money such that the Fed's efforts to control the nation's money supply and level of aggregate economic activity is accomplished by changing the availability of credit at depository institutions. On a microeconomic level, depository institutions represent the primary source of credit to most small businesses and many individuals.

While the economic role of depository institutions has varied little over time, the nature of commercial banks and competing financial institutions is constantly changing. In addition to commercial banks, savings and loans, credit unions, brokerage firms, insurance companies, and general retail stores now offer products and services traditionally associated only with commercial banks. Hence, the term *bank* today refers as much to the *range of services* traditionally offered by depository institutions as to a specific type of institution.

Exhibit 2.6 documents changes in the number of institutions and total assets controlled by commercial banks, savings banks, and credit unions from 1970 through 2013. During the 42.5 years, commercial banks' share of depository institution assets varied from around 64 percent in the early 1980s to over 86 percent in 2013. This growth came at the expense of thrift institutions whose share dropped from almost 32 percent to under 7 percent by 2013, while credit unions increased their share from just over 2 percent to nearly 7 percent during this period. Note also the sharp drop in the number of all institutions. This consolidation reflects the combined impact of relaxation of restrictions on commercial bank branching, failures, mergers, acquisitions, and consolidations. The banking industry now comprises fewer, but larger, firms that control an increased share of loans and deposits, with the number of competitors shrinking rapidly.

Although revealing, these figures disguise the fact that there has been a fundamental shift in the structure of financial institutions since 1980. In particular, depository institutions' share of U.S. financial assets has systematically declined relative to assets held by other financial intermediaries. Exhibit 2.7 documents the shift from 1970 through 2013. During this time, depository institutions (commercial banks, savings institutions, and

EXHIBIT 2.6 **Number and Total Assets of Various Depository Institutions, 1997–2013**

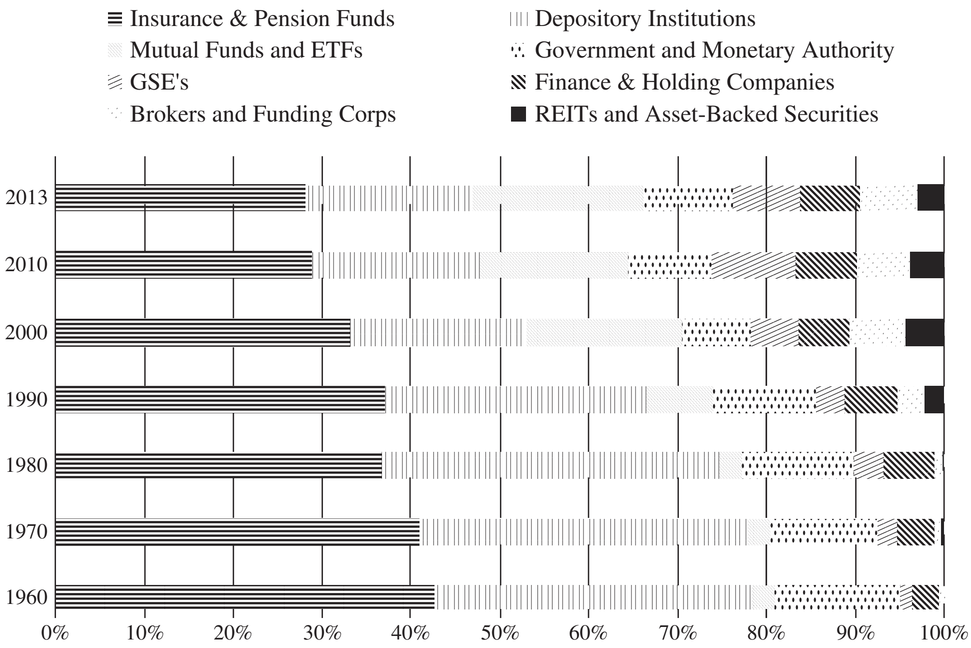
	Monetary Amounts, Billions of Dollars					Annual Growth Rates			
						1970–1980	1980–1990	1990–2000	2000–2013
	1970	1980	1990	2000	2013*				
Commercial Banks									
Number	13,500	14,163	12,343	8,315	5,876	0.50%	–1.40%	–3.90%	–2.64%
Total assets	$517	$1,485	$3,390	$6,239	$13,670	11.10%	8.60%	6.30%	6.22%
(% of Total Assets)	66.00%	63.60%	71.00%	79.00%	86.61%				
Savings Institutions[a]									
Number	5,669	4,594	2,815	1,590	936	–2.10%	–4.80%	–5.60%	–3.99%
Total assets	$250	$784	$1,259	$1,223	$1,052	12.10%	4.90%	–0.30%	–1.15%
(% of Total Assets)	31.80%	33.60%	26.40%	15.50%	6.67%				
Credit Unions									
Number	23,819	21,930	8,821	10,316	6,554	–0.80%	–8.70%	1.60%	–3.43%
Total assets	$18	$67	$127	$438	$1,062	14.00%	6.60%	13.20%	7.05%
(% of Total Assets)	2.20%	2.90%	2.70%	5.50%	6.73%				

*Data are through December 2013.

[a] Includes savings and loan associations and mutual savings banks.

Source: Quarterly Banking Profile Graph Book at www.fdic.gov and NCUA annual reports.

EXHIBIT 2.7 **Percentage Distribution of U.S. Financial Assets Held by Various Financial Institutions, 1970–2013***



	1960	1970	1980	1990	2000	2010	2013
Insurance & Pension Funds	42.59%	40.87%	36.68%	37.04%	33.05%	28.76%	28.13%
Depository Institutions	35.74%	36.89%	38.00%	29.36%	19.91%	18.99%	18.78%
Mutual Funds and ETFs	2.44%	2.55%	2.51%	7.49%	17.44%	16.58%	19.08%
Government and Monetary Authority	14.25%	12.11%	12.61%	11.71%	7.75%	9.52%	10.22%
GSE's	1.21%	2.24%	3.35%	3.10%	5.31%	9.43%	7.50%
Finance & Holding Companies	3.04%	4.12%	5.69%	5.98%	5.71%	6.85%	6.78%
Brokers and Funding Corps	0.72%	0.85%	1.05%	3.23%	6.43%	5.97%	6.40%
REITs and Asset-Backed Securities	0.00%	0.38%	0.11%	2.11%	4.40%	3.91%	3.10%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Source: Federal Reserve Statistical Release, *Flow of Funds Accounts of the United States*: www.federalreserve.gov/releases/z1/. Data as of December 2013.

credit unions) decreased their share of assets held from nearly 36 percent to under 20 percent, with almost all of the decrease occurring since the late 1990s. Insurance, private pension and state and local government retirement funds, mutual funds, mortgage-related firms, and all other nonbanks (which include securities brokers and dealers, issuers of securitized assets, and GSEs) evidenced the greatest growth. This graph is dramatic evidence of the competition that depository institutions face from other financial firms that compete in the same general product lines, but which are less regulated. The decline in depository institutions' market share is overstated, however, because many institutions strategically choose to move business off-balance sheet via securitization. When market share is measured in terms of revenues, commercial banks have done better in maintaining their historical market share.

Efficient and Competitive Financial System

Regulators spend considerable effort analyzing and modifying regulations regarding what prices financial institutions can charge and what products and services they can offer. Product restrictions, barriers to entry, and restrictions on mergers and the degree of branching can clearly enhance safety and soundness, but they also hinder competition. Effective financial regulation requires a delicate balance between the system's competitiveness and general safety and soundness concerns. In general, regulators approve new charters when the ownership group invests sufficient capital and hires strong management to run the institution. Branching restrictions, which previously were the exclusive domain of the states to determine, are no longer relevant now that all states permit interstate branching. Regulators approve virtually all mergers after all interested parties voice their assessments. With the largest institutions, the process entails allowing consumer groups to argue why the big banks aren't serving disadvantaged customers. Normally, large commercial banks, savings institutions, and credit unions commit to assistance in the form of mortgage loans and other services in certain trade areas where customers frequently underutilize banking services.

Consumer Protection

State legislatures and the Federal Reserve have implemented numerous laws and regulations to protect the rights of individuals who try to borrow. The purposes are wide ranging, varying from restricting deceptive advertising or trade practices to prohibiting discrimination. Exhibit 2.4 lists the broad areas in which the Federal Reserve has established regulations, including those areas of consumer regulations. Regs. B, C, E, M, S, V, Z, AA, BB, and DD apply specifically to consumer regulation. Equal credit opportunity (Reg. B), for example, makes it illegal for any lender to discriminate against a borrower on the basis of race, sex, marital status, religion, age, or national origin. It establishes guidelines for structuring loan applications and specifies how information can be used in making credit decisions. Community reinvestment prohibits redlining in which lenders as a matter of policy do not lend in certain geographic markets. Chapter 15 summarizes the key federal regulations as they pertain to consumer borrowing. Reg. Z requires disclosure of effective rates of interest, total interest paid, the total of all payments, as well as full disclosure as to why a customer was denied credit.

Trends in Federal Legislation and Regulation[11]

Legislation prior to the 1970s focused on limiting geographic and product expansion while restricting the interest rates banks could charge on loans and pay on their deposits. The fundamental focus of federal banking legislation and regulation since 1970 has been to better define and expand the product and geographic markets served by depository institutions, and to increase competition. Subsequent problems with failed savings and loans and commercial banks raised concerns that only a few large organizations would survive because all financial institutions would eventually have the same powers, and large firms would drive small firms out of business. Today, the banking and financial services industry is evolving into a new and more exciting industry full of challenges and opportunities. Smaller banks appear to have opportunities in providing

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[11] See the FDIC's "Important Banking Legislation" (http://www.fdic.gov/regulations/laws/important/index.html) and the Board of Governors of the Fed's "Regulations" http://federalreserve.gov/bankinforeg/reglisting.htm) for a summary of bank regulations.

specialized products and services. Larger banks have expanded their product mix and have all but eliminated the distinction between a bank, securities firm, and insurance company.

Key legislative and regulatory changes have attempted to address these basic issues: What is a bank? Where can banks conduct business? What products can banks offer and what interest rates may they charge or pay? Significant regulatory developments are identified in the following section with particular attention paid to the Dodd–Frank Act.

Key Federal Legislation: 1970–1993

Legislation of the late 1970s and early 1980s focused on the deregulation of pricing and products within the banking system. The **Community Reinvestment Act (CRA)**, passed in 1977, prevents a depository institution from acquiring another institution if the parent receives a poor CRA evaluation; that is, the depository institution is not doing enough to ensure that its credit and services are available to all members of the defined community. The **Depository Institutions Deregulation and Monetary Control Act (DIDMCA) of 1980** removed interest rate ceilings and authorized commercial banks and savings institutions to pay interest on checking accounts through the use of negotiable orders of withdrawal (NOW) accounts. The **Depository Institutions Act of 1982** (also known as Garn–St. Germain) expanded FDIC powers to assist troubled banks. The act authorized money market deposit accounts to allow commercial banks and thrifts to compete with products offered by brokerage firms. Many have suggested that these additional authorities created more problems and losses during the 1980s for thrift institutions.

Regulation subsequently returned to deregulation of the banking industry, allowing new brokerage, underwriting, and insurance powers on a limited basis. With the rolling recession of the late 1980s and early 1990s, many commercial banks throughout the United States suffered severe asset-quality problems leading to numerous failures. The **Competitive Equality Banking Act of 1987** recapitalized the Federal Savings and Loan Insurance Corporation (FSLIC) and expanded the FDIC's authority over open bank assistance transactions.

Problems in the savings and loan industry persisted, and the late 1980s and early 1990s saw legislation designed to solve the problems left over from the S&L crisis, as well as address commercial bank asset-quality and capital problems. Congress passed the **Financial Institutions Reform, Recovery and Enforcement Act of 1989** (FIRREA) with the primary purpose of restoring public confidence in the savings and loan industry. It abolished the FSLIC and placed the FDIC in charge of insurance of the industry and created two insurance funds, the BIF and the Savings Association Insurance Fund (SAIF). The act also abolished the Federal Home Loan Bank Board and created the Office of Thrift Supervision (OTS) and the Resolution Trust Corporation (RTC), which was to manage and dispose of the assets of failed institutions. The act further established severe penalties for bank boards and management for their actions or failure of action. Congress also passed the **Federal Deposit Insurance Corporation Improvement Act of 1991**, which greatly increased the powers and authority of the FDIC, recapitalized the BIF, and allowed the FDIC to borrow from the Treasury. The act mandated a least-cost method and *prompt corrective action* for dealing with failing banks, and established new capital requirements for banks.

Accounting standards during the 1980s meant that the significant increases in interest rates during the 1980s left long-term assets, such as mortgages, significantly overvalued on the books of savings and loans. The Financial Accounting Standards Board issued **FASB 115** in 1993 to address the market value accounting of all investments in equity securities that have readily determinable fair values, and all investments in debt securities. Investments subject to the standard are classified in three categories:

1. *Held-to-maturity securities.* Debt securities that the institution has the positive intent and ability to hold to maturity are classified as held-to-maturity securities and reported at historical (amortized) cost.
2. *Trading account securities.* Debt and equity securities that are bought and held primarily for the purpose of selling (or trading) them in the near term. Trading securities are reported at fair value, with unrealized gains and losses included in earnings (net income).
3. *Available-for-sale securities.* Debt and equity securities not classified as either held-to-maturity securities or trading securities. Available-for-sale securities are reported at fair value, with unrealized gains and losses excluded from earnings but reported as a net amount in a separate component of shareholders' equity.

One potential weakness of FASB 115 is that it does not apply to loans, including mortgage loans, that have not been securitized (sold in the secondary market).

Key Federal Legislation: 1994–2000

By the mid-1990s, legislation again turned to deregulation of the financial services industry, both in geographic scope as well as product lines and types of permissible activities. The **Riegle–Neal Interstate Banking and Branching Efficiency Act of 1994** permits adequately capitalized bank holding companies to acquire banks in any state. The **Gramm–Leach–Bliley Act of 1999** repealed the Glass–Steagall Act and modified the Bank Holding Company Act to create a new financial holding company authorized to engage in underwriting and selling insurance and securities, conducting both commercial and merchant banking, investing in and developing real estate, and other activities "complementary" to banking. The act also restricts the disclosure of nonpublic customer information and requires disclosure of a *privacy policy*. The 1990s ended with unprecedented merger and consolidation activities as holding companies consolidated separate banks into branches and acquired new lines of business, including investment underwriting and insurance.

Key Federal Legislation: 2001–2006

The beginning of the twenty-first century started with an economic recession, the terrorist events of September 11, 2001, and widespread corporate scandals. These events have not only had a dramatic impact upon the legislation of the early 2000s but also upon the lives of just about everyone in the world. In 2001, Congress passed the International Money Laundering Abatement and Financial Anti-Terrorism Act, also known as **Title III** of the **USA Patriot Act**, designed to prevent terrorists and others from using the U.S. financial system to move funds that support illegal activity. The act specifically required financial institutions to keep additional records and establish anti–money laundering programs. Congress passed the **Sarbanes–Oxley Act** in 2002, which established the Public Company Oversight Board to regulate public accounting firms that audit publicly traded companies. It specifically addresses issues of conflicts among company executives and accounting firms and their affiliates, and requires chief executive officers (CEOs) and chief financial officers (CFOs) to certify the annual and quarterly reports of publicly traded companies. The act also established many required policies and procedures in the area of corporate governance for the boards of publicly traded companies.

The **Check Clearing for the 21st Century Act (Check 21)** created a framework for the elimination of paper checks by allowing any institution to "truncate" the paper check at any point in the process. Today, many financial institutions offer remote capture whereby businesses can scan checks they receive from customers and transmit the information electronically to their financial institution. Several depository institutions, including USAA Savings Bank and Wells Fargo, are offering remote capture from "home." With this system, individuals can scan the paper check on their own personal scanners or smart phones and receive credit for the check instantly. Customers, however, must not forget to destroy the original check once it has been scanned.

The **Fair and Accurate Credit Transactions Act (FACT) of 2003** and the **Servicemembers Civil Relief Act (SCRA) of 2003** both addressed important issues of the time. The FACT enhances consumer rights in situations involving identity theft, credit scoring, and claims of inaccurate credit information. The SCRA provides specific relief to active-duty military to allow for postponement or suspension of certain civil obligations.

After long debate over many years, the **Deposit Insurance Reform Act of 2005** was passed; this act merged the old BIF and the old SAIF into one new fund, the DIF. It increased deposit insurance on retirement accounts to $250,000. The act also removed the restrictions on risk-based insurance premiums to allow the FDIC to charge risk-based premiums regardless of the size of the reserve fund.

Key Federal Legislation: 2007–2010

The economic events and subprime financial crisis of 2007–2009 were the catalyst for several pieces of legislation aimed at solving the liquidity crisis, creating an economic stimulus, providing home mortgage foreclosure forbearance, and implementing housing finance reform and consumer protection reforms. The focus of the majority of the new legislation and regulation was to put the U.S. economy back on its feet and protect consumers from a wave of home mortgage foreclosures. The significant drop in housing values and the use of nontraditional mortgage products fueled the massive increase in home foreclosures.

The **Troubled Asset Relief Program (TARP)** of 2008 created a $750 billion fund originally designed to allow the U.S. Treasury to purchase distressed assets from financial institutions. The value of many mortgage derivatives had fallen dramatically because investors were uncertain of the true value of these products. In early 2008, as liquidity dried up and financial institutions stopped lending—not only to businesses and consumers, but to other financial institutions—financial markets came to a virtual stop. During the period of time it took to establish a plan for asset purchase, the Treasury changed gears and began the **TARP Capital Purchase Program (TARP–CCP)**. Under this plan, the Treasury began investing directly in the preferred stock of financial institutions. Qualified institutions could issue senior preferred stock equal to not less than 1 percent—and to not more than $25 billion, or 3 percent—of risk-weighted assets. This preferred stock would pay 5 percent per year for 5 years, then 9 percent thereafter (see Chapter 12 for more details). In addition, the TARP program temporarily increased FDIC deposit coverage to $250,000 through 2009 and provided unlimited insurance coverage for noninterest-bearing business accounts.

In late 2008, the Mortgage Bankers Association estimated that 2.2 million home mortgages would be in the foreclosure process by year-end 2008. The record-setting pace of foreclosures in 2008 prompted several members of Congress and Shelia Bair, chair of the FDIC, to push foreclosure relief for the American homeowner. Congress passed legislation labeled the **Housing and Economic Recovery Act (HERA) of 2008**. This package consisted of several pieces of legislation including the following:[12]

- The **Federal Housing Finance Regulatory Reform Act of 2008** was designed to address problems related to certain GSEs: Fannie Mae, Freddie Mac, and the Federal Home Loan Banks (FHLBs). The act established new management and capital standards, restricted asset growth and capital distribution, and required that new product offerings by these GSEs be reviewed and approved. In addition, the act created a new regulator, the **FHFA**, for Fannie Mae, Freddie Mac, and the 12 FHLBs. This agency merged the Office of Federal Housing Enterprise Oversight (OFHEO), the Federal Housing Finance Board (FHFB), and the U.S. Department of Housing and Urban Development (HUD) into one GSE mission team. The act also increased the affordable housing mission of Fannie and Freddie, raised the mortgage limits in high-cost housing areas, and created a Housing and Trust Fund and Capital Magnet Fund for the construction of affordable rental housing.
- The **HOPE for Homeowners Act of 2008** created a new discount program at the Federal Housing Administration (FHA) to back FHA-insured mortgages and to allow lenders to provide mortgage loans to distressed borrowers at a deep discount to prevent foreclosures.
- The **Treasury Emergency Authority** provisions authorized the Treasury to purchase debt securities issued by the GSEs and to purchase common stock.
- The **Secure and Fair Enforcement for Mortgage Licensing Act (SAFE) of 2008** provided for the establishment of a nationwide licensing and registry system that would establish minimum national standards for all residential mortgage brokers and lenders.
- The **Foreclosure Prevention Act of 2008** and the **FHA Modernization Act of 2008** expanded the benefits of the FHA loan limit, established minimum down payments for FHA loans (3.5 percent), made changes to FHA insurance for manufactured housing, and increased consumer protections. The act provided for new requirements for the safe use of reverse mortgages by seniors, foreclosure protections for service members, a loss-mitigation process to help troubled homeowners retain their homes, emergency assistance for areas of the country with the highest foreclosure rates, housing counseling resources, and mortgage disclosure improvements.

In July 2008, the Federal Reserve Board amended **Regulation Z** (Truth in Lending Act [TILA] of 1968) to provide additional consumer protection against unfair and deceptive home mortgage lending practices, impose restrictions on certain types of mortgage lending, and establish disclosure and advertising standards. Modifications to Reg. Z provided four additional protections, resulting in a newly defined category of higher-priced mortgage loans (those with an interest rate of 1.5 percent and 3.5 percent above the Freddie Mac mortgage index on first- and second-lien mortgages, respectively). The four protections do the following:[13]

1. Prohibit a lender from making mortgage loans without considering how borrowers' income or total assets affects their ability to repay the loan.
2. Require lenders to verify the income and assets of borrowers.

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[12] Democratic Policy Committee, "H.R. 3221, the Housing and Economic Recovery Act of 2008," July 25, 2008, http://www.dpc.senate.gov/dpcdoc.cfm?doc_name=lb-110-2-123.

[13] Federal Reserve Board, Press Release, July 14, 2008, www.federalreserve.gov/newsevents/press/bcreg/20080714a.htm.

3. Restrict prepayment penalties. There are no prepayment penalties if the loan can be reset within the first four years; no prepayment penalty can extend beyond two years.
4. Require escrow accounts for insurance and taxes for all first-lien mortgage loans.

Modifications to Reg. Z also prohibit lenders from coercing appraisers to inflate home values, prohibit pyramiding late fees, require good-faith estimates of fees and loan costs, and require a schedule of payments. The modifications also prevent lenders from advertising a "fixed" rate if the rate may indeed change.

The **Emergency Economic Stabilization Act of 2008** authorized the U.S. Treasury to supply banks with cash by purchasing up to $700 billion in distressed assets, particularly mortgage-backed securities. The **Helping Families Save Their Homes Act of 2009** included provisions that were intended to prevent mortgage foreclosures, enhance the availability of mortgage credit, and protect renters living in foreclosed homes. The act also amended the Truth in Lending Act by establishing a new requirement for notifying consumers regarding the sale of their mortgage loan. In addition, the act increased the borrowing authority for the FDIC and NCUA, lengthened the DIF restoration plan period from 5 years to 8 years, and extended the $250,000 deposit insurance coverage through the end of 2013.

Key Federal Legislation: Dodd–Frank

In 2010 Congress passed, and the president signed into law, the **Dodd–Frank Wall Street Reform and Consumer Protection Act (Dodd–Frank)**. This sweeping piece of legislation contains 16 major areas and is over 3,000 pages.[14] The Senate Banking Committee's "Brief Summary" is over 15 pages![15] When passed, the legislation had 398 rules to be written by various federal regulatory agencies. As of November 2013, only 162 of the 398 rules have been finalized, 121 have been proposed but not finalized, and 115 have not yet been proposed.[16] The 16 sections of the Dodd–Frank Act are:

I. Financial Stability
II. Orderly Liquidation Authority
III. Transfer of Powers to the Comptroller of the Currency, the Corporation, and the Board of Governors
IV. Regulation of Advisers to Hedge Funds and Others
V. Insurance
VI. Improvements to Regulation of Bank and Savings Association Holding Companies and Depository Institutions
VII. Wall Street Transparency and Accountability
VIII. Payment, Clearings, and Settlement Supervision
IX. Investor Protection and Improvements to the Regulation of Securities
X. Bureau of Consumer Financial Protection
XI. Federal Reserve System Provisions
XII. Improving Access to Mainstream Financial Institutions
XIII. Pay It Back Act

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[14] http://www.gpo.gov/fdsys/pkg/PLAW-111publ203/pdf/PLAW-111publ203.pdf

[15] http://www.banking.senate.gov/public/_files/070110_Dodd_Frank_Wall_Street_Reform_comprehensive_summary_Final.pdf

[16] http://www.davispolk.com/sites/default/files/Nov2013_Dodd.Frank_.Progress.Report_0.pdf

XIV. Mortgage Reform and Anti-Predatory Lending Act
XV. Miscellaneous Provisions
XVI. Section 1256 Contracts

The Dodd–Frank Act is somewhat overwhelming in its length, as well as the rules and regulations yet to be written and implemented. Although some have applauded the steps the Act has taken, others have criticized the Act as hindering economic growth. In particular, the Dodd–Frank Act:

- Created the **Financial Stability Oversight Council** and the **Office of Financial Research**. The Council is charged with identifying and responding to risks that threaten financial stability in the U.S. and overseeing nonbank financial institutions, such as hedge funds. The Council is chaired by the Treasury Secretary and is made up of 10 federal financial regulators, an independent member, and 5 nonvoting members. The Office of Financial Research was established "to serve the Financial Stability Oversight Council, its member agencies, and the public by improving the quality, transparency, and accessibility of financial data and information; by conducting and sponsoring research related to financial stability; and by promoting best practices in risk management."[17]
- Gives federal regulators the ability to take over and liquidate both large bank holding companies and large nonbank financial institutions in the event the firms pose a serious threat to the country's financial stability. The Act also gives the Federal Reserve the authority to force these complex financial institutions to divest some of their holdings if the firm poses a threat to the country's financial stability.
- Requires certain hedge fund managers and private equity fund managers to register as advisers with the SEC.
- Requires complex financial institutions to have "funeral plans" in place. These plans are required to detail the quick and orderly shutdown of the firm in the event the firm were to fail.
- Created the **Consumer Financial Protection Bureau**. The CFPB is charged with providing consumers with information about mortgages and other financial products in plain English. The CFPB enforces federal consumer financial protection laws.In addition, the director of CFPB is charged with creating four offices: the Office of Fair Lending and Equal Opportunity; the Office of Financial Education; the Office of Service Members Affairs; and the Office of Financial Protection for Older Americans. Each of these offices is charged with serving and protecting consumer groups through oversight and enforcement of federal laws, especially as they relate to military personnel and older Americans. The CFPB is independent of other regulatory agencies and receives its funding from the Federal Reserve.
- Created the **Office of National Insurance**. The Office of National Insurance is charged with promoting the national coordination of the insurance sector, although the office does not have a supervisory role. Supervisory responsibility still remains with the states.[18]
- Created the **Office of Credit Rating Agencies** and a mandate to standardize credit ratings terminology and require disclosure of the credit rating agencies' methodologies.

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[17] http://www.treasury.gov/initiatives/ofr/Pages/default.aspx

[18] http://www.law.cornell.edu/wex/dodd-frank_title_V

Under the Act, "the SEC can require credit rating agencies to submit their rating systems for review, and can de-certify an agency that gives misleading ratings."[19]

- Eliminated the OTS and transferred those functions to the Federal Reserve, the OCC, and the FDIC.
- Requires securitizers of mortgages to retain 5% of the credit risk if the mortgage does not meet the Ability to Repay and Qualified Mortgage standards (see Chapters 13 and 15 for details on the Ability to Repay and Qualified Mortgage standards). This forces the securitizers of mortgages to have "skin in the game" and incur losses in the event the mortgage-backed securities they issued default.
- Prohibits banking entities from engaging in proprietary trading, subject to some exceptions (often referred to as the "Volcker Rule"), and increases capital requirements for nonbank financial companies that engage in proprietary trading.
- Requires companies to include a resolution in their proxy statements asking for shareholders to have a nonbinding vote on the compensation of the firm's executive officers.
- Repealed Reg. Q, which prohibited the payment of interest on demand deposits. Prior to the passage of the Act, banks could not pay explicit interest on corporate checking accounts.
- Requires regulation of credit default swaps by the SEC or the Commodity Futures Trading Commission. In addition, the Act establishes a code of conduct for swap dealers, allows regulators to impose capital requirements on swap dealers, and requires that no "Federal assistance" may be provided to any "swaps entity."
- Eliminates "Too-Big-To-Fail" bailouts. The Act states that taxpayers will not bear the cost of liquidating large, complex financial institutions. Rather it charges the FDIC as the receiver and provides for a three- to five-year period to complete the liquidation of failed institutions.
- Mitigates systemic risk by requiring that the Federal Reserve, CFTC, SEC, and FDIC work together to create rules and standards of operations for **Financial Market Utilities (FMUs)**. FMUs are systems "that provide the essential infrastructure for transferring, clearing, and settling payments, securities, and other financial transactions among financial institutions or between financial institutions and the system." Examples of FMUs are the Options Clearing Corporation and the Chicago Mercantile Exchange.[20]
- Authorizes the SEC to impose a fiduciary duty on brokers who give investment advice to their clients. This advice must be in the best interest of the client.
- Permanently extended the maximum deposit insurance amount from $100,000 to $250,000.
- Created national underwriting standards for residential mortgages. The intent is to ensure that "the consumer has a reasonable ability to repay the loan, according to the terms, and all applicable taxes, insurance (including mortgage guarantee insurance), and other assessments."[21]

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[19] http://www.cnbc.com/id/47075854

[20] http://www.federalreserve.gov/paymentsystems/designated_fmu_about.htm

[21] http://www.gpo.gov/fdsys/pkg/PLAW-111publ203/pdf/PLAW-111publ203.pdf

Even this "brief" overview of Dodd–Frank is somewhat daunting, and with many of the rules remaining to be written and finalized, it is difficult to predict what the ultimate regulatory structure will look like. Although regulation is critical to a sound financial system, too much regulation can hinder the industry and also limit long-term economic growth.

Current Unresolved Regulatory Issues

Bank regulation is continuously evolving in response to economic and competitive conditions. Although many issues regarding the future structure and operating environment of financial services institutions have been debated recently, the financial crisis of 2007–2009 put the need for regulatory reform of the fragmented system of financial regulation in the United States back in the spotlight. Key facets of many of the outstanding regulatory issues are identified below, with the topics discussed in greater detail throughout the book.

Capital Adequacy. The adequacy of bank capital levels is constantly debated. During the 1980s, when bank and thrift failures soared, capital levels were generally considered inadequate, especially at larger institutions. Effective in 1992, banks and thrifts were subject to minimum capital requirements designed to reduce the overall risk of the banking industry. These standards, however, were based on the minimum levels of equity on the general default riskiness of bank assets. The original Basel I and the new Basel III capital standards require equity capital based on the riskiness of financial institutions' assets. In addition, the FDIC charges insurance premiums based on the riskiness of the institution and its respective capital levels.

Today, regulators follow the "capital is king" approach. Well-capitalized financial institutions have been allowed to expand the range of products they offer—including establishing affiliates that can underwrite and deal in securities. A well-capitalized institution's regulatory burdens are lessened as well. Because the amount of capital needed is related to the degree of risk and types of activities in which banks engage, the difficulty is in identifying which firms are truly well capitalized and which firms need additional capital. Today, therefore, the capital debate centers around determining "what is an adequate level of capital?" Large financial institutions such as Citigroup invest in many different types of assets and products and in the development of various revenue streams. Prior to the subprime crisis of 2007–2009, companies such as Bear Stearns, Lehman Brothers, and Countrywide Financial assumed they fully understood the risks behind the securitization of collateralized debt obligations, many of which were subprime loans. The subprime fallout of 2008, however, left many analysts and regulators questioning whether large corporations can effectively measure and manage the risk of their own portfolios.

Hence, the debate regarding how much capital is enough continues today. As banks enter into new product lines and nontraditional business activities, the concern of regulators is that the FDIC may be underwriting additional risks not covered by a bank's capital position. Regulators would like to increase the minimum requirement because it reduces the likelihood of failure. Bankers, by contrast, argue that it is expensive and difficult to obtain additional equity, and that high requirements restrict their competitiveness. Basel III, in fact, raises minimum capital requirements for all banks and puts more emphasis on common equity as the preferred form of capital.

The ramifications of greater capital requirements are enormous. First, equity is more expensive than debt because interest payments are deductible to the bank, while dividends on stock are not. It is thus costly to issue new stock. Second, the majority of commercial banks (most commercial banks are smaller community banks) do not have ready access to the equity market and most banks subsequently find it extremely difficult to add capital externally. Small banks' stocks are not broadly traded. Banks that need capital must rely either on retaining earnings, solicit funds from current directors, managers and shareholders, or find a merger partner. Thus, the final impact is that increased capital requirements restrict growth and make it difficult to compete as a small entity, leading to consolidation. The net effect will be increasingly larger firms. The largest banks, however, have found access to equity markets much quicker, easier, and cheaper. Capital-rich firms have market power to purchase capital-deficient firms relatively inexpensively.

Regulatory Reform. Although not a new debate, the subprime housing crisis of 2008–2009 brought the debate about financial institutions' regulatory reform back into mainstream discussion. The financial institution regulatory system is fragmented across a variety of types of institutions and numerous regulatory agencies. Regulation of those institutions that have traditionally been called "banks" in the United States is highly fragmented. Depository institutions, such as commercial banks, savings institutions, and credit unions, have historically been regulated by one or more of the following overlapping regulatory agencies: the Fed, the OCC, the OTS, the FDIC, state financial regulatory agencies, and the NCUA. The Dodd–Frank Act, however, eliminated at least one of these regulatory agencies by merging the OTS into the OCC, but it also created a new regulatory authority, the Consumer Finance Protection Bureau.

The parent companies of many large financial institutions are now registered as FHCs as provided by the Gramm–Leach–Bliley Act of 1999. These holding companies have also been regulated by the Federal Reserve. Examples include Bank of America and J.P. Morgan Chase. Other financial companies, traditionally known as either investment banks or insurance companies, had not registered as FHCs prior to the financial crisis of 2008. These would include such companies as Merrill Lynch, State Farm Mutual Automobile Insurance Company, and USAA. These companies operated in the traditional bank market by using either a limited banking charter, such as an Industrial Loan Company (ILC), or a thrift charter. USAA's parent company uses a unitary thrift charter and owns a savings bank and an insurance business, as well as an investment and brokerage business. Today, Merrill Lynch is owned by Bank of America, and State Farm is a financial holding company.

Nondepository institutions have historically not been subject to the same regulatory burden as depository institutions. Examples include large investment banks (such as Goldman Sachs and Morgan Stanley, which are now FHCs subject to regulation by the Federal Reserve), insurance companies, finance companies, hedge funds, retail companies with significant financial interests (such as Walmart), credit card companies (American Express is now a financial holding company), pawn shops that make secured loans, money transfer businesses (foreign currency transfers), and auto finance companies. In fact, financial regulators historically relied on what can be termed "delegated" regulation. Richard Fisher, president of the Dallas Federal Reserve, stated:

> *U.S. regulators rely heavily on a core group of very large money center banks with significant exposures, expecting them to act as delegated monitors, disciplining the remaining players in the financial system through effective controls on counterparty risk by assessing and limiting the risk of other banks, hedge funds, and private equity firms. And finally, regulators and investors alike have come to depend on ratings agencies to assess and monitor firms and securities on their behalf.*[22]

Many of the large nondepository financial institutions converted to FHCs during the financial crisis to avail themselves of the Federal Reserve's lending authority. This conversion

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[22] See Richard W. Fisher (2008).

at least partially resolved the lack of regulation of these companies, which was a contributor to the financial crisis. One of the intents of the Dodd–Frank Act is to bring uniformity to the regulatory system in which all players are regulated equally. With so many regulations remaining to be written for Dodd–Frank, only time will tell how effective this massive piece of legislation will be.

The exposure of the U.S. financial system to a breakdown in the chain of delegated monitoring could not have been more evident than in the recent financial and economic problems created by a few large financial players in subprime mortgage securitizations. Traditional mortgages with lower-risk terms have been securitized and sold through GSEs such as Fannie Mae and Freddie Mac for a long time. As more and more nonprime mortgages that did not meet the standards of Fannie and Freddie came on the market, new players from the private sector appeared. These new investors were clearly influenced by the AAA ratings provided by the major rating agencies, a decade of steadily escalating housing prices, the promise of a new paradigm in real estate, fancy words like "tranche" and mathematical formulas so complicated that most people said, "it has to be right." Add to that mix a dominant investment firm in subprime pools of mortgage-backed securities (such as Bear Stearns, which was not a "bank" and not directly regulated by the Fed), and you have a recipe for problems.

On the lending side, popular opinion has been that "banks" were significant lenders and investors in subprime mortgages and mortgage-backed securities. This again creates confusion with regard to the use of the word "bank." Most commercial banks were not significantly involved in subprime lending, as these loans did not meet their credit standards. In fact, many commercial banks were squeezed out of mortgage lending after 2005, when terms on mortgage loans became very lax. The dominant players were a few large commercial banks (Citibank), savings institutions (Countrywide, Golden West Financial, and Washington Mutual, none of which exist today), and private mortgage companies. Some of the largest lending groups in the subprime mortgage market were private mortgage companies that were subject to little regulation. Many critics argue that this lack of direct supervision was a leading cause as to why some of these loans were made in the first place.

With respect to regulation, it should be noted that Bear Stearns was not a depository institution (nor are most private mortgage companies) and hence was not subject to direct regulation by the Federal Reserve. Yet, as Bear Stearns' problems became critical, the Federal Reserve agreed to lend to them directly, even though the Fed has a strong preference for working through depository institutions such as J.P. Morgan Chase. Within a day, the Fed guaranteed loans to J. P. Morgan Chase to "encourage" it to purchase Bear Stearns. Because the Fed is willing and able to assist financial players they do not directly supervise, the system appears to be at greater risk than it was before the most recent financial innovations. As a result, the debate about the need for a major overhaul of our financial regulatory system is once again playing out in the mainstream.

Too Big To Fail

One of the Dodd–Frank Act's stated purposes is "to end 'too big to fail'" and "to protect the American taxpayer by ending bailouts."[23] Unfortunately, eliminating "too big to fail" (TBTF) is more complicated than just saying it.[24]

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[23] http://www.gpo.gov/fdsys/pkg/PLAW-111publ203/pdf/PLAW-111publ203.pdf

[24] Congressman Stewart B. McKinney is credited with coining the phrase "too big to fail." http://www.nytimes.com/2009/06/21/weekinreview/21dash.html?_r=0

The first bank to be treated as too large to be allowed to fail was Continental Illinois National Bank and Trust Company in 1984. At the time of its failure, Continental Illinois was the seventh-largest bank in the country and one of 24 banks with over $10 billion in assets. Today, there are approximately 110 banks with assets over $10 billion (and 4 with over $1 trillion in assets). Continental Illinois' failure compelled "regulators to recognize not only that very large institutions could fail but also that bank regulators needed to find satisfactory ways to cope with such failures."[25]

Prior to Continental Illinois' failure, the FDIC would typically either close (and then liquidate) a failed bank and pay off the insured depositors or arrange for the bank to be acquired. Due to Continental Illinois' size and complexity, a "payoff and liquidation was simply not considered a viable option."[26] However, federal banking regulators were not willing to let it fail, fearing that this would create panic in the financial markets. Instead, federal banking regulators injected billions of dollars into Continental Illinois, with the FDIC eventually owning 80% of the bank. It took until 1991 for the FDIC to completely divest its investment in Continental Illinois, at an estimated cost of $1.1 billion to the FDIC.[27, 28]

Since the failure of Continental Illinois, the FDIC typically handles large bank failures using a Purchase and Assumption (P&A) process. In a P&A, the FDIC accepts bids for a package of all of the failed bank's deposits, other nonsubordinated liabilities, assets (often minus the nonperforming loans), and cash from the FDIC, with the highest bidder acquiring the failed bank. The effect of a P&A is that all depositors, even uninsured depositors, receive all of their deposits.[29] Unfortunately, this policy simply treats all large financial institutions as if they are too big to fail.

So what is wrong with TBTF? Are the country's largest banks too large? Should there be a limit on the size of a bank? Federal regulators and economists have debated these issues for the last 30 years.

One major issue with TBTF is that it creates two classes of banks: large banks, where all creditors and depositors have unlimited de facto protection (even deposits accounts with more than $250,000), and small banks where creditors and uninsured depositors may incur losses.[30] TBTF gives larger financial institutions a funding advantage over smaller banks and an incentive to take on additional risk. Many consider this disparate treatment inherently unfair. Alan Greenspan, former Federal Reserve Chairman, contends that "If they're too big to fail, they're too big."[31]

Another problem with TBTF is that it creates **moral hazard**. Moral hazard can be defined as the "lack of incentive to guard against risk where one is protected from its consequences."[32] If creditors and depositors of a large bank believe the government will pay them off in the event the large bank fails, they have less incentive to be concerned about the risks the bank is taking. If the bank's risky behavior pays off, it can compensate its creditors and depositors. If the risky "bets" do not pay off, the creditors and depositors are still paid, but by the taxpayers, not the bank. Because of the implicit

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[25] http://www.fdic.gov/bank/historical/history/235_258.pdf

[26] Ibid.

[27] http://www.fdic.gov/bank/historical/managing/history2-04.pdf

[28] Kaufman, George G. (2004). Too Big to Fail in U.S. Banking: Quo Vadis?. In Benton E. Gup (Ed.), Too Big to Fail: Policies and Practices in Government Bailouts (pp. 154). Westport, CT: Praeger Publishers.

[29] http://www.fdic.gov/bank/analytical/firstfifty/chapter5.pdf

[30] Wheelock, David C., "Too Big To Fail: The Pros and Cons of Breaking Up Big Banks." The Regional Economist. October 2012.

[31] McKee, Michael, and Scott Lanman, "Greenspan Says U.S. Should Consider Breaking Up Large Banks." Bloomberg, October 15, 2009: http://www.bloomberg.com/apps/news?pid=email_en&sid=aJ8HPmNUfchg

[32] http://www.oxforddictionaries.com/us/definition/american_english/moral-hazard

government guarantee, creditors and depositors do not demand higher interest rates to be compensated for the risk the bank is taking. This allows the large banks to borrow at rates that are lower than they would be in the absence of the implied guarantee. Importantly, managers of TBTF firms are encouraged to take on greater risk. Smaller banks, without an implicit guarantee, are at a cost disadvantage when raising funds. Richard Fisher, President, and Harvey Rosenblum, former Executive Vice-President of the Federal Reserve Bank of Dallas, explain that this implicit government guarantee exempts large financial institutions "from the normal processes of bankruptcy and creative destruction. Without fear of failure, these banks and their counterparties can take excessive risks."[33] Again, many consider this to be unfair.

Most do not argue that TBTF is a good thing. However, some opponents of limits on bank size point out that larger banks experience economies of scale, reducing the cost of banking for their customers. This economies of scale argument is often used to justify bank mergers. Large organizations also argue that they need size and complexity to compete with global firms that are not subject to size restrictions. Others argue that TBTF is a necessary evil. Given the concentration of banking assets and the interconnectedness of the financial sector, the failure of one large bank would create a domino effect that could take down the entire financial system. Thus, the largest financial institutions should not be allowed to fail. So what should be done?

The solution is not to simply let large banks fail, but to create the proper incentives for appropriate risk management practices. Large financial institutions currently expose us to systemic risk (the top 0.2% of banks control two-thirds of the U.S. banking industry's assets).[34] The collapse of a large bank could easily cause significant losses to other banks and firms, hindering the entire financial system and the economy. Although the Dodd–Frank Act "was a well-intentioned response,"[35] it cannot eliminate TBTF. However, Fisher and Rosenblum suggest the following to mitigate systemic risk, reduce moral hazard, and level the playing field for large and small banks.

1. Require that deposit insurance and borrowing at the Fed's discount window apply only to traditional commercial banks and not to nonbank affiliates of the financial or bank holding company.
2. Customers and creditors of nonbank affiliates should sign a "legally binding, unambiguous disclosure acknowledging and accepting that there is no government guarantee."[36] The same would apply for uninsured depositors.
3. Restructure the largest FHCs such that the banking entities are "too small to save." Regulatory mechanisms would be put in place to allow for the orderly bankruptcy or liquidation of any of the financial holding company's entities. Richmond Federal Reserve President Jeffrey Lacker has stated that he is in favor of bankruptcy being the primary tool for handling large failing banks.[37]

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[33] Fisher, Richard W. and Harvey Rosenblum, "Fisher and Rosenblum: How to Shrink the 'Too-Big-to-Fail' Banks." *The Wall Street Journal.* March 10, 2013: http://online.wsj.com/news/articles/SB10001424127887324128504578344652647097278

[34] Fisher, Richard W., "Correcting 'Dodd–Frank' to Actually End 'Too Big to Fail' Statement before the Committee on Financial Services, U.S. House of Representatives, June 26, 2013: http://www.dallasfed.org/news/speeches/fisher/2013/fs130626.cfm

[35] Ibid.

[36] Fisher, Richard W. and Harvey Rosenblum, "Fisher and Rosenblum: How to Shrink the 'Too-Big-to-Fail' Banks." *The Wall Street Journal.* March 10, 2013: http://online.wsj.com/news/articles/SB10001424127887324128504578344652647097278

[37] Torres, Craig and Cheynne Hopkins, "Fed Presidents Say Dodd–Frank Failed to Dispel Too-Big-to-Fail." Bloomberg News, June 25, 2013: http://www.bloomberg.com/news/2013-06-25/fed-presidents-say-dodd-frank-failed-to-dispel-too-big-to-fail.html

No set of financial regulations can eliminate all future bank failures or financial crises. However, steps can be taken to reduce the impact of future bank failures. It is clear that market discipline needs to be reintroduced, and an environment for economic Darwinism, where poorly managed banks, large or small, are allowed to die off, should be encouraged.

Summary

According to historical regulatory definition, a commercial bank is a firm that both accepts demand deposits and makes commercial loans. Although this has been the legal definition, it is not fundamentally useful today. Even the word "bank" can be confusing when describing today's modern financial institution. Financial institutions can own and operate securities businesses, insurance companies, and other financial services firms, and such firms can own and operate commercial banks. Most of the legal and regulatory differences that have historically separated various types of depository institutions are gone. Commercial banks, savings institutions, credit unions, FCBs, insurance companies, investment and brokerage companies, and other affiliates of nationwide financial conglomerates compete directly in the same space, providing not only traditional banking services, but also a wide variety of financially related products and services. Most of us would not know, or even care, whether our financial institution was a depository institution by the types of products and services it offers.

Even though many of the regulatory constraints that separated commercial banking, investment banking, and insurance were removed in 1999, depository institutions still do not operate on an equal footing with other nonbank firms. Clear evidence of this became apparent as a result of the financial crisis of 2007–2009. Companies such as Bear Stearns and Lehman Brothers, who were not commercial banks or regulated as commercial banks, were able to expand into activities outside the scope of commercial banking. In addition, they were allowed to operate with a fraction of the capital required by similar commercial banks. These lower capital levels were obviously a contributing factor to their demise.

Even though the constraints separating commercial banking and investment banking were fundamentally removed in 1999, few investment banks chose to become financial (or bank) holding companies until 2008. The basic argument was that the additional regulatory burden outweighed the benefits of being a bank holding company. This obviously changed in 2008 as many noncommercial banks, such as American Express, Goldman Sachs, and Morgan Stanley, converted to bank holding companies. The argument is that by becoming bank holding companies, their access to borrowings from the Federal Reserve and the TARP program outweighed the additional regulation they would face by acquiring bank holding company status. Prior to 2008, it was mostly the largest commercial banks who embraced the full line of new product powers. In fact, Citigroup was the only U.S. banking company that took a major position in all three of these areas—commercial banking, investment banking, and insurance—but it has since sold most of its insurance underwriting business and may well divest itself of other lines of business. Other large commercial banking companies, however, aggressively entered the securities business.

This chapter describes the organizational structure of the financial services industry with particular emphasis on the depository institution industry and the legislation and regulation that guide its operating policies. Early restrictions regarding branching encouraged the formation of holding companies and the development of nonbank institutions as a means of circumventing branching restrictions. The impact of interest deregulation and increased deposit insurance was to encourage risk-taking by commercial banks and thrifts, so that many firms failed during the 1980s and early 1990s. In 1989, Congress approved the FIRREA, which substantially restructured the thrift industry by redefining acceptable business activities. During the 1990s, the regulatory trend was to remove the barriers in opportunities, which are now available, to different types of financial services companies, and thus expand the number of competitors in most product lines. The Financial Modernization Act of 1999 greatly enhanced these opportunities, such that all managers must constantly assess what businesses and products their firms should offer and in what form. Regulation of the late 2000s focus on addressing the financial crisis brought on by the deteriorating real estate and home mortgage industries.

The financial crisis of 2007–2009 focused attention on the potential need for modifications to the regulatory system. This chapter summarizes provisions of the Dodd-Frank Act, which will forever change the financial regulatory landscape.

Questions

1. What are the advantages of a depository institution having many branches in a city or state as opposed to just one main office location? What are the disadvantages?
2. Explain why there are so many different regulatory agencies. Devise a regulatory structure that would improve the existing system.
3. What are the basic objectives of depository institution regulation? How do regulators attempt to achieve these objectives?
4. Is the purpose of commercial bank regulation to prevent bank failures? Explain.
5. Federal deposit insurance used to cover a maximum of $40,000 per eligible account. It was later raised to $100,000 per account and is now $250,000 per eligible account. What cost and/or risk does this present to the FDIC?
6. What does the acronym CAMELS refer to in commercial bank examinations? What are the most important facets of an examination?
7. Why were commercial banks prohibited from underwriting corporate securities within the United States but not abroad? How can a depository institution engage in underwriting corporate securities today?
8. Change is always good for some participants and bad for others. Which types of financial institutions appear best situated to gain from potential changes in the regulatory structure within the financial services arena? Which institutions seem most likely to lose?
9. Outline the major provisions of the Gramm–Leach–Bliley Act of 1999. Many experts considered this bill to favor larger multibank holding companies. What are some of the advantages or disadvantages of this bill to the largest and smallest commercial banks and savings institutions? What impact, if any, do you think this bill had upon the financial crisis of 2007–2009?
10. Exhibit 2.7 documents the sharp drop in financial assets controlled by depository institutions. Explain why depository institutions are losing market share. What must happen for them to reverse this trend? Explain why mutual funds and pension funds are increasing their market shares. Explain whether the financial crisis of 2007–2009 will reinforce or change these trends.
11. What are the basic arguments for increasing capital requirements at large commercial banks? In what ways will depositors, stockholders, and society in general benefit? How might each group be disadvantaged? As commercial banks enter new lines of business such as brokerage, how much additional capital should be required? Should

these new lines of business be insured by the FDIC? Why or why not? Give examples from today's financial marketplace.

12. Much of the intense competition in the financial services industry comes from products that are the most standardized, such as mortgages, automobile loans, money market accounts, savings accounts, and so on. These products will offer very low profit margins. If you managed a small community bank today, devise a strategy to compete in this environment.
13. What are the issues surrounding "too big to fail"? Is it possible for Congress to simply "outlaw" TBTF institutions? Why or why not?
14. Summarize the five major provisions of the Dodd-Frank Act in terms of the impact on the operating performance of financial institutions and the efficiency of financial markets.

Activities

1. Which depository institutions in your area seem to have best adapted to change? What criteria will you use to decide? What about financial services available on the Internet? What portion of your financial business do you conduct on the Internet? How much of this business do you expect to transact on the Internet in three to five years?
2. What large financial institutions headquartered out of state have a major presence in your state? Are there any foreign institutions in your state? List their competitive advantages and disadvantages versus in-state institutions. What nonbank firms offer competing products in your market? Make a list of which firms will allow you to open a checking account. Which firms will allow you to borrow money as an individual? Are they all commercial banks? If not, what types of firms are they?
3. List the different programs or facilities offered by the Federal Reserve or U.S. Treasury that provide liquidity to financial and nonfinancial firms. How do the programs differ? Why are the different programs necessary? Identify several large firms that have borrowed under these facilities.
4. There are many proponents of expanding the types of activities allowed depository institutions in the United States. Do you think the United States should allow depository institutions to provide any service they wish? Do you think that nondepository companies, which are not regulated in the same manner as depositories, should be able to offer a full line of depository services (traditional banking products)? What are the primary advantages of expanded powers? What are the primary disadvantages?
5. Examine the trend in bank failures from 2006–2014. In which states did the most failures occur? Provide explanations for these states suffering extensive failures.

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3

Analyzing Bank Performance

After almost 15 years of relative quiet, commercial bank failures reappeared in 2008. No banks failed in 2005 and 2006. Then, failures increased rapidly with 30, 148 and 157 in 2008, 2009 and 2010, respectively. Net operating income of FDIC-insured depository institutions exhibited a similar pattern with a record-setting $37.55 billion in the second quarter of 2006, only to fall to a $36.97 billion loss by the fourth quarter of 2008. The turning point for the financial crisis was clearly 2008 as net operating income for FDIC-insured institutions remained near record profitability for most of 2007. It was not until the fourth quarter of 2007 that net operating income fell to just $2.46 billion.

While most formal bank failures involve small and medium-size banks, many of the largest banks in the U.S. and globally either failed or were propped up by governments because of asset-quality problems and inadequate capital. JPMorgan Chase acquired Bear Stearns and Washington Mutual; Bank of America acquired Countrywide and Merrill Lynch; PNC acquired National City Bank; Wells Fargo acquired Wachovia; and the United States Government acquired almost 80 percent of AIG. Many of these same firms, including the acquirers, cut their dividends and sold preferred stock to the U.S. Treasury under the Troubled Asset Relief Program (TARP). Depository institutions, in the aggregate, reported: (1) worsening asset quality leading to higher loan charge-offs, (2) shrinking net interest income, and (3) declining noninterest income due, in large part, to record trading losses and higher numbers of nonperforming loans. All of these factors led to lower profits.

It is interesting to compare the 1980s banking crisis with that of 2008–2009. More than 100 banks failed every year between 1982 and 1992, with 470 and 534 failing in 1988 and 1989, respectively (see Exhibit 3.11 later in the chapter for more details). By contrast, only the years 2009 and 2010 saw more than 100 bank failures, although 2011 saw 92 bank failures, there were only 51 failures in 2012 and 24 failed in 2013. Nevertheless, it is difficult to compare directly the two periods because the total number of institutions is so different. There were well over 15,000 institutions during most of the 1980s and just over 7,500 during the latter half of the 2000s. In terms of the percent of banks that failed during the two periods, 1989 exhibited the largest percentage of bank failures at 3.38 percent, while 2010 was the peak from the 2008–2009 crisis, which stood at 2.05 percent of banks failing. Although the 1980s experienced more failures, the 2008–2009 crisis was witness to much larger failures and near failures, of which many were prevented via heroic measures by federal governments across the world.

What are the causes of depository institution failures? Can an objective observer analyze an institution's financial information and accurately assess its financial condition? When managers find their banks in trouble, what strategies can they pursue to improve performance and ensure survival? These questions became increasingly important during the 2008–2009 period as financial companies' earnings declined with the increase in the number of nonperforming loans and problem mortgages.

Many financial institutions experience dramatic changes in profits from one period to the next, both absolutely and relative to what stock analysts expect. In many cases, profits are lower because of unanticipated loan losses. PNC Bank, discussed extensively in this chapter, is a prime example. In 2002 PNC reported a return on equity (ROE) of 19.48 percent that far exceeded its peers, but its ROE fell to just 5.39 percent in 2009 before rising to 7.6 percent in 2012 and 9.68 percent in 2013. Obviously, profits were down in 2009-2012 due to weak economic conditions, but the decline also reflected a dramatic change in PNC's business model. The much higher reported profits of 2002 were not just a result of a better economy, but also a much higher-risk business model that PNC employed during that period. PNC sold off most of its higher-risk assets after 2002, such that profitability fell absolutely and relative to peers. While the bank's newer lower-risk business model produced lower returns, it allowed PNC to outperform its peer banks during most of the financial crisis because it largely avoided the subprime crisis and the associated bad loans.

This chapter introduces bank financial statements and presents a procedure for analyzing a depository institution's performance using periodic balance sheet and income statement data. It describes balance sheet and income statement components, provides a framework for comparing the trade-offs between profitability and risk, and compares the performance of a small community bank with that of a large super-regional banking organization. It uses data presented in a bank's Uniform Bank Performance Report (UBPR) to demonstrate the analysis.

Return on equity (ROE) and return on assets (ROA) reached record levels in the late 1990s and mid-2000s.[1] However, the softening of the economy in 2007 and the subprime-related loan losses and losses in trading activities in 2008–2009 changed the industry landscape (see Exhibit 3.1). ROA for the industry was well over 1.3 percent from 2002–2006 and by 2006, over one-half of all institutions reported ROAs greater than 1 percent. By the end of 2008, however, the average ROA had fallen to 0.13 percent and had become negative, −0.9 percent, by the end of 2009. Although the fall in profits was widespread, most of the decline was concentrated in a relatively small number of the largest institutions or those with significant exposures to real estate-related loans and securities and leveraged loans.

This chapter details the essential elements of evaluating financial institution performance. The analysis begins by introducing bank financial statements. A return on equity framework is then used to describe the trade-offs between profitability and risk and provide measures that differentiate between high- and low-performance banks. A ***high-performance firm*** is one that makes an exceptional return to shareholders while maintaining an acceptable level of risk. This definition makes it clear that high performance is more than high returns. It is the ability to generate high returns while carefully assessing and pricing the level of risk assumed by the institution.

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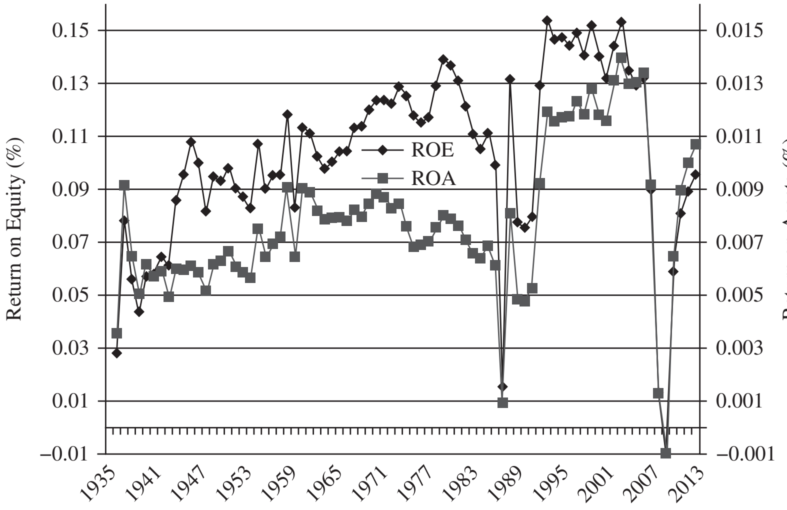
[1] As discussed in detail later, return on equity equals net income divided by average stockholders equity, whereas return on assets equals net income divided by average total assets.

EXHIBIT 3.1 **Trends in Return on Equity and Return on Assets for Commercial Banks, 1935–2013**



Source: FDIC Quarterly Banking Profile, www.fdic.gov/, www2.fdic.gov/qbp.

The analytical framework is applied to data for **PNC Bank**, a large multibank company owned by PNC Bank Corporation, and **Community National Bank**, a representative specialized community bank.[2] The analysis allows us to compare the financial characteristics of different-sized banks. The chapter also introduces the CAMELS system used by federal and state regulators to rate banks. Finally, because banks can disguise adverse changes in their performance from year to year, we pay special attention to sources of financial statement manipulation.

Commercial Bank Financial Statements

Like other financial intermediaries, commercial banks facilitate the flow of funds from surplus spending units (savers) to deficit spending units (borrowers). Their financial characteristics largely reflect government-imposed operating restrictions and peculiar features of the specific markets served. Several unique characteristics stand out and each presents special opportunities and risks to the bank manager:

1. Because their function is primarily financial, most depository institutions own few fixed assets and thus exhibit low operating leverage.
2. Many bank liabilities are payable on demand or carry short-term maturities so depositors can renegotiate deposit rates as market interest rates change. As a result, interest expense changes coincidentally with short-run changes in market interest rates, thereby creating significant asset allocation and pricing problems.
3. Many commercial bank deposits are insured by the FDIC. Thus, if the bank fails, the deposit holder is guaranteed payment for the insured amount. Insured deposits carry below-market interest rates.

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[2] PNC Bank Corp. is a large and complex banking organization. We deal only with PNC Bank in this chapter and assume that PNC Bank can be evaluated independently of PNC Bank Corporation.

4. Banks operate with less equity capital than nonfinancial companies, which increases financial leverage and the volatility of earnings.

The Balance Sheet

A bank's balance sheet presents financial information comparing what a bank owns with what it owes and the ownership interest of stockholders. Assets indicate what the bank owns; liabilities represent what the bank owes; and equity refers to the owners' interest such that:

$$\text{Assects} = \text{Liabilities} + \text{Equity} \tag{3.1}$$

Balance sheet figures are stock values calculated for a particular day or point in time. As such, values on the balance sheet represent the balance of cash, loans, investments, and property owned by the bank on a particular day. Regulators require that banks report balance sheet and income statement data quarterly, so figures are available publicly for the periods ending March, June, September, and December each year. Exhibit 3.2 shows balance sheets for two separate banking organizations. The first two blocks of data represent the consolidated statement for PNC Bank, N.A. PNC Bank is the principal banking subsidiary of the *financial holding company*, The PNC Financial Services Group, which is headquartered in Pittsburgh, Pennsylvania (www.pncbank.com). Its corporate legal structure consists of only one subsidiary bank: PNC Bank, N.A., chartered in Wilmington, Delaware, and 141 nonbank subsidiaries, one of which is Blackrock, an investment management, risk management and advisory services firm.[3] The holding company operates four major lines of business engaged in retail banking, corporate and institutional banking, asset management, and residential mortgage banking. PNC provides many of its products and services nationally and a subset of its products and services internationally. The bank's primary geographic markets are located in Pennsylvania, Ohio, New Jersey, Michigan, Illinois, Maryland, Indiana, North Carolina, Florida, Kentucky, Washington, D.C., Delaware, Alabama, Virginia, Georgia, Missouri, Wisconsin, and South Carolina.

At year-end 2013, PNC Bank reported assets of just under $310 billion, representing 100 percent of the holding company's consolidated assets. PNC grew its total assets by 5.1 percent or almost $15 billion in 2013. At the end of 2013, just under 63 percent the bank's assets were in loans, with another 25.4 percent in investments and roughly 12 percent in nonearning assets.

How PNC funds its operations appears at the bottom of Exhibit 3.2 under Liabilities and Total Bank Equity Capital. For example, at year-end 2013, PNC funded 70.2 percent of assets with core deposits, 17.4 percent with borrowed funds and 12.4 percent with bank capital. CNB, in contrast, saw its core deposit funding equal 79.6 percent, while borrowed funds and bank capital accounted for 12.2 percent and 8.2 percent, respectively.

The final two blocks of data in Exhibit 3.2 are for Community National Bank (CNB), which represents a typical small, independent community bank. This bank's main office is located in a small town where the bank has five branches. It also operates a loan production office in a large metropolitan area.[4] At year-end 2013, CNB had $140 million in assets, up 6.1 percent from 2012. By contrast with PNC, it had almost 85 percent of assets in loans, 6.3 percent in investments, and 9.1 percent in nonearning assets.

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[3] In November 2008, PNC sold preferred stock under TARP-CPP and used the proceeds to acquire National City Bank. In March 2012 the bank acquired RBC Bank (USA), the U.S. retail banking subsidiary of Royal Bank of Canada.

[4] A loan production office is an office of a bank that makes and produces loans, but does not accept deposits.

EXHIBIT 3.2 **2012–2013 Balance Sheet Information for PNC Bank and Community National Bank**

	PNC Bank, National Association					
	Dec–12			Dec–13		
Balance Sheet	**% Cha**	**$ 1,000**	**% of Total**	**% Cha**	**$ 1,000**	**% of Total**
ASSETS						
Loans:						
Real estate loans	11.2	84,702,621	28.7	1.0	85,507,520	27.6
Commercial loans	25.4	63,489,326	21.5	8.1	68,636,927	22.1
Individual loans	10.9	24,969,293	8.5	5.2	26,257,534	8.5
Agricultural loans	33.1	109,067	0.0	8.2	117,967	0.0
Other LN&LS in domestic off.	35.3	14,861,017	5.0	1.4	15,071,565	4.9
LN&LS in foreign off.	–7.3	1,606,524	0.5	66.3	2,671,988	0.9
Loans held for sale	26.1	3,702,343	1.3	–38.9	2,263,778	0.7
Loans not held for sale	16.9	186,034,160	63.1	5.4	195,998,417	63.2
Memo: Total loans	17.0	189,736,503	64.3	4.5	198,262,195	64.0
LN&LS loss Allowance	–7.2	4,035,708	1.4	–10.6	3,608,665	1.2
Net Loans & Leases	17.7	185,700,795	62.9	4.8	194,653,530	62.8
Investments:						
U.S. Treasury & Agency securities	–3.4	35,499,632	12.0	–4.9	33,746,638	10.9
Municipal securities	20.3	2,947,442	1.0	24.5	3,669,924	1.2
Foreign debt securities	22.2	1,113,763	0.4	3.6	1,153,930	0.4
All other securities	7.0	21,752,329	7.4	–0.6	21,612,153	7.0
Interest bearing bank balances	256.7	3,951,114	1.3	206.2	12,099,025	3.9
Fed funds sold & resales	–21.0	1,741,009	0.6	28.8	2,242,907	0.7
Trading account assets	–3.8	3,000,248	1.0	39.1	4,174,830	1.3
Total Investments	4.7	70,005,537	23.7	12.4	78,699,407	25.4
Total Earning Assets	13.8	255,706,332	86.7	6.9	273,352,937	88.2
Nonint Cash & Due from banks	27.1	5,213,060	1.8	–22.6	4,034,133	1.3
Premises, fixed assets & capital leases	5.2	4,521,665	1.5	2.5	4,633,026	1.5
Other real estate owned	5.5	887,467	0.3	–31.9	604,503	0.2
Dir & Indir Inv RE Ventures	0.0	0	0.0	0.0	0	0.0
Investment in unconsolidated subs.	0.0	0	0.0	0.0	0	0.0
Acceptances and other assets	–2.4	28,697,866	9.7	–4.6	27,375,080	8.8
Total Assets	12.0	295,026,390	100.0	5.1	309,999,679	100.0
Average Assets During Quarter	10.7	290,037,593	98.3	4.5	303,072,731	97.8

EXHIBIT 3.2 (continued)

	Community National Bank					
	Dec–12			Dec–13		
Balance Sheet	**% Cha**	**$ 1,000**	**% of Total**	**% Cha**	**$ 1,000**	**% of Total**
ASSETS						
Loans:						
Real estate loans	39.7	62,214	47.1	2.9	64,034	45.7
Commercial loans	–3.8	12,685	9.6	9.5	13,887	9.9
Individual loans	–18.0	3,813	2.9	–12.7	3,329	2.4
Agricultural loans	–9.0	37,085	28.1	2.7	38,070	27.2
Other LN&LS in domestic off.	0.0	0	0.0	0.0	0	0.0
LN&LS in foreign off.	0.0	0	0.0	0.0	0	0.0
Loans held for sale	0.0	0	0.0	0.0	0	0.0
Loans not held for sale	12.3	115,797	87.7	3.0	119,320	85.1
Memo: Total loans	12.3	115,797	87.7	3.0	119,320	85.1
Loan & Lease loss Allowance	23.1	782	0.6	–9.0	712	0.5
Net Loans & Leases	12.2	115,015	87.1	3.1	118,608	84.6
Investments:						
U.S. Treasury & Agency securities	–48.5	2,487	1.9	–85.4	364	0.3
Municipal securities	209.9	1,593	1.2	130.2	3,667	2.6
Foreign debt securities	0.0	0	0.0	0.0	0	0.0
All other securities	0.0	0	0.0	0.0	0	0.0
Interest bearing bank balances	–66.0	16	0.0	29506	4,737	3.4
Fed funds sold & resales	0.0	0	0.0	0.0	0	0.0
Trading account assets	0.0	0	0.0	0.0	0	0.0
Total Investments	–24.0	4,096	3.1	114.1	8,768	6.3
Total Earning Assets	10.4	119,111	90.2	6.9	127,376	90.9
Nonint Cash & Due from banks	26.3	5,023	3.8	–0.3	5,010	3.6
Premises, fixed assets & capital leases	10.1	2,642	2.0	0.3	2,650	1.9
Other real estate owned	–11.9	303	0.2	–79.5	62	0.0
Dir & Indir Inv RE Ventures	0.0	0	0.0	0.0	0	0.0
Investment in unconsolidated subs.	0.0	0	0.0	0.0	0	0.0
Acceptances and other assets	–10.7	4,975	3.8	1.6	5,054	3.6
Total Assets	9.9	132,054	100.0	6.1	140,152	100.0
Average Assets During Quarter	9.2	129,754	98.3	6.0	137,545	98.1

EXHIBIT 3.2 **(continued)**

	PNC Bank, National Association					
	Dec–12			Dec–13		
Balance Sheet	**% Cha**	**$ 1,000**	**% of Total**	**% Cha**	**$ 1,000**	**% of Total**
LIABILITIES						
Demand deposits	26.5	37,117,705	12.6	5.8	39,280,715	12.7
All NOW & ATS Accounts	23.3	3,501,310	1.2	5.3	3,688,494	1.2
Money market deposit accounts	17.7	136,768,146	46.4	5.5	144,240,092	46.5
Other savings deposits	19.8	11,290,198	3.8	6.6	12,035,164	3.9
Time Deps Below Insurance Limit	–21.2	21,382,958	7.2	–14.4	18,312,116	5.9
Less: Fully Insured Brokered Deposits	–35.9	200,987	0.1	–100.0	99	0.0
Core Deposits	13.7	209,859,330	71.1	3.7	217,556,482	70.2
Fully Insured Brokered Deposits	–35.9	200,987	0.1	–100.0	99	0.0
Time Deposits Above Insurance Limit	–10.1	1,785,623	0.6	–3.9	1,716,366	0.6
Deposits held in foreign offices	–52.9	4,897,325	1.7	32.0	6,465,924	2.1
Total deposits	9.8	216,743,265	73.5	4.2	225,738,871	72.8
Fed funds purchased & resale	11.4	3,351,286	1.1	29.8	4,349,832	1.4
FHLB borrowings <1 yr	161.7	7,960,051	2.7	–23.5	6,092,549	2.0
Other borrowings inc mat <1 yr	82.9	8,906,811	3.0	–37.7	5,546,515	1.8
Memo: Volatile liabilities	15.4	26,901,096	9.1	–10.1	24,171,186	7.8
FHLB borrowings >1 Yr	–62.4	1,476,526	0.5	361.9	6,819,579	2.2
Other borrowings inc mat >1 yr	61.8	6,089,605	2.1	82.9	11,138,049	3.6
Acceptances & other liabilities	–13.4	6,098,816	2.1	–20.2	4,867,216	1.6
Total Liabilities before Sub. Notes	12.4	250,626,360	85.0	5.6	264,552,611	85.3
Sub. Notes & Debentures	20.7	5,990,020	2.0	19.2	7,142,150	2.3
Total Liabilities	12.6	256,616,380	87.0	5.9	271,694,761	87.6
TOTAL BANK EQUITY CAPITAL	14.6	36,267,544	12.3	0.6	36,502,602	11.8
Minority Interest Cons Subs	–42.4	2,142,466	0.7	–15.9	1,802,315	0.6
Total Bank Capital & Minority Int.	8.6	38,410,010	13.0	–0.3	38,304,917	12.4
Total Liabilities & Capital	12.0	295,026,390	100.0	5.1	309,999,678	100.0
Memoranda:						
Officer, Shareholder Loans (#)	0.0	3	0.0	33.3	4	0.0
Officer, Shareholder Loans ($)	6.7	4,729	0.0	3.8	4,907	0.0
Held-to-Maturity Securities	–14.2	10,353,818	3.5	12.9	11,686,509	3.8
Available-for-Sale-Securities	5.3	50,959,348	17.3	–4.8	48,496,135	15.6
Total Securities	1.4	61,313,166	20.8	–1.8	60,182,644	19.4
All Brokered Deposits	–35.9	200,987	0.1	–100.0	99	0.0

EXHIBIT 3.2 (continued)

	Community National Bank					
	Dec–12			Dec–13		
Balance Sheet	**% Cha**	**$ 1,000**	**% Cha**	**$ 1,000**	**% Cha**	**$ 1,000**
LIABILITIES						
Demand deposits	6.1	21,901	16.6	9.9	24,069	17.2
All NOW & ATS Accounts	21.3	14,610	11.1	–7.6	13,501	9.6
Money market deposit accounts	37.9	18,441	14.0	14.3	21,071	15.0
Other savings deposits	7.7	8,480	6.4	6.1	9,001	6.4
Time Deps Below Insurance Limit	4.1	50,645	38.4	3.5	52,421	37.4
Less: Fully Insured Brokered Deposits	–6.2	5,166	3.9	63.7	8,455	6.0
Core Deposits	12.2	108,911	82.5	2.5	111,608	79.6
Fully Insured Brokered Deposits	–6.2	5,166	3.9	63.7	8,455	6.0
Time Deposits Above Insurance Limit	55.5	6,159	4.7	17.4	7,231	5.2
Deposits held in foreign offices	0.0	0	0.0	0.0	0	0.0
Total deposits	12.8	120,236	91.1	5.9	127,294	90.8
Fed funds purchased & resale	0.0	0	0.0	0.0	0	0.0
FHLB borrowings <1 Yr	0.0	0	0.0	0.0	0	0.0
Other borrowings inc mat <1 yr	0.0	0	0.0	0.0	0	0.0
Memo: Volatile liabilities	55.5	6,159	4.7	17.4	7,231	5.2
FHLB borrowings >1 Yr	–100.0	0	0.0	#N/A	1,000	0.7
Other borrowings inc mat >1 yr	#N/A	1,000	0.8	–100.0	0	0.0
Acceptances & other liabilities	–7.8	367	0.3	–5.2	348	0.2
Total Liabilities before Sub. Notes	10.1	121,603	92.1	5.8	128,642	91.8
Sub. Notes & Debentures	0.0	0	0.0	0.0	0	0.0
Total Liabilities	10.1	121,603	92.1	5.8	128,642	91.8
TOTAL BANK EQUITY CAPITAL	7.8	10,451	7.9	10.1	11,510	8.2
Minority Interest Cons Subs	0.0	0	0.0	0.0	0	0.0
Total Bank Capital & Minority Int.	7.8	10,451	7.9	10.1	11,510	8.2
Total Liabilities & Capital	9.9	132,054	100.0	6.1	140,152	100.0
Memoranda:						
Officer, Shareholder Loans (#)	100.0	2	0.0	0.0	2	0.0
Officer, Shareholder Loans ($)	170.2	2,915	2.2	–6.8	2,718	1.9
Held-to-Maturity Securities	0.0	0	0.0	0.0	0	0.0
Available-for-Sale-Securities	–23.6	4,080	3.1	–1.2	4,031	2.9
Total Securities	–23.6	4,080	3.1	–1.2	4,031	2.9
All Brokered Deposits	45.3	8,003	6.1	47.4	11,794	8.4

Source: Timothy Koch and S. Scott MacDonald; from FFIEC, Uniform Bank Performance Report, https://cdr.ffiec.gov/public/ManageFacsimiles.aspx.

In general, smaller community banks have larger loan portfolios, fewer investments, and more non-interest-bearing balances due from banks as a fraction of total assets. Smaller community banks are more dependent on loans as a source of income, while larger banks hold trading assets and have a broader line of fee-based services.

Bank Assets. Bank assets fall into one of four general categories: loans, investment securities, noninterest cash and due from banks, and other assets.

1. **Loans** are the major asset in most commercial banks' portfolios and generate the greatest amount of income before expenses and taxes. They also exhibit the highest default risk and some are relatively illiquid. Loans are made to individuals, businesses, nonprofit organizations, and other borrowers and may not have standardized features.
2. **Investment securities** are held to earn interest, help meet liquidity needs, speculate on interest rate movements, meet pledging requirements, and serve as part of a bank's dealer functions. Most securities represent standardized instruments that are readily traded in secondary markets.
3. **Noninterest cash and due from banks** consists of vault cash, deposits held at Federal Reserve Banks, deposits held at other financial institutions, and cash items in the process of collection. These assets are held to meet customer withdrawal needs and legal reserve requirements, assist in check clearing and wire transfers, and effect the purchase and sale of Treasury securities.
4. **Other assets** are residual assets of relatively small magnitudes such as bankers acceptances, premises and equipment, other real estate owned (OREO), and other smaller amounts. OREO is real property that is not directly tied to a bank's normal operations. Given the loan problems during the financial crisis, many banks saw their OREO rise sharply as the banks took title to property that was pledged as collateral for loans that went into default. These other assets are nonearning assets that generate no income.

Loans A bank negotiates loan terms with each borrower that vary with the use of proceeds, source of repayment, and type of collateral. Maturities range from call loans payable on demand to residential mortgages amortized over 30 years. The interest rate may be fixed over the life of the loan or vary with changes in market interest rates. Similarly, the loan principal may be repaid periodically or as a lump sum. Exhibit 3.2 groups loans into six categories according to the use of proceeds: real estate, commercial, individual, agricultural, other loans in domestic offices, and loans in foreign offices.

1. **Real estate loans** are loans secured by real estate and generally consist of property loans secured by first mortgages or construction loans.
2. **Commercial loans** consist of commercial and industrial loans, loans to financial institutions, and obligations (other than securities) to states and political subdivisions. Commercial loans appear in many forms but typically finance a firm's working capital needs, equipment purchases, and plant expansions. This category also includes credit extended to other financial institutions, security brokers, and dealers.
3. **Individual loans** include those negotiated directly with individuals for household, family, and other personal expenditures, and those obtained indirectly through the purchase of retail paper. Loans made for the purchase of credit card items and durable goods constitute the greatest volume of this consumer credit.
4. **Agricultural loans** appear in many forms but typically finance agricultural production and include other loans to farmers.
5. **Other loans in domestic offices** include all other loans and all lease-financing receivables in domestic offices. The dollar amount of **outstanding leases** is included in gross loans because lease financing is an alternative to direct loans.

6. **Loans and leases in foreign offices** are essentially business loans and lease receivables made to foreign enterprises, or loans guaranteed by foreign governments. International loans carry significant risks beyond normal default risk.

Two adjustments are made to *gross loans and leases* to obtain a *net loan* figure. First, unearned income is deducted from gross interest received. **Unearned income** is income that has been received but not yet earned. Second, gross loans are reduced by the dollar magnitude of a bank's allowance for loan and lease losses (loan loss reserve). The **allowance for loan and lease losses (ALLL)** is a contra-asset (negative asset) reserve account that exists in recognition that some loans will not be repaid. The reserve's maximum size is determined by accounting rules and bank regulatory guidance, but increases with the growth in problem loans and decreases with net loan charge-offs. A depository institution is permitted to expense the net addition to the loss reserve, denoted as the provision for loan losses on the income statement.[5]

Investments A depository institution's investments include both short-term and long-term investment securities, interest-bearing bank balances (deposits due from other banks), federal funds sold, securities purchased under agreement to resell (repurchase agreements or RPs), and other trading account assets.[6] Investment securities are attractive because they earn interest, administration and transaction costs are extremely low (relative to loans), and when banks concentrate their purchases on higher-quality instruments, defaults are rare. Institutions can also generally sell these securities at predictable prices when they need cash.

The market value of investments will vary inversely with changes in interest rates. When interest rates increase (decrease), the market value of investment securities will fall (rise). Because most investment securities carry fixed coupon rates, when rates fall, banks can either earn very attractive yields relative to their borrowing costs or sell the securities at a gain. Of course, when rates rise, investment securities decrease in value because they carry below-market interest rates.

Short-term securities, such as U.S. Treasury and agency securities, municipal securities, foreign debt securities, and other securities have maturities of one year or less and can be easily sold to obtain cash at a price close to that initially paid by the bank. They are held primarily to meet the bank's liquidity needs. Their returns vary quickly with changes in money market conditions, but because they carry lower risk and mature in one year or less, the bank earns significantly less interest than it could earn on longer-term securities. Short-term securities include Treasury bills, municipal tax and bond anticipation notes, and other money market instruments.

Long-term investment securities consist of notes and bonds that have a maturity of more than one year and generate taxable or tax-exempt interest. *U.S. Treasury and agency securities* have historically represented the bulk of taxable investments, but banks also purchase mortgage-backed securities and small amounts of foreign and corporate bonds.[7] Most of these carry fixed interest rates with maturities up to 20 years. Some larger banks like PNC have significantly increased their holdings of certificates of participation in pools of

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[5] The reported provision for loan losses is normally less than the actual tax deduction allowed by the Internal Revenue Service and claimed by the bank.

[6] The Uniform Bank Performance Report differentiates between "Investments" and "Investment Securities." "Investments" includes "Investment Securities" as well as nonsecurities such as Fed funds sold, and interest-bearing bank balances.

[7] The asset category "U.S. Treasury & Agency Securities" listed in the Uniform Bank Performance Report is somewhat misleading. This category is defined as the total of U.S. Treasury and agency securities and corporate obligations. For more information, consult the UBPR User's Guide available from the FFIEC on the Internet at www.ffiec.gov.

residential mortgages; investments like these are classified as *all other securities*.[8] Banks own some **municipal securities (municipals)** with interest payments that are exempt from federal income taxes. Municipal securities are classified as either **general obligation or revenue bonds**. Changes in bank tax rules have made many municipal securities unattractive to banks.[9] Banks are generally restricted from purchasing individual corporate stocks as an investment, but can own them under two conditions. First, when it is acquired as collateral on a loan and second, in order for the bank to qualify as a member of the Federal Reserve System or Federal Home Loan Bank system (a requirement for membership is that banks must own stock in the Federal Reserve Bank or Federal Home Loan Bank, respectively).

Accounting for Investment Securities At purchase, a bank must designate the objective behind buying investment securities as either held-to-maturity, trading, or available-for-sale. How management categorizes securities determines the appropriate accounting. Following FASB 115:

- **Held-to-maturity (HTM)** securities are recorded on the balance sheet at amortized cost. This treatment reflects the objective to hold the securities until they mature so that the expected income is interest income with a return of principal at maturity.
- A bank actively buys and sells **trading account securities** principally to speculate on interest rate movements and profit on price changes. These securities are typically held for brief periods, such as a few days, so the bank marks the securities to market (reports them at current market value) on the balance sheet and reports unrealized gains and losses on the income statement.
- All other investment securities are classified as **available-for-sale** (AFS) because management may choose to sell them prior to final maturity. As such, they are recorded at market value on the balance sheet with a corresponding change to stockholders equity as unrealized gains and losses on securities holdings (accumulated other comprehensive income, AOCI). There is no reporting of gains or losses on the income statement with these securities. However, with Basel III, banks with more than $250 billion in assets must include these unrealized gains and losses from changes in market values of AFS securities as part of regulatory capital.

Many large depository institutions operate as security dealers that maintain an inventory of securities for resale and underwrite municipal issues. Depository institutions that form *a financial holding company* can underwrite and deal in bonds and equity securities.[10] The assets listed as *trading account securities* on the balance sheet comprise mainly Treasury obligations and collateralized mortgage obligations. The bank earns interest on this inventory but also tries to profit on the difference between the purchase and sale price of the securities. It subsequently bears the risk that the market value of its inventory might decrease. Large banks, in addition, earn fee income by underwriting securities.

Noninterest Cash and Due from Banks This asset category consists of vault cash, deposits held at Federal Reserve Banks, deposits held at other financial institutions, and cash items in the process of collection:

1. **Vault cash** is coin and currency that the bank holds to meet customer withdrawals.

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[8] "All Other Securities" includes all other domestic securities, such as private certificates of participation in pools of residential mortgages.

[9] As noted in Chapter 2, the Tax Reform Act of 1986 eliminated bank deductions for borrowing costs associated with financing the purchase of most municipal bonds. The impact of this tax change is described in Chapter 16. Banks also purchase taxable municipals in their investment portfolios.

[10] Other financial companies can form a financial holding company as well, but until 2008 few had chosen to do so. The financial crisis of 2008–2009, however, witnessed a multitude of financial companies becoming financial holding companies: Morgan Stanley, Goldman Sachs, and American Express. (See Chapters 1 and 2).

2. **Deposits held at the Federal Reserve** are demand balances used to meet legal reserve requirements, assist in check clearing and wire transfers, or effect the purchase and sale of Treasury securities. The amount of required reserve deposits is set by regulation as a fraction of qualifying bank deposit liabilities and currently stands at 10 percent of transactions deposits. Banks hold **balances at other financial institutions**, called correspondent banks, primarily to purchase services. The amount is determined by the volume and cost of services. Since 2006, the Federal Reserve has paid interest on balances that banks hold to meet legal reserve requirements along with excess reserves.
3. **Cash items in the process of collection (CIPC)** are generally the largest component of cash, representing checks written against other institutions and presented to the bank for payment for which credit has not been given. To verify that actual balances support each check, the bank delays credit until the check clears or a reasonable time elapses. The volume of net deferred credit is commonly called *float.* The passage of federal legislation, Check 21 in 2003, reduced float by accelerating check clearing time.

Other Assets This category consists of residual assets of relatively small magnitudes, including the depreciated value of bank premises and equipment, OREO, investment in unconsolidated subsidiaries, customers' liability to the bank under acceptances, and other assets. As mentioned previously, **OREO** can be substantial at problem banks because it normally represents property taken as collateral against a loan that was unpaid. Commercial banks own relatively few fixed assets. They operate with low fixed costs relative to nonfinancial firms and exhibit low operating leverage. **Bankers acceptances** are negotiable instruments guaranteeing payment to the owner of the acceptance that are often used in the trading of goods to ensure payment to the supplier of goods.

Bank Liabilities and Stockholders Equity. Depository institution funding sources are classified according to the type of debt instrument and equity component. The characteristics of various debt instruments differ in terms of check-writing capabilities, interest paid, maturity, whether they carry FDIC insurance, and whether they can be traded in the secondary market. The components of equity (common and preferred capital) also have different characteristics and arise under varied circumstances such as the issuance of stock, net income not paid out as dividends, and Treasury stock or related transactions.

Historically, depository institutions were limited in what interest rates they could pay on different types of deposits. From 1986 - 2010, all interest rate restrictions were eliminated, except for the prohibition of interest on corporate demand deposits. This remaining restriction was eliminated with the passage of the Dodd–Frank Act of 2010.[11] Depository institutions can now compete for deposits by offering virtually unrestricted interest rates on all of their liabilities. Larger banks also issue subordinated notes and debentures, which are long-term uninsured debt. In general, bank liabilities are composed of transactions accounts, savings and time deposits, and other borrowings:

Transactions Accounts These accounts consist of demand deposit accounts, NOW and ATS accounts, and money market deposit accounts. Transactions accounts are a significant funding source because most holders can readily transfer funds by check or debit.

1. **Demand deposits** are held by individuals, partnerships, corporations, and governments with the key feature being that they pay no interest. Banks were prohibited from paying

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[11] Regulation Q has been around in various forms since about 1933 but was phased out completely in 2010 with the Dodd–Frank Act. Prior to 1983, regulation Q prohibited banks and savings and loans from paying market interest rates on most deposits of less than $100,000 and were restricted from paying interest on demand deposits. Beginning in 1983, these limits were gradually removed so that by 1986 only demand deposit rates were restricted. In 2010, Dodd–Frank repealed regulation Q and allowed commercial banks and savings banks to pay market interest rates on demand deposits.

interest on business checking accounts until a provision of the 2010 Dodd-Frank Act repealed regulation Q. Hence, businesses have historically owned the bulk of non-interest-bearing demand deposits.

2. **Negotiable orders of withdrawal (NOW)** and **automatic transfers from savings (ATS)** pay interest set by each bank without federal restrictions. These accounts are commonly referred to as interest checking accounts. Banks often require minimum balances before a depositor earns interest and may impose service charges if balances fall below a minimum.
3. **Business checking accounts** that pay interest are available to commercial customers. Some large banks offer such accounts with restrictions on minimum balances.
4. **Money market deposit accounts (MMDAs)** pay market rates, but a customer is limited to no more than six checks and automatic transfers each month. This restriction exempts depository institutions from holding required reserves against MMDAs as they are technically savings accounts, not transactions accounts. With no required reserves, depository institutions can pay higher rates of interest on MMDAs versus NOWs for the same effective cost.

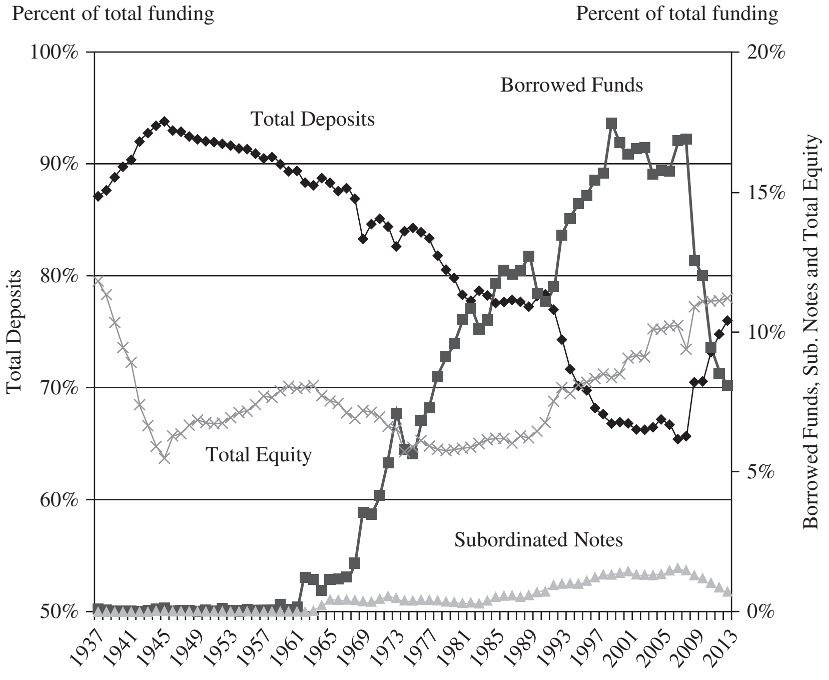
Savings and Time Deposits These deposits contribute a large portion of funding, especially at community banks. Passbook savings deposits are small-denomination accounts that have no set maturity and no check-writing capabilities. Two general time deposit categories exist, with the deposit insurance limit separating the groups:

1. **Time deposits below insurance limit** are often called small certificates of deposit (CDs). Until passage of the Dodd–Frank Act of 2010 permanently raised the FDIC insurance limit on deposits to $250,000, the insurance limit was $100,000. The features of small CDs are not as standardized as large CDs, although most depository institutions market standardized instruments. Banks and customers negotiate the maturity, interest rate, and dollar magnitude of each deposit. The only stipulation is that small time deposits carry early withdrawal penalties.
2. **Time deposits above insurance limit** are labeled jumbo certificates of deposit (CDs) and are negotiable (can be bought and sold) in a well-established secondary market. Anyone who buys a jumbo CD can easily sell it in the secondary market as long as the issuing bank is not suffering known problems. Maturities generally range from one month to five years with $1 million the typical size. Most large CDs are sold to nonfinancial corporations, local governmental units, and other financial institutions.

Other Borrowings Following the financial crisis, other borrowings declined as a source of funding for all depository institutions. With low interest rates, core deposits (checking accounts and savings accounts) grew rapidly as depositors searched for safety. The decline in loan demand similarly allowed banks to rely less on borrowed funds. Exhibit 3.3 shows this trend beginning in 2008. Bank deposits, which are FDIC insured, jumped from about 65 percent of funding to 75 percent of funding. Leading up to the financial crisis, rapid loan growth in hot real estate markets corresponded with an increased dependence on "borrowed" sources such as federal funds purchased, repurchase agreements, brokered deposits, foreign deposits and Federal Home Loan Bank advances. Because many fast growing banks failed in 2008–2010, many observers mistakenly attributed the problem to funding, when the principal cause of many bank failures was inadequate credit analysis leading to poor asset quality.

1. **Federal funds purchased and securities sold under agreement to repurchase (repos)** are liabilities created from the exchange of immediately available funds, or balances that can be cleared immediately. These are generally *borrowings between depository*

EXHIBIT 3.3 Trends in Commercial Banking Funding Sources, 1937–2013



Source: FDIC Historical Statistics on Banking, www2.fdic.gov/hsob/index.asp.

institutions and other large financial institutions, and not borrowing from the Federal Reserve Bank.[12] Federal funds purchased generally have maturities of 1–7 days and represent the exchange of clearing balances at the Federal Reserve Bank or correspondent bank. Federal funds are unsecured, whereas repos are collateralized by securities owned by the borrowing institution.

2. **Brokered deposits** most often refer to large CDs that a depository institution obtains through a third-party broker or brokerage house that markets the CDs to its customers. These are identified separately because the institution has virtually no customer contact with the holders of these CDs. The funds are *volatile* and will leave the bank quickly when a competitor offers a higher rate. Depository institutions can obtain these CDs directly from brokers or via rate boards. Curiously, regulators classified rate board deposits, such as those listed on Internet websites, as core (non-brokered) during the financial crisis even though issuing banks bought the funds by paying very high rates. Regulators can also designate other deposits as brokered deposits depending on the rate paid to customers. Specifically, if an institution pays an above-market rate, for example, 5 percent on NOWs when all other competitors in the same trade area are paying 2 percent, regulators may choose to designate the NOWs as brokered deposits because the bank is viewed as "buying the funds." Institutions that fund operations by marketing time deposits on the Internet suffer the same problem, as they generally pay rates substantially above rates paid by local (geographic) competitors.

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[12] Federal funds are loans among depository institutions and other large financial institutions or other participants and are not direct loans from the Federal Reserve Bank. Borrowings directly from the Federal Reserve Bank are called **discount window** borrowings.

3. **Deposits held in foreign offices** refer to the same types of dollar-denominated demand and time deposits discussed above except that the balances are issued by a bank subsidiary (owned by the bank holding company) located outside the United States. The average foreign deposit balance is generally quite large. Nonfinancial corporations engaged in international trade and governmental units own most of these deposits.
4. **Federal Home Loan Bank (FHLB) borrowings** are advances (direct loans) from the FHLB to banks. The FHLB is a government-sponsored enterprise that borrows directly within the money and capital markets. Bank borrowings from the FHLB are collateralized by loans or securities held by the banks and have maturities that range from one week to over 20 years. FHLB advances have seen extraordinary growth since the passage of the Gramm–Leach–Bliley Act of 1999, which expanded the scope of institution membership in the FHLB system. Recent usage by banks has fallen with the crisis and corresponding recession, but should rebound as the U.S. economy grows.
5. **Subordinated notes and debentures** consist of notes and bonds with maturities in excess of one year. Most meet requirements as depository institution capital for regulatory purposes. Unlike deposits, the debt is not federally insured and claims of bondholders are subordinated to claims of depositors. Thus, when an FDIC-insured depository institution fails, depositors are paid before subordinated debt holders receive anything. **Other liabilities** include acceptances outstanding, taxes and dividends payable, trade credit, and other miscellaneous claims.

Depository institutions differentiate between core deposits and volatile or noncore borrowings. **Core deposits** consist of demand deposits, NOW and ATS accounts, business checking accounts, MMDAs, and other savings and time deposits less than the FDIC insurance limit, less fully insured brokered deposits. They are stable deposits that are usually not withdrawn over short periods of time. The owners are not highly rate sensitive, such that the interest elasticity is low, and owners do not quickly move their balances to another institution when it pays a higher rate. Core deposits represent a more permanent funding base than large-denomination, volatile (noncore) liabilities. They are also attractive because they are relatively cheap as compared with the interest cost of noncore liabilities. In short, core deposits are the most valuable and stable source of funding for depository institutions.

Generally, large depository institutions have a greater reliance on highly rate-sensitive borrowings. Liabilities that are highly rate sensitive do not represent a stable source of funding, because they are “asset-quality sensitive.” As such, when a bank gets into trouble (its asset quality deteriorates), these sources are more difficult to find and existing balances leave the bank quickly. These types of liabilities are subsequently referred to as **volatile (or noncore) liabilities**, purchased liabilities, or hot money, and consist of jumbo CDs, deposits in foreign offices, federal funds purchased, **repurchase agreements (RPs or repos)**, Federal Home Loan Bank borrowings, and other borrowings with maturities of less than one year.[13] They are normally issued in denominations above the amount that is federally insured so the customer bears some risk of default. Thus, if a bank reports problems or a competitor offers a higher rate, customers are quite willing to move their deposits. Federal funds purchased and repos are the most popular source. Large depository institutions also issue commercial paper through their holding companies. **Commercial paper** represents short-term, unsecured corporate promissory notes.

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[13] Short-term noncore funding from March 31, 2011 forward equals the sum of time deposits of more than $250,000 with a remaining maturity of one year or less + brokered deposits issued in denominations of $250,000 and less with a remaining maturity or one year or less + other borrowed money with a remaining maturity one year or less + time deposits with a remaining maturity of one year or less in foreign offices + securities sold under agreements to repurchase and federal funds purchased. Prior to March 32, 2011, the definition used deposits of $100,000 or more. Due to the lack of detailed data, *calculated* volatile liabilities does not include brokered deposits in Exhibits 3.8 and 3.9. The calculated value of volatile liabilities also excludes FHLB borrowings (to be consistent with the UBPR).

Total Bank Equity Capital Capital represents stockholders equity, or ownership interest in the firm. Common and preferred stocks are listed at their par values while the surplus account represents the amount of proceeds received by the firm in excess of par when the stock was issued. Retained earnings represent the firm's cumulative net income since the firm started operation, minus all cash dividends paid to stockholders. Other equity is small and usually reflects capital reserves or AOCI. The book value accumulated other comprehensive income. The book value of equity equals the difference between the book value of assets and aggregate liabilities. **Minority interest in consolidated subsidiaries** is the bank's noncontrolling interest in minority subsidiaries. A detailed discussion of each component of stockholders equity and associated regulatory requirements appears in Chapter 12.

The Income Statement

A depository institution's income statement reflects the financial nature of banking, as interest on loans and investments represents the bulk of revenue (see Exhibit 3.4). The income statement format starts with **interest income (II)** then subtracts **interest expense (IE)** to produce **net interest income (NII)**. The other major source of revenue is **noninterest income (OI)**. After adding noninterest income, banks subtract **noninterest expense (OE)**, or overhead costs. Although depository institutions constantly try to increase their noninterest income and reduce noninterest expense, total noninterest expense usually exceeds noninterest income such that the difference is labeled the bank's **burden**. The next step is to subtract **provisions for loan and lease losses (PLL)**. The resulting figure essentially represents operating income before securities transactions and taxes. Next, **realized securities gains or losses (SG)** from the sale of securities are added to produce pretax net operating income. Subtracting applicable income taxes, tax-equivalent adjustments, and any extraordinary items yields **net income (NI)**. The components of the income statement are as follows:

1. **Interest income (II)** is the sum of interest and fees earned on all assets, including loans, deposits held at other institutions, municipal and taxable securities, and trading account securities. It also includes rental receipts from lease financing. All income is taxable, except for the interest on state and municipal securities and some loan and lease income, which is exempt from federal income taxes.
    - The **estimated tax benefit** for loan and lease financing and tax-exempt securities income is the estimated dollar tax benefit from not paying taxes on these items. For comparative purposes, tax-exempt interest income can be converted to a taxable equivalent (te) amount by dividing tax-exempt interest by 1 minus the bank's marginal income tax rate. The estimated tax benefit on municipal securities can be approximated by:[14]

$$\text{Municipal interest income (te)} = \frac{\text{Municipal interest income}}{(1 - \text{bank marginal tax rate})}$$

$$\text{Estimated tax benefit} = \text{Municipal interest income (te)} - \text{Municipal interest income}^{15}$$

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[14] Actually, the estimated tax benefit is calculated on the UBPR using a tax-equivalent adjustment worksheet. You can find this worksheet on the FFIEC's Web page at www.ffiec.gov.

[15] Tax-equivalent municipal interest for PNC equaled $124.563 million in 2013. This was composed of $80.966 million in tax-exempt interest income plus $43.597 million in estimated tax benefit. PNC also had tax benefits from loan and lease financing estimated at $121.663 million. Total tax-equivalent income on loans and leases was $8.144 billion. CNB's tax-equivalent income can be similarly found.

EXHIBIT 3.4 **2012–2013 Income Statements of PNC Bank and Community National Bank**

	PNC Bank, National Association					
	Dec–12			Dec–13		
Income Statement	**% Cha**	**$ 1,000**	**% of Total**	**% Cha**	**$ 1,000**	**% of Total**
Interest Income:						
Interest and fees on loans	8.8	8,171,129	52.7	–5.1	7,756,257	49.7
Income from lease financing	0.2	277,359	1.8	–4.2	265,588	1.7
Memo: Fully taxable	7.7	8,243,295	53.2	–5.4	7,795,380	49.9
Tax–exempt	47.3	205,193	1.3	10.4	226,465	1.5
Estimated tax benefit	47.6	110,243	0.7	10.4	121,663	0.8
Income on Loans & Leases (TE)	8.8	8,558,731	55.2	–4.9	8,143,508	52.2
U.S. Treasury & Agency securities	–44.6	62,971	0.4	–28.0	45,340	0.3
Mortgage Backed Securities	–4.4	1,668,960	10.8	–15.9	1,403,494	9.0
Estimated tax benefit	18.9	36,314	0.2	19.8	43,497	0.3
All other securities income	1.2	299,712	1.9	–0.7	297,508	1.9
Tax–Exempt Securities Income	18.7	67,591	0.4	19.8	80,966	0.5
Investment Interest Income (TE)	–5.4	2,067,957	13.3	–13.4	1,789,839	11.5
Interest on due from banks	–32.8	4,481	0.0	173.0	12,234	0.1
Interest on Fed funds sold & resales	–30.0	22,628	0.1	–63.7	8,223	0.1
Trading account income	–14.8	49,418	0.3	–60.7	19,445	0.1
Other interest income	6.9	66,473	0.4	–5.6	62,729	0.4
Total interest income (TE)	5.5	10,769,688	69.5	–6.8	10,035,978	64.3
Interest Expense:						
Interest on Deposits in foreign offices	–32.4	15,427	0.1	–36.8	9,753	0.1
Interest on CD's over $100M	–39.2	80,817	0.5	–30.9	55,857	0.4
Interest on All Other Deposits:	–43.3	300,540	1.9	–5.1	285,080	1.8
Total interest exp. on deposits	–42.2	396,784	2.6	–11.6	350,690	2.2
Interest on Fed funds purchased & resale	31.7	9,549	0.1	–40.0	5,727	0.0
Interest on Trad Liab & Oth Borrowings	–0.4	163,946	1.1	–19.7	131,644	0.8
Interest on Sub. Notes & Debentures	0.9	227,450	1.5	0.1	227,733	1.5
Total interest expense	–26.4	797,729	5.1	–10.3	715,794	4.6
Net interest income (TE)	9.3	9,971,959	64.3	–6.5	9,320,184	59.7

EXHIBIT 3.4 (continued)

	Community National Bank					
	Dec–12			Dec–13		
Income Statement	**% Cha**	**$ 1,000**	**% of Total**	**% Cha**	**$ 1,000**	**% of Total**
Interest Income:						
Interest and fees on loans	5.3	6,926	87.0	14.1	7,905	90.5
Income from lease financing	0.0	0	0.0	0.0	0	0.0
Memo: Fully taxable	5.4	6,914	86.8	14.2	7,896	90.4
Tax–exempt	–14.3	12	0.2	–25.0	9	0.1
Estimated tax benefit	–20.0	4	0.1	–25.0	3	0.0
Income on Loans & Leases (TE)	5.3	6,930	87.0	14.1	7,908	90.6
U.S. Treasury & Agency securities	#N/A	2	0.0	–100.0	0	0.0
Mortgage Backed Securities	–75.4	14	0.2	–28.6	10	0.1
Estimated tax benefit	–100.0	0	0.0	#N/A	1	0.0
All other securities income	82.4	31	0.4	116.1	67	0.8
Tax–Exempt Securities Income	–66.7	1	0.0	200.0	3	0.0
Investment Interest Income (TE)	–37.3	47	0.6	66.0	78	0.9
Interest on due from banks	–60.0	2	0.0	200.0	6	0.1
Interest on Fed funds sold & resales	–100.0	0	0.0	0.0	0	0.0
Trading account income	0.0	0	0.0	0.0	0	0.0
Other interest income	166.7	48	0.6	–58.3	20	0.2
Total interest income (TE)	5.1	7,027	88.2	14.0	8,012	91.8
Interest Expense:						
Int on Deposits held in foreign offices	0.0	0	0.0	0.0	0	0.0
Interest on CD's over $100M	–7.6	352	4.4	–2.6	343	3.9
Interest on All Other Deposits:	–23.4	647	8.1	–18.7	526	6.0
Total interest exp. on deposits	–18.5	999	12.5	–13.0	869	10.0
Interest on Fed funds purchased & resale	300.0	4	0.1	–100.0	0	0.0
Interest on Trad Liab & Oth Borrowings	–71.9	41	0.5	–48.8	21	0.2
Interest on Sub. Notes & Debentures	0.0	0	0.0	0.0	0	0.0
Total interest expense	–24.0	1,044	13.1	–14.8	890	10.2
Net interest income (TE)	12.7	5,983	75.1	19.0	7,122	81.6

EXHIBIT 3.4 (continued)

	PNC Bank, National Association					
	Dec–12			Dec–13		
Income Statement	**% Cha**	**$ 1,000**	**% of Total**	**% Cha**	**$ 1,000**	**% of Total**
Noninterest Income:						
Fiduciary Activities	3.8	652,109	4.2	11.7	728,276	4.7
Deposit service charges	4.3	988,316	6.4	4.4	1,031,935	6.6
Trading rev, venture cap., securitize inc.	22.2	196,902	1.3	19.2	234,665	1.5
Investment banking, advisory inc.	12.5	354,885	2.3	–1.3	350,209	2.2
Insurance commissions & fees	–8.1	31,037	0.2	–16.6	25,879	0.2
Net servicing fees	19.8	493,174	3.2	4.0	512,966	3.3
LN&LS net gains (losses)	–1391	(472,990)	–3.1	–138.7	182,818	1.2
Other net gains (losses)	–2177	223,641	1.4	–4.8	212,875	1.4
Other noninterest income	4.5	2,168,778	14.0	2.0	2,212,584	14.2
Total noninterest income	0.8	4,635,852	29.9	18.5	5,492,207	35.2
Adjusted Operating Income (TE)	6.4	14,607,811	94.3	1.4	14,812,391	94.9
Non–Interest Expenses:						
Personnel expense	18.1	4,167,663	26.9	1.0	4,208,874	27.0
Occupancy expense	8.3	1,249,657	8.1	–1.6	1,230,005	7.9
Goodwill impairment	#N/A	44,840	0.3	–100.0	0	0.0
Other Intangible Amortization	2.4	166,897	1.1	–12.1	146,716	0.9
Other Oper Exp (Incl intangibles)	10.4	4,257,711	27.5	–15.9	3,579,299	22.9
Total Noninterest Expenses	13.6	9,886,768	63.8	–7.3	9,164,894	58.7
Provision: Loan & Lease Losses	–11.1	977,178	6.3	–33.4	651,026	4.2
Pretax Operating Income (TE)	–4.6	3,743,865	24.2	33.5	4,996,471	32.0
Realized G/L Hld–to–Maturity Sec.	0.0	0	0.0	0.0	0	0.0
Realized G/L Avail–for–Sale Sec.	–4.4	92,568	0.6	–10.7	82,680	0.5
Pretax Net Operating Income (TE)	–4.6	3,836,433	24.8	32.4	5,079,151	32.5
Applicable Income Taxes	–8.0	997,790	6.4	28.0	1,276,998	8.2
Current Tax Equivalent Adjustment	39.3	146,557	0.9	12.7	165,161	1.1
Other Tax Equivalent Adjustments	0.0	0	0.0	0.0	0	0.0
Applicable Income Taxes (TE)	–3.9	1,144,347	7.4	26.0	1,442,159	9.2
Net Operating Income	–4.9	2,692,086	17.4	35.1	3,636,992	23.3
Net Extraordinary Items	0.0	0	0.0	0.0	0	0.0
Net Inc Noncontrolling Minority Interests	–33.9	25,119	0.2	424.1	131,638	0.8
Net Income	–4.5	2,666,967	17.2	31.4	3,505,354	22.5
Cash Dividends Declared	3.2	2,405,750	15.5	18.7	2,855,750	18.3
Retained Earnings	–43.5	261,217	1.7	148.7	649,604	4.2
Memo: Net International Income	0.0	0	0.0	0.0	0	0.0
Memo: Total revenue	4.0	15,498,108	100.0	0.7	15,610,865	100.0
Memo: Total revenue net of interest expense	6.4	14,700,379	94.9	1.3	14,895,071	95.4

EXHIBIT 3.4 **(continued)**

	Community National Bank					
	Dec–12			Dec–13		
Income Statement	**% Cha**	**$ 1,000**	**% of Total**	**% Cha**	**$ 1,000**	**% of Total**
Noninterest Income:						
Fiduciary Activities	0.0	0	0.0	0.0	0	0.0
Deposit service charges	–13.5	660	8.3	–19.1	534	6.1
Trading rev, venture cap., securitize inc.	0.0	0	0.0	0.0	0	0.0
Investment banking, advisory inc.	0.0	0	0.0	0.0	0	0.0
Insurance commissions & fees	#N/A	3	0.0	–66.7	1	0.0
Net servicing fees	0.0	6	0.1	–16.7	5	0.1
LN&LS net gains (losses)	0.0	0	0.0	0.0	0	0.0
Other net gains (losses)	–53.1	(46)	–0.6	132.6	(107)	–1.2
Other noninterest income	–3.0	318	4.0	–10.7	284	3.3
Total noninterest income	–5.8	941	11.8	–23.8	717	8.2
Adjusted Operating Income (TE)	9.7	6,924	86.9	13.2	7,839	89.8
Non–Interest Expenses:						
Personnel expense	18.8	2,901	36.4	11.9	3,245	37.2
Occupancy expense	1.4	567	7.1	29.1	732	8.4
Goodwill impairment	0.0	0	0.0	0.0	0	0.0
Other Intangible Amortization	0.0	0	0.0	0.0	0	0.0
Other Oper Exp (Incl intangibles)	5.5	1,763	22.1	–3.3	1,704	19.5
Total Noninterest Expenses	12.0	5,231	65.7	8.6	5,681	65.1
Provision: Loan & Lease Losses	–49.2	254	3.2	–58.7	105	1.2
Pretax Operating Income (TE)	26.6	1,439	18.1	42.7	2,053	23.5
Realized G/L Hld–to–Maturity Sec.	0.0	0	0.0	0.0	0	0.0
Realized G/L Avail–for–Sale Sec.	–105.8	(3)	0.0	–133.3	1	0.0
Pretax Net Operating Income (TE)	20.8	1,436	18.0	43.0	2,054	23.5
Applicable Income Taxes	0.0	0	0.0	0.0	0	0.0
Current Tax Equivalent Adjustment	–16.7	5	0.1	–20.0	4	0.0
Other Tax Equivalent Adjustments	0.0	0	0.0	0.0	0	0.0
Applicable Income Taxes (TE)	–16.7	5	0.1	–20.0	4	0.0
Net Operating Income	21.0	1,431	18.0	43.3	2,050	23.5
Net Extraordinary Items	0.0	0	0.0	0.0	0	0.0
Net Inc Noncontrolling Minority Interests	0.0	0	0.0	0.0	0	0.0
Net Income	21.0	1,431	18.0	43.3	2,050	23.5
Cash Dividends Declared	72.6	787	9.9	29.2	1,017	11.6
Retained Earnings	–11.4	644	8.1	60.4	1,033	11.8
Memo: Net International Income	0.0	0	0.0	0.0	0	0.0
Memo: Total revenue	3.0	7,965	100.0	9.6	8,730	100.0
Memo: Total revenue net of interest expense	9.7	6,921	86.9	13.3	7,840	89.8

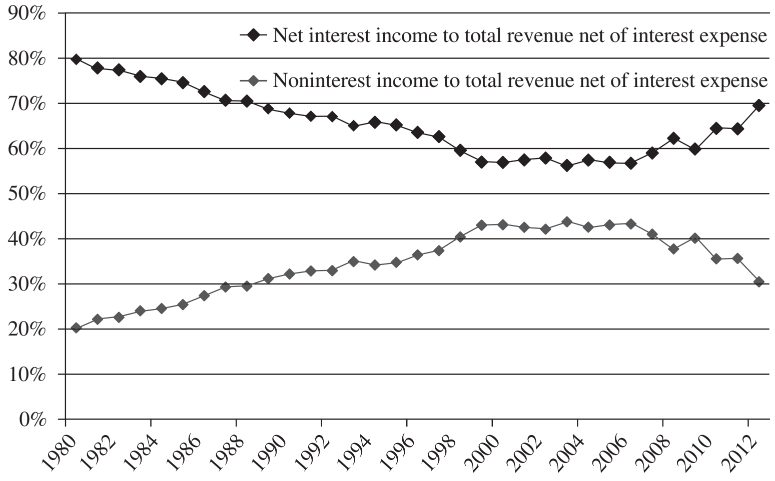
Source: Timothy Koch and S. Scott MacDonald; from FFIEC, Uniform Bank Performance Report, https://cdr.ffiec.gov/public/ManageFacsimiles.aspx.

2. **Interest expense (IE)** is the sum of interest paid on all interest-bearing liabilities, including transactions accounts, time and savings deposits, volatile liabilities and other borrowings, and long-term debt. Gross interest income minus gross interest expense is labeled **net interest income (NII)**. This figure is important because its variation over time indicates how well management is controlling interest rate risk.
3. **Noninterest income (OI)** is becoming increasingly important because of pricing pressure on net interest income. Exhibit 3.5 documents the long-term trend in both net interest income and noninterest income at banks. From 1980 through 2008, net interest income fell from 80 percent of bank total (net) operating revenue to under 66 percent. Following the crisis, the contribution has increased to 70 percent. The earlier trend reflects the increased reliance on trading income at the largest banks and fees from non-credit services as well as changing interest rates. With falling and low interest rates, banks sharply reduced the interest they paid on all liabilities. As loans and securities matured, banks replaced them with lower yielding assets while they could not lower liability rates accordingly because many rates were already close to zero. Net interest income has lately contributed more as large banks have seen their trading revenue fall sharply – a result of both the economic slowdown and limited activities following Dodd-Frank requirements. Regulations also limit some bank fees, such as those on customer account overdrafts. Fortunately, many customers are demanding additional products and services such as brokerage accounts and insurance, which generate fee income. Exhibit 3.5 reveals that noninterest income as a fraction of net operating revenue has fallen consistently since the onset of the financial crisis to just 30 percent in 2013.

   Smaller financial institutions are generally much more dependent on net interest income as their primary source of revenue, while larger financial institutions generally depend more on noninterest income sources. Financial modernization has expanded the types of noninterest sources available to depository institutions; these sources include the following:

   a. **Fiduciary activities** reflect income from the institution's trust department.
   b. **Deposit service charges**, such as checking account fees, generally constitute the bulk of noninterest income.
   c. **Trading revenue, venture capital revenue, and securitization income** reflect gains (losses) from trading securities (making a market in securities) and off-balance sheet derivatives; venture capital activities; net securitization income and fees from securitization transactions; and unrealized losses (recovery of losses) on loans and leases held for sale. These types of revenue are realized only at the largest banks.
   d. **Investment banking, advisory, brokerage, and underwriting fees and commissions** include report fees and commissions from underwriting securities, private placements of securities, investment advisory and management services, and merger and acquisition services. Revenues from these sources are significant only at the largest banks.
   e. **Insurance commission fees and income** include income from underwriting insurance and from the sale of insurance or from reinsurance; this category includes fees, commissions, and service charges.

EXHIBIT 3.5 **Trends in Noninterest as a Proportion of Commercial Bank Total Revenue Net of Interest Expense, 1980–2013**



Source: FDIC Quarterly Banking Profile and the author's estimates, www.fdic.gov/, www2.fdic.gov/qbp.

f. **Net servicing fees** are from servicing real estate mortgages, credit cards, and other financial assets held by others.

g. **Net gains (losses) on sales of loans** are net gains (or losses) on the sales or other disposal of loans and leases.

h. **Other net gains (losses)** includes net gains (losses) on the sales or other disposal of other real estate owned, and on sales of other assets (excluding securities) such as premises and fixed assets and personal property acquired for debts previously contracted (such as automobiles, boats, equipment, and appliances).

4. **Noninterest expense (OE)** is composed primarily of personnel expense, occupancy expense, and other operating expense (which includes technology expenditures, utilities, and deposit insurance premiums). The remaining noninterest expense items are other **intangible amortizations** and **goodwill impairment**, which are amortization expense and impairment losses for goodwill and other intangible assets. Noninterest expense far exceeds noninterest income at most banks, hence the label *burden*, which equals OE-OI.

5. **Provisions for loan and lease losses (PLL)** represents management's estimate of the potential incremental lost revenue from bad loans and is a deduction from income representing a bank's periodic allocation to its allowance for loan and lease losses (ALLL) on the balance sheet. It is a noncash expense and is subtracted from net interest income in recognition that some of the reported interest income overstates what will actually be received when some of the loans go into default. Although management determines the size of the provision and what is reported to stockholders, Internal Revenue Service (IRS) rules, generally accepted accounting principles (GAAP) and regulatory guidance specify the maximum allowable amounts and corresponding tax deduction. As is discussed later, provisions for loan and lease losses differ from loan charge-offs, which indicate loans and leases that a bank formally recognizes as uncollectible and charges off against the ALLL.

6. **Realized securities gains or losses (SG)** arise when a depository institution sells securities from its investment portfolio prior to final maturity at prices above (or below) the initial or amortized cost to the bank. All such profits are reported and taxed as ordinary income. Securities gains are generally viewed as unpredictable, because it is difficult to forecast interest rates and whether the bank can sell securities for a profit or loss. Banks also report amounts of unrealized gains or losses. Generally, securities change in value as interest rates change, but the gains or losses are unrealized—meaning that the bank has not sold the securities to capture the change in value.
7. **Pretax net operating income** equals tax-equivalent net interest income, plus noninterest income, minus noninterest expense, minus provision for loan losses, plus realized securities gains or losses. It represents the bank's operating profit before taxes and extraordinary items.
8. **Applicable income taxes (T)** equals estimated taxes to be paid over time, not actual tax payments. In addition to applicable income taxes, two additional tax items are subtracted from pretax net operating income. The **current tax equivalent adjustment** simply reverses the current part of the tax benefit included in interest income on loan and lease financing, as well as the estimated tax benefit from municipal securities. *Other tax equivalent adjustments* reverse the remainder of the tax equivalent adjustment included in interest income on loans, leases, and municipal securities income. This item is an estimate of the tax benefit attributable to tax loss carrybacks.
9. **Net income (NI)** is the operating profit less all federal, state, and local income taxes, plus or minus any accounting adjustments and extraordinary items.[16] Accounting adjustments generally represent a restatement of earnings resulting from a change in accounting treatment of certain transactions.

Finally, **total revenue (TR)**, equals total interest income plus noninterest income and realized securities gains (losses). It is comparable to net sales for a nonfinancial firm. **Total expense (EXP)** equals the sum of interest expense, noninterest expense, and provisions for loan losses, and is comparable to cost of goods sold plus other operating expenses at a nonfinancial firm. A bank's net interest income (NII) equals interest income (II) minus interest expense (IE), and burden equals noninterest expense (OE) minus noninterest income (OI). Thus, a depository institution's net income (NI) can be viewed as having five contributing factors: net interest income (NII), burden, provisions for loan and lease losses (PLL), realized securities gains or losses (SG), and taxes (T):

$$\text{NI} = \text{NII} - \text{Burden} - \text{PLL} + \text{SG} - \text{T} \tag{3.2}$$

Income statements for the two banking organizations are presented in Exhibit 3.4. Not surprisingly, the components of net income differ substantially, reflecting different business strategies and thus diverse portfolios. Net income for PNC Bank equaled $3.505 billion in 2013, up 31.4 percent from 2012 because of a sharp increase in noninterest income and reduction in PLL and noninterest expense. Community National Bank's net income was $2.05 million, which was up 43.3 percent in 2013 largely due to an increase in net interest income. The contribution of each of the five components to PNC's and CNB's profitability is summarized below.

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[16] Extraordinary items include such items as revenue from the sale of real assets, the sale of a subsidiary, and other one-time transactions. It is important that analysts distinguish between these one-time gains or losses and normal operating income and expenses. One-time transactions are nonrecurring and affect the income statement only in the period they appear. As such, reported net income may overstate true operating income.

Components of Net Income in 2013

	PNC ($000)	CNB ($000)
Net interest income (NII) (te)	$ 9,320,184	$ 7,122
– Burden	$ (3,672,687)	$ (4,964)
– Provisions for loan losses (PLL)	$ (651,026)	$ (105)
+ Securities gains (losses) (SG)	$ 82,680	$ 1
– Taxes (T)	$ (1,442,159)	$ (4)
Net Operating Income	$ 3,636,992	$ 2,050
Net Extraordinary Items	$ 0	$ 0
Net Inc Noncontrolling Minority Interests	$ (131,638)	$ 0
= Net income (NI)	$ 3,505,354	$ 2,050

The Relationship between the Balance Sheet and Income Statement

The balance sheet and income statement are interrelated. The composition of assets and liabilities and the relationships between different interest rates determine net interest income. The mix of deposits between consumer and commercial customers affects the services provided and, thus, the magnitude of noninterest income and noninterest expense. The ownership of nonbank subsidiaries increases fee income, but often raises noninterest expense. The following analysis emphasizes these interrelationships. Let:

$\mathbf{A_i}$ = dollar magnitude of the ith asset

$\mathbf{L_j}$ = dollar magnitude of the jth liability

$\mathbf{NW}$ = dollar magnitude of stockholders equity

$\mathbf{y_i}$ = average pretax yield on the ith asset

$\mathbf{c_j}$ = average interest cost of the jth liability

where n equals the number of assets and m equals the number of liabilities. The balance sheet identity in Equation 3.1 can be restated as:

$$\sum_{i=1}^{n} A_i = \sum_{j=1}^{m} L_j + NW \tag{3.3}$$

Interest earned on each asset equals the product of the average yield (y_i) and the average dollar investment (A_i). Thus:

$$\text{Interest income} = \sum_{i=1}^{n} y_i A_i \tag{3.4}$$

Similarly, interest paid on each liability equals the product of the average interest cost (c_j) and the average dollar funding (L_j) from that source, so that:

$$\text{Interest expense} = \sum_{j=1}^{m} c_j L_j \tag{3.5}$$

Net interest income (NII) equals the difference:

$$NII = \sum_{i=1}^{n} y_i A_i - \sum_{j=1}^{m} c_j L_j \tag{3.6}$$

This restatement of NII indicates what factors can cause net interest income to change over time or differ between institutions. First, net interest income changes when the ***composition*** or ***mix*** of assets and liabilities changes. In terms of Equation 3.6, as portfolio composition changes, the respective values of the assets (A_i) and liabilities (L_j) change in magnitude. This alters net interest income because each A_i or L_j is multiplied by a different interest rate, such as the rate on loans versus the rate on Treasury securities. Second, even if portfolio composition is unchanged, the average ***rate earned*** on assets (asset yields) and ***rate paid*** on liabilities (interest costs) may rise or fall due to changing interest rates and lengthening or shortening of maturities on the underlying instruments. Finally, the ***volume*** or size of total interest-earning assets or interest-bearing liabilities can change. All else equal, a larger volume of earning assets would increase interest income as would a lower volume of interest bearing liabilities.

Analysts generally distinguish between two lines of business at commercial banks: retail and wholesale based on the target customers. The **retail** line of business at the bank is often driven by a branch network focusing on individual consumer banking relationships where individual demand, savings, and time deposits represent most of the liabilities, while consumer and small business loans linked to key individuals represent a higher fraction of the loan portfolio. Noninterest income and fees associated with products directed toward individuals and small business customers are often much higher. The **wholesale** line of business deals primarily with larger commercial customers and is characterized by fewer consumer deposits, more purchased (noncore) liabilities, and proportionately more business loans to large firms. As discussed in Chapter 1, many large financial institutions focus on both retail and wholesale customers. This difference in portfolio composition, in turn, produces different yields on earning assets (y_i) and costs of liabilities (c_j). Larger loans are often transactions driven, with smaller margins, while retail loans are relationship driven and typically associated with larger margins.

Noninterest income, noninterest expense, and provisions for loan losses indirectly reflect the same balance sheet composition. The greater the loan portfolio, the greater are operating overhead and provision for loan losses. Likewise, institutions that emphasize consumer loans operate with more noninterest expense (overhead). They often invest more in branch systems and equipment to attract consumer deposits and handle small, multiple-payment consumer loans. Bank holding companies with nonbank subsidiaries, on the other hand, generate more fee income.

Net income thus varies with the magnitudes of assets and liabilities and the associated cash flows:

$$\mathrm{NI} = \sum_{i=1}^{n} y_i A_i - \sum_{j=1}^{m} c_j L_j - \mathrm{Burden} - \mathrm{PLL} + \mathrm{SG} - \mathrm{T} \qquad \textbf{(3.7)}$$

Net income in excess of dividend payments to shareholders increases retained earnings and, thus, total stockholders equity.

The Return on Equity Model

In 1972, David Cole introduced a procedure for evaluating bank performance via ratio analysis.[17] This procedure, summarized in Exhibit 3.6, enables an analyst to evaluate the source and magnitude of bank profits relative to selected risks taken. This section employs the **return on equity model** to analyze bank profitability and identifies specific measures

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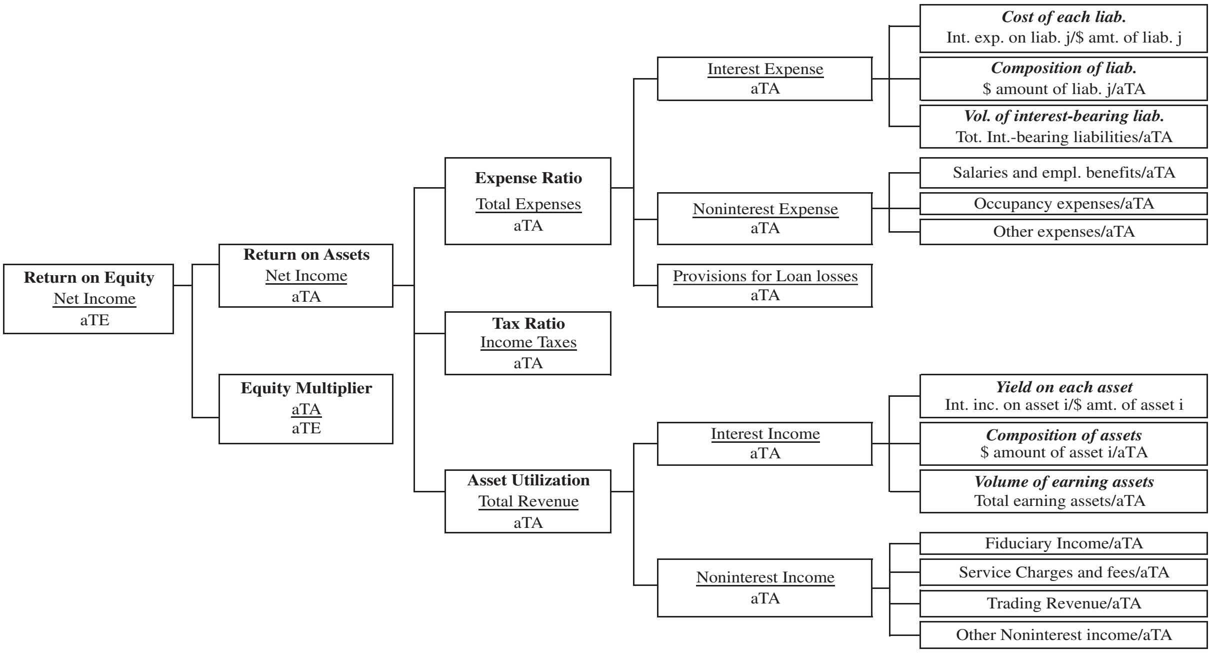
[17] The following discussion is based on the Dupont system of financial analysis and adaptations by Cole (1972). A more meaningful definition of return on equity is the ratio of net income minus dividends on preferred stock to common stockholders equity, because it indicates the potential return to common stockholders.

EXHIBIT 3.6 Decomposition of Return on Equity: The Nature of Bank Profits



Note: aTA = average total assets and aTE = average total equity.

of credit risk, liquidity risk, interest rate risk, operational risk, and capital risk. The ratios are used to assess the performance of the two banking organizations introduced earlier.

The Uniform Bank Performance Report (UBPR) is a comprehensive analytical tool created for the various bank supervisory and examination agencies from the Federal Financial Institutions Examination Council (FFIEC) quarterly call and income reports.[18] The UBPR contains a wealth of profitability and risk information presented in a consistent and uniform manner. Although the 35 pages of data and ratio information might appear intimidating, the advantage of this report over "typical" financial statements is its uniformity in the presentation of data. Most of the UBPR for PNC Bank is contained in the appendix to this chapter. All data for Community National Bank were obtained from its UBPR as well.

The UBPR provides information over a five periods, either annually or quarterly. The report format is updated virtually every year. The real strength of the UBPR is its consistency across institutions. UBPR data consist of three basic types: bank-level ratios and dollar values, peer group averages, and bank percentile ranks. Bank-level dollar values consist primarily of detailed income statement and balance sheet data. Ratios provide data on almost all aspects of a specific bank's profitability and risk (BANK). Peer group averages (PG #) are classified into 15 different groups based on the size of banks, their general location, and their number of branches. Percentile ranks (PCT) allow for a more comprehensive analysis and rank each bank's ratio, within the peer group, in ascending order, from 0 to 99. Each percentile rank indicates that the associated ratio is above that fraction of peer banks' ratios. A basic table of contents for the UBPR is included in this chapter's appendix.

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[18] Complete UBPR reports, including peer group data, can be found at the FFIEC's Internet Web page at http://www.ffiec.gov/ubpr.htm. The UBPR has been available for banks since 1986 and for FDIC-insured savings banks since 1990. Since the elimination of the Office of Thrift Supervision, data for thrift institutions are being converted from the previous Uniform Thrift Performance Report (UTPR) format, to the UBPR format.

Profitability Analysis

If you cornered a group of bank presidents and asked them to summarize performance for the past year, most would quote either their bank's **return on equity (ROE) or return on assets (ROA)**. If these measures were higher than those of peers, they would drop the phrase "high-performance bank" into the conversation. Of course, for a firm to report higher returns, it must either take on more risk, price assets and liabilities more effectively, or realize cost advantages compared with peers. The following analysis starts with these aggregate profit measures, then decomposes return on assets into component ratios to determine why performance varies from peers.

Aggregate bank profitability is measured and compared in terms of return on equity and return on assets. The ROE model simply relates ROE to ROA and financial leverage, then decomposes ROA into its contributing elements. By definition:

$$\text{ROE} = \text{Net income}/\text{Average total equity}^{19}$$

ROE equals net income divided by average total stockholders equity and measures the percentage return on each dollar of stockholders equity.[20] It is the aggregate return to stockholders before paying cash dividends.

ROA equals net income divided by average total assets and thus measures net income per dollar of average assets owned during the period. ROE is linked to ROA by the **equity multiplier (EM)**, which equals average total assets divided by total equity, via the following accounting identity:

$$\begin{aligned} \text{ROE} &= \frac{\text{Net income}}{\text{Average total assets}} \times \frac{\text{Average total assets}}{\text{Average total equity}} \\ &= \text{ROA} \times \text{EM} \end{aligned} \tag{3.8}$$

A larger equity multiplier indicates a larger amount of debt financing relative to stockholders equity. As such, EM measures financial leverage and represents both a profit and risk measure. Consider two competing banks, each holding $100 million in assets with the identical composition. Asset quality is the same. One bank is financed with $90 million in debt and $10 million in total equity, while the other bank is financed with $95 million in debt and just $5 million in total equity. In this example, EM equals 10× for the first bank and 20× for the second bank.

$$\text{EM} = 10\times = \$100/\$10 \text{ for the bank with } \$10 \text{ million in equity}$$
$$\text{EM} = 20\times = \$100/\$5 \text{ for the bank with } \$5 \text{ million in equity}$$

EM affects a bank's profits because it has a multiplier impact on ROA to determine a bank's ROE. In the above example, if both banks earned 1 percent on assets, the first

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[19] Balance sheet figures should always be averaged for use with income statement figures when calculating profitability ratios. This reduces any distortion caused by unusual transactions around reporting dates. All balance sheet values listed in Exhibit 3.2 are for end of period (EOP). Data for average total assets and average total loans and leases are included in Exhibit 3.7 and are used in the ratios presented in Exhibits 3.8 and 3.9 when possible. All other ratios which call for "average" balance sheet figures, calculated in Exhibits 3.8 and 3.9, use averages of annual data. See the Contemporary Issues box: "Interpreting Financial Ratios and the Use of Average Balance Sheet Data."

[20] ROE for PNC in 2013 was calculated as: ROE = $3{,}505{,}354/((38{,}304{,}917 + 38{,}410{,}010)/2) = 9.14\%$, and the value reported in the UBPR was 9.68 percent. Because the UBPR uses averages of quarterly balance sheet figures and we used an average of the beginning and end of the period above, we know that small decrease in equity did not occur equally over the year. Note that we include both bank capital and minority interest as stockholders equity per accounting norms.

bank would report an ROE of 10 percent, while the second bank's ROE would equal 20 percent:

$$\begin{aligned} \text{With 10 percent equity and ROA} &= 1 \text{ percent: ROE} = 0.01 \times 10 = 10 \text{ percent} \\ \text{With 5 percent equity and ROA} &= 1 \text{ percent: ROE} = 0.01 \times 20 = 20 \text{ percent} \end{aligned}$$

Financial leverage works to the bank's advantage when earnings are positive, as the second bank provides shareholders a return that is twice that of its competitor. However, there are two sides to leverage, as it also accentuates the negative impact of losses. If each bank reported an ROA equal to negative 1 percent, the second bank's ROE would be negative 20 percent, or twice the loss of the first bank. Equation 3.8 suggests that higher ROE targets can be obtained either by increasing ROA or increasing financial leverage.

CONTEMPORARY ISSUES

Interpreting Financial Ratios and the Use of Average Balance Sheet Data

The interpretation of historical financial data typically begins with ratio analysis. To be meaningful, ratios must be calculated consistently and compared with benchmark figures. Ratios are constructed by dividing one balance sheet or income statement item by another. The value of any ratio depends on the magnitude of both the numerator and denominator and will change when either changes. Several rules apply when constructing ratios.

Rule 1: Use Average Balance Sheet Data when Comparing Income Statement Data with Balance Sheet Data. Balance sheet items are stock figures, measuring value at a point in time, whereas income statement items are flow figures, measuring value over a period of time, such as one year. When constructing ratios combining balance sheet and income statement figures, average balance sheet data should be used. For example, suppose that only year-end balance sheet figures for 2012 and 2013 are available along with 2013 income statement figures. Return on equity in 2013 is calculated as the ratio of 2013 net income to the average of year-end, 2012 and 2013, total equity. It would be better to use quarterly average balance sheet figures, with daily averages being the best. In fact, the UBPR calculates three different types of average assets and liabilities for use on selected pages.

The first type of average used in the UBPR is a cumulative or year-to-date average of the one-quarter averages for assets and liabilities reported in the call report. The resulting year-to-date averages are used as the denominator in earnings ratios and yield and rate calculations found on pages 1 and 3 of the UBPR. As an example, the average assets used for the page 1 earnings analysis in the September 30 UBPR reflect an average of the quarterly average assets reported in March, June, and September of the current year. The second type of average used in the UBPR is a year-to-date average of end-of-period balances reported in the call report from the beginning of the year forward. To provide an accurate figure, the asset or liability balance at the prior year-end is also included. Averages calculated in this manner are used to determine the percentage composition of assets and liabilities on page 6. For example, the September 30 year-to-date average total loans is composed of the balances for total loans from the call report for the prior December, and current March, June, and September divided by 4. The final type of average used in the UBPR is a moving four-quarter average using quarterly average data. These averages are used as the denominator in the last-four-quarters income analysis on page 12. A four-quarter window compares four quarters of income/expense to selected assets or liabilities averaged for a similar period of time. Thus, average assets used in the September 30 UBPR analysis of net income on page 12 would include the quarterly average assets for the prior December, and current March, June, and September. That average creates a window stretching from October 1 of the prior year to September 30 of the current year.

All balance sheet values listed in Exhibit 3.2 are for end-of-period (EOP). In contrast, the average total assets and average total loans and leases data in Exhibit 3.7 are averages of quarterly values per the UBPR. When calculating the ratios reported in Exhibits 3.8 and 3.9 using average assets and loans, we use figures from Exhibit 3.7 whenever possiable. All other ratios in Exhibits 3.8 and 3.9, which call for "average" balance sheet figures, use averages of year-end annual data. A special note, however, applies to the composition of asset and liability data that appear on page 6 of the UBPR. The UBPR uses averages in the numerator as well as the denominator. Recall that the UBPR uses averages of quarterly data rather than averages of end-of-year data. To be consistent, end-of-period averages are used in the numerator and denominator when calculating data consistent with page 6 of the UBPR.

Rule 2: Compare Individual Ratios over Time. The second rule that applies is that a single ratio by itself is generally meaningless. Calculate ratios over different time intervals to discern notable changes. Determine whether the changes are due to factors affecting the numerator or denominator. This typically requires comparing trends in two related ratios. In addition, compare ratios with similar figures from a control or representative peer group at the same point in time. The peer group represents average performance for a comparable firm. Of course, it is extremely important to identify the correct peer group. Peers should be the same approximate size, operate in the same geographic and product markets, and have the same strategies. The UBPR identifies peers by size, state, and metropolitan or nonmetropolitan area, along with the number of branches. This is generally too broad a group to be meaningful. Most banks create their own peer groups to compare performance.

Rule 3: Accounting Data May Not Reflect Accepted Accounting Procedures and May Be Manipulated. Important data, such as the volume of a bank's outstanding loan commitments and other off-balance sheet activities, may be omitted. This potentially biases traditional ratios. The UBPR now provides a section on "Off-Balance Sheet Items." Footnotes to financial statements generally provide sources and an explanation for many calculations. Additional explanations for balance sheet, income statement, and ratio calculations can be obtained from the UBPR Users Manual available from the FFIEC or on the Internet at www.FFIEC.gov.

EM represents a risk measure because it reflects how many assets can go into default before a bank becomes insolvent. Consider the ratio of total equity to total assets, or 1/EM. This ratio equals 10 percent for the first bank in the example, and 5 percent for the second bank. Although both banks hold identical assets, the first is in a less risky position because twice as many of its assets can default (and be reduced in value to zero on the balance sheet) compared with the second bank before it is insolvent. Thus, a high EM raises ROE when net income is positive, but also indicates high capital or solvency risk.

Expense Ratio and Asset Utilization

The Dupont Analysis has been used for many years and can be modified slightly for use in a financial institution. It represents a straightforward decomposition of ROA. The UBPR provides a wealth of data to assist in the analysis of a financial institution's performance.[21] The basic return on total assets, ROA, is composed of two principal parts: income generation and expense control (including taxes). Recall that net income (NI) is:

$$\text{NI} = \text{Total revenue (TR)} - \text{Total operating expense (EXP)} - \text{Taxes} \tag{3.9}$$

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[21] Similar information can be obtained for Farm Credit Banks from the Farm Credit Administration (www.fca.gov), and for credit unions from the National Credit Union Administration (www.ncua.gov).

Total revenue is analogous to net sales plus other income at a nonfinancial company, and equals the sum of interest income, noninterest income, and securities gains (losses).[22] Total operating expense (EXP) equals the sum of interest expense, noninterest expense, and provisions for loan and lease losses. Dividing both sides by ***average total assets*** **(aTA)** "decomposes" ROA into its components:[23]

$$\mathrm{ROA} = \frac{\mathrm{NI}}{\mathrm{aTA}} = \frac{\mathrm{TR}}{\mathrm{aTA}} - \frac{\mathrm{EXP}}{\mathrm{aTA}} - \frac{\mathrm{Taxes}}{\mathrm{aTA}} \tag{3.10}$$

$$\mathrm{ROA} = \mathrm{AU} - \mathrm{ER} - \mathrm{TAX} \tag{3.11}$$

where:

$$\begin{aligned} \mathrm{AU} &= \text{Total revenue}/\mathrm{aTA} \\ \mathrm{ER} &= \text{Total operating expenses}/\mathrm{aTA} \\ \mathrm{TAX} &= \text{Applicable income taxes}/\mathrm{aTA} \end{aligned}$$

Hence, a bank's ROA is composed of asset utilization (AU), the expense ratio (ER), and the tax ratio (TAX). The greater the AU and the lower the ER and TAX, the higher the ROA.

Expenses: Expense Ratio Components. Consider first the **expense ratio (ER)**, which has a very intuitive interpretation. For example, an ER of 5 percent indicates that a bank's gross operating expenses equal 5 percent of total assets. Thus, the lower (greater) the ER, the more (less) efficient a bank will be in controlling expenses. The decomposition of ER appears at the top of Exhibit 3.6. Three additional ratios isolate the impact of specific types of operating expenses:

$$\begin{aligned} &\text{Interest expense ratio} &&= \text{Interest expense (IE)}/\mathrm{aTA} \\ &\text{Noninterest expense ratio} &&= \text{Noninterest expense (OE)}/\mathrm{aTA} \\ &\text{Provision for loan loss ratio} &&= \text{Provisions for loan losses (PLL)}/\mathrm{aTA} \end{aligned}$$

The sum of these ratios equals the expense ratio.[24]

$$\mathrm{ER} = \left(\frac{\mathrm{EXP}}{\mathrm{aTA}}\right) = \frac{\mathrm{IE}}{\mathrm{aTA}} + \frac{\mathrm{OE}}{\mathrm{aTA}} + \frac{\mathrm{PLL}}{\mathrm{aTA}} \tag{3.12}$$

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[22] Extraordinary income and expense are included in the definitions of total revenue and total expense. Because they are one-time occurrences, they should be excluded when evaluating operating performance and comparing key ratios over time and versus peers. We assume that extraordinary income and expense are relatively small. If they are substantive, they should be excluded from the analysis. As such, net income would equal net income before extraordinary items.

[23] The standard Dupont Analysis approach decomposes ROA into the product of profit margin (PM) and asset utilization (AU) as ROA = AU × PM, where PM equals NI/TR and AU equals TR/aTA. These ratios are not directly available in the UBPR. AU can be calculated from page one of the UBPR by adding (interest income/aTA) plus (noninterest income/aTA) plus (securities gains/aTA). PM can then be obtained indirectly by dividing ROA by AU (PM = ROA/AU).

[24] This relationship is quite useful but *ER* is not directly reported on the UBPR. ER can be obtained from the UBPR in two ways. First, it can be calculated as the ratio of total operating expenses to average total assets. Using average asset data from Exhibit 3.7 for PNC in 2013 this is:

$$\text{ER for PNC} = 3.58\% = [(715{,}794 + 9{,}164{,}894 + 651{,}026)/293{,}964{,}224].$$

Second, ER can be calculated using Equation 3.12 and the ratio data on page 1 of the UBPR:

$$\text{ER for PNC} = 3.58\% = 0.24\% + 3.12\% + 0.22\%.$$

All other factors being equal, the lower each ratio, the more profitable the bank. The value of each measure compared with similar ratios of peer banks reveals whether specific types of expenses contribute to significant differences in performance. When the ratios differ, an analyst should examine additional ratios that reflect the underlying reasons and causes of the differences. Careful analysis requires that both interest expense and noninterest expense be examined by source.

Interest Expense Interest expense may vary between depository institutions for three reasons: differential rate, composition, or volume effects. **Rate effects** suggest that the interest cost per liability, c_j from Equation 3.5, may differ between banks. For example, if the rate paid on CDs over the insurance limit is higher than the rate paid at other banks (all else equal), the bank's interest cost would be higher. The interest cost of each liability is calculated by dividing interest expense on the particular liability by the average total dollar amount of the liability from the balance sheet.[25] For example, the cost of Fed Funds Purchased equals the interest paid on Fed Funds Purchased divided by the average amount of Fed Funds Purchased outstanding during the period.[26]

$$\text{Cost of liability}_j = c_j = \text{Interest expense on liability}_j/\text{Average balance of liability}_j$$

Differences in interest expense arise for many reasons, including differences in risk premiums, the timing of the borrowing, and the initial maturity of the borrowing. Banks pay different **risk premiums** based on how the market perceives their asset quality and overall risk. The greater is perceived risk, the higher is the cost of liabilities. Banks also **time their borrowings** differently relative to the interest rate cycle. If they borrow when rates are low, their interest costs will fall below banks that issue new debt when rates are higher. Finally, banks use different **maturities** of deposits and debt that pay different rates depending on the yield curve at the time of issue. Generally, longer-term deposits pay higher rates than do short-term deposits. The c_j will differ among banks for any of these reasons.

Composition (mix) effects suggest that the mix of liabilities may differ. Banks with substantial amounts of demand deposits pay less in interest because these deposits are non–interest-bearing. A bank that relies on CDs and federal funds purchased will pay higher average rates than a bank with a larger base of lower-cost demand and small time deposits because these noncore liabilities are riskier than core deposits and, therefore, pay higher rates. This example represents a key advantage of core deposits over volatile or noncore liabilities. Composition effects are revealed by common size ratios that measure each liability as a percentage of average total assets:[27]

$$\%\text{ of assets funded by liability}_j = \$\text{ amount of liability}_j/\text{Average total assets}$$

Volume effects recognize that a financial institution may pay more or less in interest expense simply because it operates with different amounts of interest-bearing debt versus DDAs and equity and, thus, pays interest on a different amount of liabilities. The UBPR reports the ratio (average interest-bearing debt divided by average assets), which reveals

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[25] Not all data needed to calculate costs and yields are available from the UBPR, which is noted in Exhibits 3.8 and 3.9 with #N/A. In addition, costs and yields calculated using annual end of year balance sheet data may differ from the figures reported on page 3 of the UBPR because the UBPR use averages of quarterly balance sheet figures for the individual asset values.

[26] The cost of Fed funds purchased & resale is $0.15\% = 5{,}727/((4{,}349{,}832 + 3{,}351{,}286/2)$.

[27] To be consistent, the percentage of total assets funded by liabilities presented in Exhibit 3.8 uses averages of end-of-year data for both the numerator and denominator. So, PNC's 2013 *Time Deposits Above Insurance Limit* as a percentage of average assets $= 0.58\% = (1{,}785{,}623 + 1{,}716{,}366)/(295{,}026{,}390 + 309{,}999{,}678)$ and the UBPR reports 0.59%.

the percentage of assets financed by debt subject to interest payments. **Interest-bearing debt** would include all liabilities that explicitly pay interest; these would generally include all liabilities (less demand deposits) as well as acceptances and other liabilities. A bank's total debt relative to equity is further revealed by its equity multiplier. When EM is high, interest expense may be high, reflecting proportionately high amounts of debt financing. When EM is low, interest expense is normally low. This is true even if the bank pays the same effective interest rates and has the same percentage composition of liabilities.

Noninterest Expense Noninterest expense, or overhead expense, can be decomposed into its various constituent parts as well. Measures of personnel expense, which includes salaries and benefit payments, occupancy expense, and other operating expenses as a percentage of total overhead expense indicate where cost efficiencies are being realized or where a bank has a comparative disadvantage. Similar ratios are often constructed comparing these expenses to average assets to allow comparisons across different-sized banks. Noninterest expense may also vary between banks depending on the composition of liabilities. Banks with large amounts of transactions deposits, for example, exhibit greater relative overhead costs.

Income: Asset Utilization Components. The decomposition of AU appears at the bottom of Exhibit 3.6. **Asset utilization** is a measure of the financial institution's ability to generate total revenue. The greater the AU, the greater the bank's ability to generate income from the assets it owns. For example, if a bank's AU equals 7 percent, its gross return (before expenses and taxes) on average total assets equals 7 percent. A higher figure indicates greater profits, everything else held constant. If the same bank's ER is 5 percent, the bank's net return on investment (assets) before taxes is 2 percent. Total revenue (TR) can be divided into three components:

$$\begin{aligned}\text{TR} = {} & \text{Interest income (II)} + \text{Noninterest income (OI)} + \\ & \text{Realized securities gains or losses (SG)}\end{aligned}$$

Dividing both sides by average total assets produces:[28]

$$\text{AU} = \left(\frac{\text{TR}}{\text{aTA}}\right) = \frac{\text{II}}{\text{aTA}} + \frac{\text{OI}}{\text{aTA}} + \frac{\text{SG}}{\text{aTA}} \qquad \textbf{(3.13)}$$

This indicates how much of a bank's gross yield on assets results from interest income, noninterest income, and realized securities gains (losses). Interest income may differ between banks for the same three reasons discussed with interest expense: rate, composition, and volume effects. For the rate effect, an examination of pretax (gross) yields per asset, y_i from Equation 3.4, allows the bank to compare realized interest yields with those of peer banks. Differences may reflect different ***maturities***, the ***timing of purchases*** relative to the interest rate cycle, or a different ***composition*** of holdings (hence risk of the assets) within each asset category. For example, a bank that invests heavily in new construction loans should initially earn higher gross yields on loans than a bank that lends primarily to Fortune 500 companies—because construction loans are riskier. Differences in investment security yields, in turn, reflect differences in average maturities with generally higher yields on longer-term securities. Gross yields on assets can be

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[28] AU, like ER, cannot be found directly in the UBPR, but can be calculated for the bank by either using balance sheet and income statement data or adding the components in Equation 3.13, which are provided on page 1 of the UBPR. AU for PNC and its Peer Group, using data for 2013 are:

$$\begin{aligned}\text{AU (PNC)} &= 5.31\% = 3.41\% + 1.87\% + 0.03\% \\ \text{AU(Peer)} &= 4.68\% = 3.61\% + 1.05\% + 0.02\%.\end{aligned}$$

calculated similar to costs of liabilities by dividing interest income on the particular asset by the average dollar amount of the asset from the balance sheet:[29]

$$\text{Yield on asset}_i = y_i = \text{Interest income on asset}_i/\text{Average balance of asset}_i$$

Even if two banks earned the same yields on all assets, interest income would be greater at the one that invested proportionately more in higher-gross-yielding loans. Thus, the composition (mix) effect suggests that asset composition also affects AU. Measures of asset composition can be obtained by examining the percentage of total assets contributed by each asset type. Generally, a comparison of loans to assets and securities to assets indicates the overall impact. A high loan-to-asset ratio increases interest income because loans carry higher gross yields than securities, on average.

Finally, a higher volume of earning assets will result in greater interest income and AU, all else being equal. **Earning assets** include all assets that generate explicit interest income plus lease receipts. It equals total assets minus all nonearning assets, such as noninterest cash and due from banks, acceptances, premises, and other assets. A review of a bank's **earnings base (EB)** compares the proportionate investment in average earning assets to average total assets and indicates whether one bank has more or fewer assets earning interest than peers.[30]

$$\text{Earnings base (EB)} = \text{Average earning assets}/\text{aTA}$$

Noninterest Income Noninterest income can be decomposed into its contributing sources as well. Examining the proportion of noninterest income contributed by fees, fiduciary activities, deposit service charges, trading revenue, and other noninterest income relative to average total assets or total noninterest income indicates which component contributes the most to AU and why differences might exist with peers.[31] It also identifies whether other income might be skewed by substantial nonrecurring items. When financial institutions report extraordinary income, an analyst should subtract the amount from net income before calculating the performance ratios. This purges extraordinary income so that a truer picture of operating performance appears.

The last factor affecting ROA is a bank's tax payments. Generally, applicable income taxes are divided by average assets. Although taxes are important to a bank's bottom line, they are often affected by issues unrelated to their long-run operations. Tax treatment of municipal securities, as well as the bank's loan loss reserve, can have a significant effect on the bank's level of tax payments.[32]

Aggregate Profitability Measures Such measures as net interest margin, spread, and the efficiency ratio are commonly cited when evaluating the performance of financial

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[29] This is another area of discrepancy between yields calculated using average asset data from the UBPR and yields provided in the UBPR. The *rate or yield on loans* for 2013 can be calculated as: interest income on loans and leases (TE)/average total loans and leases. Hence, rate on loans = 4.22% = 8,143,508/192,826,560 (average loans from the supplemental data in Exhibit 3.7).

[30] PNC's 2013 earnings base (EB) is calculated as 87.45% = (255,706,332 + 273,352,937)/(295,026,390+ 309,999,679).

[31] Noninterest expense components can be found on page 3 of the UBPR.

[32] The bank's tax ratio (TAX) cannot be found directly in the UBPR, but can be calculated using balance sheet and income statement data or from page 1 of the UBPR as:

$$\text{TAX} = 0.54\% = \text{AU} - \text{ER} - \text{ROA} = 5.31\% - 3.58\% - 1.19\%.$$

institutions. **Net interest margin (NIM)** is a summary measure of the net interest return on income-producing assets:

$$\text{NIM} = \text{Net interest income}/\text{Average earning assets}$$

Spread (SPRD), which equals the average yield on earning assets minus the average cost of interest-bearing liabilities, is a measure of the rate spread or funding differential on-balance sheet items that earn or pay interest:[33]

$$\text{SPRD} = \frac{\text{Interest income}}{\text{Average earning assets}} - \frac{\text{Interest expense}}{(\text{Average interest-bearing liabilities})}$$

Net interest margin and spread are extremely important for evaluating a bank's ability to manage interest rate risk. As interest rates change, so will a bank's interest income and interest expense. For example, if interest rates increase, both interest income and interest expense will increase because some assets and liabilities will reprice at higher rates. Variation in NIM and SPRD indicates whether a bank has positioned its assets and liabilities to take advantage of rate changes—that is, whether it has actually profited or lost when interest rates increased or declined. Also, NIM and spread must be large enough to cover burden, provisions for loan losses, securities losses, and taxes for a bank to be profitable and grow its earnings.

The **burden ratio** measures the amount of noninterest expense covered by fees, service charges, securities gains, and other income as a fraction of average total assets:

$$\text{BURDEN Ratio} = \frac{(\text{Noninterest expense} - \text{Noninterest income})}{\text{aTA}}$$

The greater this ratio, the more noninterest expense exceeds noninterest income for the bank's balance sheet size. A bank is thus better off with a low burden ratio, ceteris paribus.

The **efficiency ratio** (EFF) measures a bank's ability to control noninterest expense relative to net operating income (total revenue net of interest expense or NII plus noninterest income):

$$\text{EFF} = \frac{\text{Noninterest expense}}{(\text{NII} + \text{Noninterest income})}$$

Conceptually, it indicates how much a bank pays in noninterest expense for one dollar of net operating revenue. Bank analysts expect larger banks to keep this ratio below 55 percent, or 55 cents per dollar of net operating income. Banks use this ratio to measure the success of recent efforts to control noninterest expense while supplementing earnings from increasing fees. The smaller the efficiency ratio, the more profitable the bank, all other factors being equal. Profitability measures for PNC and CNB are presented later in the chapter under the section "Evaluating Bank Performance: An Application."

Managing Risk and Returns

The fundamental objective of bank management is to maximize shareholders wealth. This goal is interpreted to mean *maximizing* the market value of a firm's common stock. Wealth maximization, in turn, requires that managers evaluate the present value

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[33] SPRD is not directly available in the UBPR, but can be calculated directly using balance sheet and income statement data or from ratios on pages 1 and 3 of the UBPR. For PNC in 2013:

$$\begin{aligned}\text{SPRD} &= \text{Int-Inc-TE to Avg Earning Assets (page 1)}\\ &\quad - \text{Avg. interest paid on All Interest-Bearing Funds (page 3)}\\ \text{SPRD} &= 3.84\% - 0.31\%\\ &= 3.53\%\end{aligned}$$

of cash flows under uncertainty with larger, near-term cash flows preferred when evaluated on a risk-adjusted basis. In terms of Equation 3.8, profit maximization appears to suggest that financial institution managers simply invest in assets that generate the highest gross yields and keep costs down. But profit maximization differs from wealth maximization. To obtain higher yields, a bank must either take on increased risk or lower operating costs. Greater risk manifests itself in greater volatility of net income and market value of stockholders equity. More importantly, when a firm assumes risk, the immediate results are most often an increase in *reported* profit. Because most firms use accrual accounting, higher-risk assets are associated with higher accrued profits early in the life of the investment. Only later in the life of the investment do poor underwriting practices translate into actual losses. The subprime issues that occurred in the late 2000s are classic examples of this problem. Early in the life of most subprime loans, banks accrued large profits on the loans. When the loans were no longer performing, significant write-offs took place, wiping out profits accrued in earlier years. Wealth maximization requires the manager to evaluate and balance the trade-offs between the opportunity for higher returns, the probability of not realizing those returns, and the possibility that the bank might have to write off large losses on those loans and even face bank failure.

A bank's profitability will generally vary directly with the riskiness of its portfolio and operations near-term. Although some risks can be sought out or avoided, others are inherent in the prevailing economic environment and specific markets served. Banks in agriculture or energy-related areas, for example, lend to businesses involved in cyclical industries. Even though management can control the credit evaluation procedure, returns to the bank vary with returns to its customers, and these returns are heavily dependent on local economic conditions.

Risk management is the process by which managers identify, assess, monitor, and control risks associated with a financial institution's activities. The complexity and range of financial products have made risk management more difficult to accomplish and evaluate. In larger financial institutions, risk management is used to identify all risks associated with particular business activities and to aggregate information such that exposures can be evaluated on a common basis. A formal process enables these institutions to manage risks on both a transactions basis and by portfolio in light of the institution's exposures in a global strategic environment. The Federal Reserve Board has identified six types of risk:[34]

1. Credit risk
2. Liquidity risk
3. Market risk
4. Operational risk
5. Reputation risk
6. Legal risk

Although capital or solvency risk is not listed as a separate risk category by either the Federal Reserve Board or the OCC, it represents the summary of all listed risks. Each of these risks is fundamental to the likelihood that current events or potential events will negatively affect an institution's profitability and the market value of its assets, liabilities, and stockholders equity. The impact of adverse risk events can be absorbed by sufficient bank

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[34] The Office of the Comptroller of the Currency (OCC) uses a nine-part matrix of risk. The OCC's definition of risk includes the same general types of risk as the Board of Governors' definition, except that market risk is divided into price risk, interest rate risk, and foreign exchange risk. The OCC also includes strategic risk, which is included in all of the other categories based on the Board of Governors' model.

capital such that the institution will remain solvent. As a result, capital, or solvency, risk is addressed separately and represents a summary of the six risks listed above.

Using historical accounting data, it is possible to examine potential sources of risk assumed in achieving the returns indicated by the ROE model, with the exception of comprehensive operational risk, reputation risk, and legal risk. Although there may be some financial indicators of these types of risk, they are more difficult to quantify.[35] One must proceed with caution, however, when using historical data as a measure of a firm's risk position, as many potential problems exist. First, historical data only tell the analyst what has happened, not what is going to happen. Risk is about the future, not the past. We use historical data as a measure of the business policies and practices of the company. If events change (an economic recession occurs) or management changes its business model (by moving into subprime lending), historical data may not be representative of the firm's risk profile.

Credit Risk

Credit risk is associated with the quality of individual assets and the likelihood of default. It is extremely difficult to assess individual asset quality because limited published information is available. In fact, many banks that buy banks are surprised at the acquired bank's poor asset quality, even though they conducted a due diligence review of the acquired bank prior to the purchase.

Whenever a bank acquires an earning asset, it assumes the risk that the borrower will default, that is, not repay the principal and interest on a timely basis. **Credit risk** is the potential variation in net income and market value of equity resulting from this nonpayment or delayed payment. Different types of assets and off-balance sheet activities have different default probabilities. Loans typically exhibit the greatest credit risk. Changes in general economic conditions and a firm's operating environment alter the cash flow available for debt service. These conditions are difficult to predict. Similarly, an individual's ability to repay debts varies with changes in employment and personal net worth. For this reason, financial institutions perform a credit analysis on each loan request to assess a borrower's capacity to repay. Unfortunately, loans tend to deteriorate long before accounting information reveals any problems. In addition, many banks enter into off-balance sheet activities, such as loan commitments, guaranty offers, and derivative contracts. These risks can be substantial, but are difficult to measure from published data.

Bank investment securities generally exhibit less credit (default) risk because borrowers are predominantly federal, state, and local governmental units. Banks also generally concentrate their purchases on investment-grade securities—those rated Baa (BBB) or higher—which should exhibit less default risk. Of course, the financial crisis revealed that the rating agencies systematically underestimated the risk associated with many types of mortgages and the related mortgage-backed securities, collateralized loan obligations, etc. For example, during the crisis, many of the highest rated securities (Aaa - Moody's and AAA - S&P) defaulted shortly after issue. Investors that relied on these ratings took huge losses. In response, the Dodd-Frank Act stipulates that banks not rely exclusively on ratings when making their investment decisions.

Even municipal bonds are subject to defaults. For example, in 2012 the city of Stockton, California became the largest U.S. city to file for bankruptcy after the city council found out it only had $150,000 left in it bank account! The city, with a population of approximately 300,000, became the symbol for excess during the real estate boom of

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[35] Risk is traditionally measured by the standard deviation or coefficient of variation of returns. The following discussion identifies sources of potential variation in returns. Sources of return risk are evidenced by simple ratios that reflect portfolio allocations or income streams that differ from industry averages. Of course, some variation is beneficial. If returns are systematically greater than norms or what is expected, a bank will be better off.

the 2000s and was a large casualty of the bursting of the housing bubble in the late 2000s. By 2009, Stockton's outstanding debt obligations were almost $1 billion including civic improvements and lavish pension and health care benefits for retirees. The City of Detroit followed in July 2013 by filing for bankruptcy with outstanding debt estimated to be $20 billion, more than twice that at Stockton.

Unfortunately, some banks have purchased large amounts of problem securities. For example, many banks owned preferred stock issued by Fannie Mae and Freddie Mac. When the U.S. Treasury put these firms into conservatorship and cut the dividends to zero, banks were forced to write-off the principal amounts they owned. Some of the largest depository institutions also significantly increased their holdings of collateralized debt obligations (CDOs) and other types of mortgage-backed securities in 2006–2007. As mentioned previously, the rating agencies often assigned high credit ratings to these securities—designating some securities as Aaa and AAA. Even with high ratings, the mortgages used to collateralize the securities were often issued to subprime borrowers. The rating agencies supposedly awarded high ratings on the basis of how cash flows from the borrowers were designated to service the debt. Specifically, investors in high-priority securities were to receive the first principal and interest payments made by all borrowers, thereby reducing credit risk. Unfortunately, in many cases borrower payments were insufficient to cover the debt service for even these first-in-line securities. Errors in the rating agencies' assessments were one of the leading contributors to the subprime crisis of 2008, and it became clear that bad debt is bad debt, regardless of how the repayments are structured. An important lesson is that even when rating agencies assign high quality ratings to debt, the rating does not mean that the security is completely safe.

Depository institutions evaluate their general credit risk by asking three basic questions, and their credit risk measures focus predominantly on these same general areas:

1. What has been the historical loss rate on loans and investments?
2. What losses are expected in the future?
3. How prepared is the institution to weather the losses?

Historical Loss Rate. Managers often focus their attention initially on an institution's historical loan loss experience because loans exhibit the highest default rates. Ratios (as a percentage of total loans and leases) that examine the historical loss experience are related to gross losses, recoveries, and net losses. Data at the top of page 7 of the UBPR provide a summary of aggregate gross losses, recoveries, net losses, provisions for loan losses, and the level of the reserve for loan losses. Data in the middle of page 7 provide data on loss rates of various loan categories. The bottom of page 7 summarizes the initial balance and adjustments to the ALLL during each period. A summary of aggregate loan quality data for PNC and Community National Bank appears in Exhibit 3.7 under the Summary of Loan Loss Account and Noncurrent LN&LS.

Net losses (net charge-offs) equal the difference between gross loan losses and recoveries. **Gross loan losses (charge-offs)** equal the dollar value of loans written off as uncollectible during a period. **Recoveries** refer to the dollar amount of loans that were previously charged-off, but subsequently collected. Net losses directly reduce the allowance for loan losses (ALLL) that a bank sets aside for potential losses. It is important to note that net losses are not directly reported on the income statement. Instead, a bank reports provisions for loan losses, which represents a transfer of funds (deferral of income taxes because it is deducted from income before determining taxes) to build the ALLL up to its desired level. A review of Exhibit 3.2 reveals that the balance sheet lists

EXHIBIT 3.7 Supplemental Operational and Loan Data for PNC Bank and Community National Bank, 2012–2013

		PNC Bank, National Association					
		Dec–12			Dec–13		
SUPPLEMENTAL DATA	Pg #	% Cha	$ 1,000	% of Total	% Cha	$ 1,000	% of Total
Average Assets	1	11.06	284,903,864		3.18	293,964,224	
Domestic Banking offices	3	14.52	2,903		–5.75	2,736	
Foreign Branches	3	0.00	1		0.00	1	
Number of equivalent employees	3	8.39	53,544		–5.24	50,736	
SUMMARY OF RISK–BASED CAPITAL							
Net Tier One	11A	11.03	28,351,799	11.3	1.34	28,730,869	11.0
Net Eligible Tier Two	11A	9.11	7,404,389	2.9	19.45	8,844,595	3.4
Total–risk–based–capital	11A	10.63	35,756,188	14.2	5.09	37,575,464	14.3
Total Risk–Weighted Assets	11A	12.31	251,467,949	100.0	4.29	262,244,996	100.0
SUMMARY OF LOAN LOSS ACCOUNT							
Balance at beginning of period	7	–11.05	4,346,873	2.4	–7.16	4,035,708	2.1
Gross Credit Losses	7	–17.35	1,870,555	1.0	–15.35	1,583,428	0.8
Memo: Loans HFS Writedown	7	–3.98	52,165	0.0	–58.46	21,667	0.0
Recoveries	7	–6.92	581,803	0.3	–12.98	506,277	0.3
Net Credit Losses	7	–21.33	1,288,752	0.7	–16.42	1,077,151	0.6
Provisions for Credit Losses	7	–11.09	977,178	0.5	–33.38	651,026	0.3
Other Adjustments	7	–150.00	409	0.0	–324.45	(918)	0.0
Balance at end of period	7	–7.16	4,035,708	2.2	–10.58	3,608,665	1.9
Average LN&LS	7	16.03	179,591,931	100.0	7.37	192,826,560	100.0
NONCURRENT LN&LS							
90 days and over past due	8	–8.49	3,931,988	2.2	–36.17	2,509,844	1.3
Total Nonaccrual LN&LS	8	–9.40	3,375,508	1.9	5.58	3,563,833	1.8
Total Non–current LN&LS	8	–8.92	7,307,496	4.1	–16.88	6,073,677	3.1
LN&LS 30–89 Days Past Due	8	–6.91	1,802,366	1.0	–28.66	1,285,872	0.7
Restructured LN&LS 90+ Days P/D	8	–57.89	9,411	0.0	–8.54	8,607	0.0
Restructured LN&LS Nonaccrual	8	196.12	1,592,215	0.9	–5.09	1,511,223	0.8
All other real estate owned	8	5.51	887,467	0.5	–31.88	604,503	0.3

EXHIBIT 3.7 (continued)

		Community National Bank					
		Dec–12			Dec–13		
SUPPLEMENTAL DATA	Pg #	% Cha	$ 1,000	% of Total	% Cha	$ 1,000	% of Total
Average Assets	1	5.51	123,839		10.07	136,305	
Domestic Banking offices	3	0.00	5		0.00	5	
Foreign Branches	3	0.00	0		0.00	0	
Number of equivalent employees	3	6.57	50		0.07	50	
SUMMARY OF RISK–BASED CAPITAL							
Net Tier One	11A	6.79	10,385	9.6	9.95	11,418	10.4
Net Eligible Tier Two	11A	23.15	782	0.7	–8.95	712	0.6
Total–risk–based–capital	11A	7.79	11,167	10.3	8.62	12,130	11.0
Total Risk–Weighted Assets	11A	14.37	107,903	100.0	1.93	109,985	100.0
SUMMARY OF LOAN LOSS ACCOUNT							
Balance at beginning of period	7	–11.19	635	0.6	23.15	782	0.7
Gross Credit Losses	7	–78.59	131	0.1	48.85	195	0.2
Memo: Loans HFS Writedown	7	0.00	0	0.0	0.00	0	0.0
Recoveries	7	–25.00	24	0.0	–16.67	20	0.0
Net Credit Losses	7	–81.55	107	0.1	63.55	175	0.1
Provisions for Credit Losses	7	–49.20	254	0.2	–58.66	105	0.1
Other Adjustments	7	0.00	0	0.0	0.00	0	0.0
Balance at end of period	7	23.15	782	0.7	–8.95	712	0.6
NONCURRENT LN&LS							
90 days and over past due	8	408.24	1,789	1.7	5.20	1,882	1.6
Total Nonaccrual LN&LS	8	5586.49	2,104	2.0	–97.20	59	0.0
Total Non–current LN&LS	8	900.77	3,893	3.6	–50.14	1,941	1.6
LN&LS 30–89 Days Past Due	8	64.41	1,677	1.6	–44.13	937	0.8
Restructured LN&LS 90+ Days P/D	8	0.0	0	0.0	0.0	0	0.0
Restructured LN&LS Nonaccrual	8	0.0	0	0.0	0.0	0	0.0
All other real estate owned	8	–11.9	303	0.3	–79.5	62	0.1

Source: Timothy Koch and S. Scott MacDonald; from FFIEC, Uniform Bank Performance Report, http://www.ffiec.gov/ubpr.htm.

the ALLL under gross loans as a contra-asset account. Importantly, this allowance or loan loss reserve is only an accounting entry and does not represent funds in some cookie jar that a bank can go to when it needs cash. The greater the ALLL, the more the institution has provided for loan losses but not charged off.

Expected Future Losses. Ratios that examine expected future loss rates are based on past-due loans, nonaccrual loans, total noncurrent loans, and classified loans as a percentage of total loans. These data can be found on pages 8 and 8A of the UBPR. **Past-due loans** represent loans for which contracted interest and principal payments have not been made but are still accruing interest. Past-due loans are often separated into 30–89 days past due and 90 days and over past due. The formal designation of **nonperforming loans** are loans where the principal and/or interest owed are more than 90 days past due.[36] **Nonaccrual loans** are those not currently accruing interest. The sum of nonperforming and nonaccrual loans equals **noncurrent loans**. Nonaccrual loans are currently—or have been habitually past due, or have other problems, which have placed them in nonaccrual status.

Restructured loans are loans for which the lender has modified the required payments on principal or interest. The lender may have lengthened maturity and/or renegotiated the interest rate. During the financial crisis, regulators and bank investors paid close attention to troubled debt restructurings (TDRs) in which banks modified (eased) loan terms in the hope of reducing future loan losses. Most banks have their own internal rating system for identifying default risk within their loan portfolio. **Classified loans** are a general category of loans in which management sets aside reserves for clearly recognized losses. The common terms used by regulators for such adversely classified loans are **substandard, doubtful** and **loss**. Because some loans, such as speculative construction loans, are riskier than others, analysts should examine the composition of a bank's loan portfolio and the magnitude of past-due, nonaccrual, noncurrent, restructured, and adversely classified loans relative to total loans to better assess risk.

Preparation for Losses. Ideally, management should relate the size of the ALLL to actual and expected noncurrent loans, which represent potential charge-offs. With a loss reserve equal to all noncurrent loans (100 percent coverage), the institution should be well protected because it should not expect to charge off all nonperforming and nonaccrual loans. GAAP (generally accepted accounting principles) and call reporting guidelines require that a bank's loan loss reserve be adequate to cover the known and inherent risk in the loan portfolio. For tax purposes, however, the maximum allowable deduction for losses and the size of the reserve are set by IRS rules. Thus, prudent management could lead to a conflict with the IRS and GAAP accounting standards. In recent years, the IRS required depository institutions to use a five-year historical average charge-off method or direct (actual) charge-off method for calculating provisions for loan losses. Currently, depository institutions are expected to have detailed models that incorporate information on noncurrent loans with specific macroeconomic and related factors that provide information regarding expected losses. When regulators consider the current loan portfolio to be more risky, regulators and GAAP accounting require higher provisions or a greater loan loss reserve.[37] As depository institutions realize losses, they will make loan loss provisions. The net impact is that earnings will be more volatile, reflecting the timing, or volatility, of actual loan charge-offs.

The UBPR presents a series of ratios that examine a bank's ability to handle current and expected future losses on both page 1 and page 7. These include the bank's provisions for loan losses to average total assets; the loan and lease loss allowance (loan loss reserve) as a percentage of total loans; earnings coverage of net losses; and loan and lease loss allowance to net losses. When management expects to charge off large amounts of loans, it will build up the allowance for loan losses. It does this by adding to provisions for loan losses. Thus, a large allowance may indicate both good and bad performance. If

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[36] A popular ratio used by analysts, called the "Texas Ratio" is similar to the nonperforming loans ratio. The so called Texas ratio is defined as total nonperforming plus other real estate owned divided by tangible equity capital plus loan loss reserves.

[37] There is considerable disagreement among bankers, bank regulators and accountants as to the appropriate methodology to determine the ALLL. The argument evolves around the difference between 'incurred loss' by which a bank recognizes losses when they are probable (based on current information) and 'expected loss' by which a bank recognizes losses over the entire life of a loan using reasonable and supportable forecasts. Regulators have proposed moving to expected losses as a determinant, even though it is virtually impossible to accurately predict future losses. Some analysts and regulators estimate that moving to expected loss will increase required ALLLs by up to 50 percent.

asset quality is poor, a bank needs a large allowance because it will need to charge off many loans. The allowance should be large because charge-offs will deplete it. In this case, a high loss reserve signals bad performance. With high-quality assets, banks charge off fewer loans, so the allowance can be proportionately less. An institution with a large ALLL and few past-due, nonaccrual, or nonperforming loans will not need all of the reserve to cover charge-offs, which will be low. Such a bank has reported provisions for loan losses that are higher than needed such that prior period net income is too low. Future profit measures should benefit once provisions are lowered.

Three other sources of credit risk should be identified. First, companies that lend in a narrow geographic area or concentrate their loans to a certain industry have risk that is not fully measured by balance sheet or historical charge-off data. This **concentration risk** is a direct result of a lack of diversification and dramatically affects a majority of the bank's portfolio if economic factors negatively affect the geographic or industry concentration. This type of bank could be subject to risks that the rest of the banking industry is not subject to in its operations. Second, depository institutions with **high loan growth** often assume greater risk, because credit analysis and review procedures become less rigorous as loan officers have less time for each loan. More importantly, those institutions with high loan-growth rates may be achieving this growth by making loans they would not make in the past. If they are making these loans by accepting additional risk, their historical data may not represent the risk of the *current* portfolio. In many instances, the loans perform for a while, but losses eventually increase. Thus, high loan-growth rates, particularly when the loans are generated externally through acquisitions or through entering new trade areas, often lead to future charge-offs. Third, banks that lend funds in foreign countries take country risk.

Country risk refers to the potential loss of interest and principal on international loans due to borrowers in a country refusing to make timely payments, as per a loan agreement. In essence, foreign governments and corporate borrowers may default on their loans due to government controls over the actions of businesses and individuals, internal politics that may disrupt payments, general market disruptions, and problems that arise when governments reduce or eliminate subsidies used as a source of repayment.

Ideally, it would be useful to examine the credit files (actual loan files) of a bank to assess the quality of specific loans. Although this information is provided to regulators, it is not available to the public. Regulators assign each bank a rating for asset quality ("A" for asset quality) as part of the CAMELS rating system. There has been some discussion of publishing these ratings, a policy that analysts desire but bankers fear.

Liquidity Risk

Liquidity risk is the current and potential risk to earnings and the market value of stockholders equity that results from a bank's inability to meet payment or clearing obligations in a timely and cost-effective manner. Liquidity risk is greatest when a bank cannot anticipate new loan demand or deposit withdrawals, and does not have access to new sources of cash. This risk can be the result of either funding problems or market liquidity risk. **Funding liquidity risk** is the inability to liquidate assets or obtain adequate funding from new borrowing. **Market liquidity risk** is the inability of the institution to easily unwind or offset specific exposures without significant losses from inadequate market depth or market disturbances. This risk is greatest when risky securities are trading at high premiums to low-risk Treasury securities because market participants are avoiding high-risk borrowers. This type of risk became most prevalent with the subprime liquidity crisis of 2008. Specifically, the failure of Bear Stearns in 2008 was due to its lack of marketable assets and inability to borrow in the financial markets. These problems are discussed in Chapter 11.

Generally, a firm can provide for its liquidity needs in one of two ways:

1. By holding liquid assets
2. By securing its ability to borrow (issuing new liabilities) at a reasonable cost

Thus, when depository institutions need cash, they can either sell liquid assets they own or increase borrowings from available funding sources. Liquidity risk metrics focus on the quantity and quality of liquid assets near maturity or available-for-sale at reasonable prices, as well as the firm's ability to cheaply and easily borrow funds to meet cash outflows.

Holding Liquid Assets. Liquidity refers to the ability to convert an asset to cash with minimal loss from price depreciation. Most depository institutions hold some assets that can be readily sold near par to meet liquidity needs. These liquid assets provide immediate access to cash but are costly to hold because they pay very low rates of interest. For example, **cash assets** are held to satisfy customer withdrawal needs, meet legal reserve requirements, or to purchase services from other financial institutions, but do not pay interest. Hence, depository institutions attempt to minimize cash holdings due to the cost of holding them. For this reason, cash assets do not represent a source of long-term liquidity for a depository institution. Cash balances held for clearing purposes can decline temporarily but must be replenished to meet required reserves or pay for correspondent services.[38] Cash items in the process of collection (CIPC) vary with the volume of checks handled and cannot be manipulated by the bank. Cash assets as a group are thus illiquid because a bank cannot reduce its holdings for any length of time. **Liquid assets**, therefore, consist of unpledged, marketable short-term securities that are classified as available-for-sale, plus federal funds sold and securities purchased under agreement to resell. Federally insured loans can also be readily sold and thus are liquid.

Depository institutions purchase short-term investment securities primarily to satisfy liquidity needs and for yield. Federal funds sold, securities purchased under agreement to resell, and unpledged available-for-sale securities are the most liquid assets. Short-term securities are generally more liquid than longer-term securities because they are less volatile in price and the bank gets its principal back earlier if it holds the securities until maturity. *Held-to-maturity* securities are not as liquid as *available-for-sale* securities because they can create regulatory and accounting issues if sold prior to maturity. Banks are, however, generally more willing to sell any security that currently trades at a price above book value because, at worst, they can report a securities gain. *Pledging requirements* often stipulate that depository institutions pledge either Treasury or municipal securities as collateral against deposit liabilities such as Treasury deposits, municipal deposits, and borrowings from Federal Reserve banks. These **pledged securities** are often held by a third-party trustee and cannot be sold without a release. The greater the proportion of securities pledged, the smaller the proportion that might be available for sale. Analysts, therefore, examine the proportion of, and type of, assets held in available-for-sale securities, short-term investments, and pledged securities as measures of liquidity through holding of liquid assets.

Ability to Borrow for Liquidity. If two companies hold similar assets, the one with the greater total equity or lower financial leverage can take on more debt with less chance of becoming insolvent. A depository institution that relies less on large volatile borrowings such as jumbo CDs, federal funds, Repos, Eurodollars, and commercial paper, can issue greater amounts of new debt (acquire cash) in this form. In both instances, the cost

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[38] See Chapter 11 for a discussion of cash assets and required reserve planning.

of borrowing is lower than for a bank with the opposite profile. The equity-to-asset ratio and volatile (net noncore) liability-to-asset ratio represent the bank's equity base and borrowing capacity in the money markets.[39] Volatile or purchased liquidity is also sensitive to a bank's **asset quality**, meaning that the lower a bank's equity position is or the greater its high-risk assets are relative to equity, the lower the bank's borrowing capacity and the higher its borrowing costs. The most liquid banks have unpledged assets that they can use as collateral against new borrowing.

Banks with large amounts of funding from core deposits similarly have better liquidity than banks without significant core deposits. As discussed previously, core deposits are less sensitive to the interest rate paid but more sensitive to the fees charged, services rendered, and location of the bank. Thus, a bank will retain most of these deposits even when interest rates paid by competitors increase relative to the bank's own rates. As such, the interest elasticity of the demand for core deposits is low. The greater the core deposits in the funding mix, the lower the unexpected deposit withdrawals and potential new funding requirements; hence, the greater the bank's liquidity.

The value of core deposits was demonstrated in 2008 when nonbank financial companies converted to bank holding companies. During the credit and liquidity crisis in late 2008, Goldman Sachs, Morgan Stanley, and American Express chose to become bank holding companies (actually, *financial holding companies*) and thus be regulated by the Federal Reserve. The catalyst was uncertainty about their funding sources and holding company status gave them ready access to borrowing directly from the Federal Reserve—ultimately, the ability to secure core deposit funding so as to not be forced to sell assets at low prices. Following these actions, four large insurance companies purchased small thrift institutions to gain the same access to Federal Reserve discount window borrowings and ultimately core deposits.[40]

Although it is difficult to assess loan liquidity from general balance sheet information, loans can provide liquidity in two ways. First, cash inflows from periodic interest and principal payments can be used to meet cash outflows. Second, some loans are highly marketable and can be sold to other institutions. For example, the federal government guarantees a large portion of Small Business Administration (SBA) loans. The guaranteed portion of an SBA loan is highly marketable because default risk is low.

Market Risk

Market risk is the current and potential risk to earnings and stockholders equity resulting from adverse movements in market rates or prices. The three areas of market risk are interest rate or reinvestment rate risk, equity or security price risk, and foreign exchange risk:

- **Interest rate risk** is the potential variability in a financial institution's net interest income and market (economic) value of equity due to changes in market interest rates.

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[39] Short-term noncore funding from March 31, 2011 forward equals the sum of time deposits of more than $250,000 with a remaining maturity of one year or less + brokered deposits issued in denominations of $250,000 and less with a remaining maturity of one year or less + other borrowed money with a remaining maturity of one year or less + time deposits with a remaining maturity of one year or less in foreign offices + securities sold under agreements to repurchase and federal funds purchased. A more accurate measure of volatile funding should include FHLB borrowings of less than one year.

[40] In November 2008, Lincoln National, Aegon (Transamerica), and Hartford Financial Services bought thrifts to access TARP-CPP funds and eventually access core deposit funding. Genworth Financial also attempted to become a savings and loan holding company but the deadline to convert passed before its application could be completely reviewed and approved by the Office of Thrift Supervision.

- **Equity and security price risk** is the potential risk of loss associated with a bank's trading account portfolios.
- **Foreign exchange risk** is the risk to a financial institution's condition resulting from adverse movements in foreign exchange rates.

Interest Rate Risk. Traditionally, interest rate risk analysis compares the sensitivity of interest income to changes in asset yields with the sensitivity of interest expense to changes in the interest costs of liabilities. This is done using **GAP** and **earnings sensitivity analysis**. The purpose is to determine how much net interest income and net income will vary with movements in market interest rates. A more comprehensive portfolio analysis approach compares the duration of assets with the duration of liabilities using **duration gap** and **economic value of equity sensitivity analysis** to assess the impact of rate changes on net interest income and the market value (or price) of stockholders equity. Duration is an elasticity measure that indicates the relative price sensitivity of different securities.[41]

Both GAP and duration gap focus on mismatched asset and liability maturities and durations as well as potential changes in interest rates. An asset or liability is **rate sensitive** if management expects it to be repriced (new investment or borrowing at a new rate) within a certain time period. A bank's net interest sensitivity position, or the funding GAP between assets and liabilities, is approximated by comparing the dollar amount of assets with liabilities that can be repriced over similar time frames. The dollar difference between rate-sensitive assets and rate sensitive liabilities for 30 days, 31 to 90 days, and so forth, indicates whether more assets or liabilities will reprice within a given time interval. If this measure is positive, the bank will likely realize a decrease in net interest income if the level of short-term interest rates falls as assets reprice downward faster than liabilities, and an increase in net interest income if short-term interest rates increase. If the bank's GAP measure is negative, on the other hand, meaning more liabilities reprice than assets, the bank's net interest income will likely increase with a decline in rates and decrease with an increase in interest rates. The larger the absolute value of the ratio, the greater the risk. In practice, most banks conduct earnings sensitivity or economic value of equity sensitivity analyses to examine volatility in net interest income and stockholders equity and thereby best identify interest rate risk exposures. Unfortunately, data contained in the UBPR are insufficient for evaluating a bank's interest rate risk position. More details on interest rate risk are provided in Chapters 7 and 8.

Equity and Security Price Risk. Changes in market prices, interest rates, and foreign exchange rates affect the market values of any equities, fixed-income securities, foreign currency holdings, and associated derivative and other off-balance sheet contracts. Large banks often conduct value-at-risk analyses to assess the risk of loss with their portfolios of trading assets and hold specific amounts of capital in support of this market risk. Small banks identify their exposure by conducting sensitivity analyses. Value-at-risk analysis is introduced in Chapter 12 but is for the most part beyond the scope of this book.

Foreign Exchange Risk. Changes in foreign exchange rates affect the values of assets, liabilities, and off-balance sheet activities denominated in currencies different from the bank's domestic (home) currency. When the amount of assets differs from the amount of liabilities in a currency, any change in exchange rates produces a gain or loss that

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[41] Chapter 7 presents the GAP concept and Chapter 8 formally defines duration measures and demonstrates their application to market value risk analysis and management.

affects the market value of the bank's stockholders equity. This risk is also found in off-balance sheet loan commitments and guarantees denominated in foreign currencies and is also known as *foreign currency translation risk.* Banks that do not conduct business in nondomestic currencies do not directly assume this risk. Most banks measure foreign exchange risk by calculating measures of net exposure by each currency. A bank's net exposure is the amount of assets minus the amount of liabilities denominated in the same currency. Thus, a bank has a net exposure for each currency for which it books assets and liabilities. The potential gain or loss from the exposure is indicated by relating each net exposure to the potential change in the exchange rate for that currency versus the domestic currency.

Operational Risk

Operational risk refers to the possibility that operating expenses might vary significantly from what is expected, producing a decline in net income and firm value. The Board of Governors states that it arises from "inadequate information systems, operational problems, breaches in internal controls, fraud, or unforeseen catastrophes that produce unexpected losses." The Basel Committee defines operational risk as: *The risk of loss resulting from inadequate or failed internal processes, people, and systems, or from external events.*[42] In today's electronic world, operational risk is closely associated with information technology and cybersecurity threats.

Beginning with the Basel II Accord in 2006, banks must make capital allocations for operational risk (Chapter 12 for more details on capital requirements). The focus of these capital requirements is on the optimum use of capital in the technology and business process operations of a financial institution. The events of September 11, 2001, tragically demonstrated the need for banks to protect themselves against operational risk to their systems and people. From a capital adequacy point of view, this covers technology risks, management- and people-related operational risks, and legal risks.

There are many causes of earnings variability in an institution's operating policies. Some banks are relatively inefficient in controlling direct costs and employee processing errors. Banks must also absorb losses due to employee and customer theft and fraud. More recently, cybersecurity attacks threaten bank operations. For example, in 2013, hackers stole 40 million customer accounts from retailer Target. Customers who used their credit card to purchase items at Target had their information disclosed publicly. Bank card issuers were exposed to losses associated with their card customers' transactions.

A bank's operating risk is closely related to its operating policies and processes and whether it has adequate controls. Losses from external events, such as an electrical outage, are easy to identify but difficult to forecast because they are not tied to specific tasks or products within the bank. Operational risk is difficult to measure directly but is likely greater for higher numbers of divisions or subsidiaries, employees, and loans to insiders.

Historically, measures of operational risk were limited to measures of operational efficiency and expense control or productivity, and included ratios such as total assets per employee and total personnel expense per employee. More recently, banks and other firms have come to realize that operational risk is much greater than this. Operational risk also arises from the more difficult-to-measure, unexpected loss or risk that might occur as the result of the following:

1. **Business interruptions** from loss or damage to assets, facilities, systems, or people
2. **Transaction processing** from failed, late, or incorrect settlements

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[42] See "What is Operational Risk?" by José Lopez. *Economic Letter*, Federal Reserve Bank of San Francisco, January 25, 2002 and the 2011 Basel Committee report on Operational Risk.

3. **Inadequate information systems** in which the security of data or systems is compromised
4. **Breaches in internal controls** resulting in fraud, theft, or unauthorized activities
5. **Client liability** resulting in restitution payments or reputation losses

Unfortunately, there is no concrete way to estimate from published data the likelihood of these contingencies. The key is to have strong internal audit procedures with follow-up to reduce exposures and for management to meticulously identify and quantify potential losses by type of event and the line of business where the event has an impact.

Legal and Reputation Risk

Almost by definition, legal and reputation risk are difficult to measure. **Legal risk** is the risk that unenforceable contracts, lawsuits, or adverse judgments could disrupt or negatively affect the operations, profitability, condition, or solvency of the institution. Legal risk not only addresses general liability issues, but also compliance risk. Banking is a heavily regulated industry and one with extensive regulatory compliance requirements. Lending to consumers, for example, requires very specific and detailed disclosures on the interest rate, maturity, and repayment schedule. Following Dodd-Frank, the Consumer Financial Protection Bureau (CFPB) is closely monitoring banks along with the other regulatory agencies to ensure compliance with current laws. A bank must report its data and activities quarterly in a very detailed and specific manner, to name only a few of these extensive compliance issues. Failure to comply with the long list of regulatory mandated operational and reporting requirements can spell disaster for an institution.

Reputation risk is the risk that negative publicity, either true or untrue, can adversely affect a bank's customer base or bring forth costly litigation, hence negatively affecting profitability. Because these risks are basically unforeseen, they are all but impossible to measure. Although it is difficult to measure, and therefore manage, reputation risk, firms can mitigate this risk by ensuring their employees receive effective and consistent training, such that they are well informed as to how to communicate with external customers and how to properly handle and deliver customer information. Senior management should also make sure regular and consistent assessments of internal controls are performed to ensure that they are fully effective and still applicable. Finally, transactional documentation should be reviewed and strengthened as necessary, and systems should be in place that fully and effectively address and deal with customer complaints.

Capital or Solvency Risk

Capital risk is not considered a separate risk because all of the risks mentioned previously will, in one form or another, affect a bank's capital and hence solvency. It does, however, represent the risk that a bank may become insolvent and fail. A firm is technically insolvent when it has negative net worth or stockholders equity. The economic net worth of a firm is the difference between the market value of its assets and liabilities. Thus, **capital risk** refers to the potential decrease in the market value of assets below the market value of liabilities, indicating that economic net worth is zero or negative. If such a bank were to liquidate its assets, it would not be able to pay all creditors, and would be bankrupt. A bank with equity capital equal to 10 percent of assets can withstand a greater percentage decline in asset value than a bank with capital equal to only 6 percent of assets. One indicator of capital risk is a comparison of stockholders' equity with the bank's assets. The greater the ratio of equity to assets, the greater the amount of assets that can default without the bank becoming insolvent. Chapter 12 introduces more formal risk-based capital ratios that indicate solvency risk.

Formally, a firm is insolvent when its net worth is negative. In practice, a bank that assumes too much risk can become insolvent and fail. Fundamentally, a bank fails when its cash inflows from operations, debt service receipts, new borrowings, and asset sales are insufficient to meet mandatory cash outflows due to operating expenses, deposit withdrawals, and payment of maturing debt obligations. A cash-flow deficiency is caused by the market's evaluation that the market value of bank equity is falling and potentially negative. When creditors and shareholders perceive that a bank has high risk, they either demand a premium on bank debt and bid share prices lower, or refuse to lend to the bank altogether. In either case, a liquidity problem exists. Capital risk is closely tied to financial leverage, asset quality, and a bank's overall risk profile; the more risk that is taken, the greater is the amount of capital required. Banks operating with high risk are expected to have greater capital than banks with low risk. Regulators specify minimum amounts of capital that depository institutions must operate with to avoid sanctions. During the cris of 2008-2009, large banks scrambled to access capital and most eventually participated in the TARP-CPP in which they sold preferred stock to the U.S. Treasury. Thus, the U.S. government now had an ownership stake in many U.S. commercial banks and other financial services companies.

Off-Balance Sheet Risk

Many banks engage in activities off-balance sheet. This means that they enter into agreements that do not have a balance sheet reporting impact until a transaction is affected. An example might be a long-term loan commitment to a potential borrower. Until the customer actually borrows the funds, no loan is booked as part of the bank's assets. **Off-balance sheet risk** refers to the volatility in net income and market value of bank equity that may arise from unanticipated losses due to these off-balance sheet liabilities.

Banks earn fees when they engage in off-balance sheet agreements. These agreements, in turn, entail some risk because the bank must perform under the contract. As an example, Countrywide Financial had a loan commitment (line of credit) of $11.5 billion line of credit at the beginning of the subprime credit crisis. In August 2007 it had borrowed the entire amount and the lenders could not prevent the borrowing. The line of credit was from a syndicate of the world's 40 largest banks. Up to 70 percent of the line of credit provided Countrywide four or more years to repay. One could assume that the 40 banks involved in the syndicate might have had a different answer to Countrywide's request if they were not contractually obligated to make the loans under the credit line.

To account for the potential risk of off-balance sheet activities, risk-based capital requirements oblige a bank to convert off-balance sheet activities to "on-balance" sheet equivalents and hold capital against these activities. Appropriate capital risk measures include all the risk measures discussed earlier, as well as ratios measuring the following: Tier One capital and total risk-based capital to risk-weighted assets, tangible equity capital to total assets, dividend payout, and the growth rate in Tier 1 capital. **Tier One** (or **core**) **capital** or **Tier One leverage capital** is total common equity capital plus noncumulative preferred stock, plus minority interest in unconsolidated subsidiaries, less ineligible intangibles. **Risk-weighted assets** are the total of risk-adjusted assets where the risk weights are based on four risk classes of assets. Chapter 12 provides details on the calculation of required regulatory capital at banks. Importantly, a bank's dividend policy also affects its capital risk by influencing retained earnings.

Evaluating Bank Performance: An Application

A complete analysis of a financial firm is similar to that of any other industry with a few exceptions. The analyst begins by gathering background information on the firm's operations, including specific characteristics of the business and intensity of competition, organizational and business structure, management character and quality, as well as the quality of reported data. Is the bank a holding company or financial holding company with subsidiaries and branches, or a single entity? Does it operate as a C corporation or an S corporation?[43] Is the firm privately held or publicly traded? When did the firm begin operations, and in what geographic markets does it now compete? The evaluation should also identify the products or services provided and the bank's competitive position in the marketplace as measured by market share, degree of product differentiation, presence of economies of scale or scope in the cost structure, and the bargaining power of customers with whom the bank deals. Much of this discussion for PNC Bank was presented earlier in the chapter and hence the following discussion focuses on the financial data of PNC introduced in Exhibits 3.2, 3.4, and 3.7. It examines data for 2013 relative to peer banks and summarizes trends from 2009 to 2013. Profitability is evaluated following the ROE model presented in the chapter using data from PNC Bank's UBPR data. This evaluation is contrasted with the firm's risk position using the risk categories discussed in the "Managing Risk and Returns" section presented previously.

Profitability Analysis for PNC in 2013

Profitability ratios are provided in Exhibit 3.8. The first three columns of data are for 2012 and the next three columns are for 2013. The first column in 2012 and 2013 is labeled "CALC" and contains the ratios calculated using data listed in Exhibits 3.2, 3.4, and 3.7. The second column, "BANK," provides profitability ratios taken directly from the UBPR for PNC. The third column, titled "PG 1," represents peer group comparative figures obtained from the UBPR for other U.S. banks with more than $3 billion in assets.[44] The equations provided in the chapter apply to data in the column labeled "CALC." Because the UBPR uses several different methods of averaging balance sheet data, the calculated ratios will not always equal the UBPR ratios. Quarterly average balance sheet data are not published in the UBPR except for average total assets and average total loans. When other average balance sheet data are needed to calculate a ratio, the average value is obtained by using an average of year-end data. The calculated values are provided as a reference for applying the formulas and equations presented earlier in the chapter. Because the use of quarterly average balance sheet data will generally provide more accurate ratios, the following analysis will use ratios obtained directly from the UBPR and compare these with the listed peer group figures.[45]

PNC's profitability, as measured by return on equity (ROE), rose 208 basis points in 2013 to 9.68 percent, which was 71 basis points above that of peers for the year. This ROE represents substantial improvement over the low levels of 2009.[46] ROE was generated by a return on assets (ROA) of 1.19 percent and an equity multiplier of 8.13x. Profitability at the bank was 18 basis points above that of peers according to ROA, while its

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[43] It is important to know if a bank operates as an S corporation. S corporations do not pay federal income taxes at the bank level; rather these tax obligations are passed through to shareholders. This means that net income is "overstated" relative to a C corporation because it does not consider the taxes that must be paid by shareholders on behalf of the bank. Analysts should adjust all after-tax figures for S corporation banks to compare to C corporation banks.

[44] There are actually 15 bank peer groups that differ primarily in asset size. Peer group 1 is for banks over $3 billion.

[45] Although the following analysis will directly compare PNC's ratios to peer group ratios, it is important to recognize that the peer group may or may not be the appropriate comparison. To say a bank is doing better than the peer means it is doing better than average and does not always indicate that the bank is "doing well."

[46] Data for 2009 can be found in the Appendix to this Chapter. The following analysis will use ratios reported in the UBPR rather than those calculated. See the Contemporary Issues box: "Interpreting Financial Ratios and the Use of Average Balance Sheet Data."

financial leverage (EM), 8.13x, was lower than that of peers (8.88x). Hence the bank's higher ROE was driven by a greater ROA even with less financial leverage. PNC's lower equity multiplier signals greater equity to assets. The bank's higher ROE combined with lower leverage suggests a lower-risk position.

One of the greatest challenges of evaluating performance is that a company that assumes a higher degree of risk typically also reports higher profits at first, and only later—when those higher-risk activities create problems—does the bank report higher losses in the form of greater charge-offs or additional provisions for loan losses. PNC's higher ROA, appears to be due to a much higher AU despite operating expenses and PLL being higher. Specifically, PNC's asset utilization of 5.31 percent exceeded peers' 4.68 percent indicating it generated more revenue as a percentage of assets. The bank's higher expense ratio (ER) of 3.58 percent versus 3.22 percent for peers indicates that PNC was less efficient than its peers in controlling overhead expenses. The net effect was a 27 basis point advantage to PNC (0.63 percent AU advantage versus a 0.36 percent ER disadvantage). By breaking down asset utilization into interest income and noninterest income and the expense ratio into interest and noninterest expense and provisions for loan losses, we can better determine the operational strengths and weaknesses of PNC's profitability.

PNC's higher overall expenses are attributed to a much higher noninterest expense ratio, which at 3.12 percent was 40 basis points higher than peers. Both the bank and peers' interest expenses were low due to very low interest rates in 2013, but the bank's interest expense was 12 basis points lower than peers, on average. Finally, PNC exhibited slightly higher provisions for loan losses as a percent of average total assets.

The fact that PNC paid 12 basis points less in interest expense relative to average assets versus peers suggests that PNC operates differently than peers in at least one of the areas of *rates* paid, liability *composition,* or *volume* of interest-bearing liabilities. In terms of the rate effect, PNC's average cost of interest-bearing funds was 16 basis points lower (0.31 percent versus 0.47 percent). PNC similarly operated with a favorable low-cost mix of liabilities because it had more demand deposits that paid no interest and more core deposits overall. Generally, core deposits carry lower rates of interest than borrowed funding sources. Finally, PNC's interest-bearing debt to assets was 25 basis points above that for peers (77.64 percent versus 77.39 percent) indicating that the volume effect offset some of the benefits from favorable rate and composition effects. The greater core deposit funding is a clear indicator that PNC relied relatively less on other (generally more expensive) borrowings such as federal funds purchased, Federal Home Loan Bank borrowings, and subordinated debt.

PNC's higher noninterest expense to assets (3.12 percent versus 2.72 percent for peers) is due to higher personnel, occupancy and other expenses as a percentage of assets compared with peers. These figures appear in the final columns of data from page three of the UBPR found in the Appendix to this Chapter. PNC delivers banking services through an extensive branching network, including some foreign branches, and focuses on funding the bank with core deposits. There is often an expense tradeoff between the lower interest cost of a large volume of core deposits (particularly demand deposits) and a higher noninterest cost due to additional branch facilities and people needed to support these accounts. PNC benefits from a lower interest expense but the much higher noninterest expense offsets the benefits. Its larger retail network of branches and services, however, produces more noninterest income by offering more banking products and services such that PNC's noninterest income is substantially higher than that of peers. So, interest expense is 12 basis points lower, noninterest expense is 40 basis points higher, and noninterest income is 82 basis points higher for a net benefit of 54 basis points.

Next, consider the components of asset utilization. PNC's AU, which was 63 basis points higher than that of peers, was a result of its higher noninterest income (1.87

percent versus 1.05 percent for peers) rather than its lower interest income (3.41 percent versus 3.61 percent for peers). Securities gains were roughly equal. In general, lower interest income might be due to lower yields on assets, fewer loans, a smaller volume of earning assets, or a combination of these factors. Examining the yield on earning assets, we find that PNC earned 9 basis points less (3.84 percent versus 3.93 percent for peers). It also held 3.16 percent fewer earning assets as a percentage of average assets such that it held more nonincome producing loans and securities.[47] In terms of a rate effect, PNC's loan yield was 52 basis points lower (4.22 percent versus 4.74 percent) while its yield on investment securities was 75 basis points higher (3.11 percent versus 2.36 percent). The combined effect hurt PNC relatively because it held proportionately more loans versus peers which generated the lower average yield. Because the overall amount of earning assets was more than three percent below peers, the volume effect hurt PNC. The higher AU thus appears due to noninterest income being much greater at PNC.

The lower yield on loans might suggest loans with lower default risk or, alternatively, underpricing of default risk. It may also simply reflect a different mix of floating rate loans that are tied to short-term rates, such as the federal funds rate or LIBOR, versus longer-term fixed rate loans. In recent years, short-term rates have been well below long-term rates such that investors have generally earned more interest when they have stretched maturities out longer. PNC has reported loan problems in the past prior to the financial crisis. We investigate PNC's credit risk later in the chapter.

The relationship between interest income and interest expense is expressed in terms of net interest margin (NIM). PNC's higher net interest margin (3.56 percent versus 3.50 percent) indicates that PNC's lower interest expense offsets its lower interest income. An aggregate measure of the trade-off between interest and noninterest income and expense is the efficiency ratio, which equals noninterest expense divided by net operating income. PNC's efficiency ratio is 95 basis points below that of peers at 61.87 percent versus 62.82 percent. Thus, PNC spends less in overhead costs to generate one dollar in net operating income.

Peer group data presented in Exhibit 3.8, however, masks some important differences between PNC's performance and that of its peers. The peer data in Exhibit 3.8 are for banks with total assets of more than $3 billion such that many in this group are considerably smaller than PNC and presumably much less complex. Larger banks typically generate higher levels of noninterest income than smaller banks do. Exhibit 3.10 provides additional detail on noninterest income and compares PNC against banks with assets of more than $10 billion. Consistent with the sale of more products, PNC's noninterest income is from multiple sources: investment banking, advisory, brokerage, and underwriting fees and commissions; fiduciary activities; service charges; and net gains on loan sales. Compared to these larger peers, PNC reports just a one basis point advantage in total noninterest income relative to assets. Its service charges on deposit accounts, investment banking fees and net servicing fees are higher, while its trading account fees and other noninterest income are less. Thus, PNC's performance is in line with true peers.

In summary, PNC's aggregate profitability in 2013 was above that of the peer bank group. PNC operated with more equity and thus lower financial leverage. Its higher ROA was a direct result of higher noninterest income. PNC produced less interest income due to lower rates on loans and fewer earning assets, yet reported lower interest expense and higher interest income. A lower proportion of interest-bearing liabilities

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[47] The UBPR reports "Average earning assets/Average assets" on page 1 and "Total earning assets" on page 6. The first measure reported on page 1 includes total loans (rather than net loans) and a five period average of interest-only strips and equity securities. Hence, we use the measure on page 6 for the analysis.

EXHIBIT 3.8 Profitability Measures for PNC Bank and Community National Bank, 2012–2013

		PNC Bank, National Association					
		Dec–12			Dec–13		
Profitability Ratios	**Pg #**	**CALC**	**BANK**	**PG 1**	**CALC**	**BANK**	**PG 1**
ROE	**11**	**7.23%**	**7.60%**	**9.11%**	**9.14%**	**9.68%**	**8.97%**
ROA	1	0.94%	0.94%	1.03%	1.19%	1.19%	1.01%
EM = ROE/ROA	calc	7.69×	8.09×	8.84×	7.68×	8.13×	8.88×
AU (income)	***sum**	**5.44%**	**5.44%**	**4.99%**	**5.31%**	**5.31%**	**4.68%**
*Interest income/aTA	1	3.78%	3.78%	3.82%	3.41%	3.41%	3.61%
Average loans/aTA	6	63.02%	62.90%	61.83%	64.13%	65.00%	63.43%
Rate: Total Loans	3	4.77%	4.77%	5.09%	4.22%	4.22%	4.74%
Investment secs./aTA	6	21.81%	21.71%	20.08%	20.08%	19.85%	19.36%
Rate: Investment secs. (TE)	3	3.40%	3.38%	2.62%	2.95%	3.11%	2.36%
*Noninterest income/aTA	1	1.63%	1.63%	1.13%	1.87%	1.87%	1.05%
*Securities gains and losses/ aTA	1	0.03%	0.03%	0.04%	0.03%	0.03%	0.02%
Avg. earning assets/aTA	6	86.04%	85.74%	90.05%	87.44%	87.19%	90.35%
Yield on earning assets	1	4.48%	4.33%	4.16%	3.79%	3.84%	3.93%
Net Interest Margin	**1**	**4.15%**	**4.01%**	**3.63%**	**3.52%**	**3.56%**	**3.50%**
ER (expenses)	***sum**	**4.09%**	**4.09%**	**3.53%**	**3.58%**	**3.58%**	**3.22%**
*Interest expense/aTA	1	0.28%	0.28%	0.46%	0.24%	0.24%	0.36%
Demand deposits/aTA	6	11.90%	11.55%	6.60%	12.63%	12.39%	7.00%
Core deposits/aTA	6	70.66%	69.95%	67.16%	70.64%	71.05%	68.92%
Cost: Transaction accts	3	#N/A	0.32%	0.25%	#N/A	0.15%	0.22%
CD's below insurance limit/aTA	6	8.69%	8.48%	13.81%	6.56%	6.65%	12.72%
Cost: All Other Time Deps	3	#N/A	0.85%	1.12%	#N/A	0.86%	0.89%
Short–term noncore/aTA	6	7.02%	9.88%	11.85%	6.12%	8.10%	11.08%
Time Deps Above Ins Limit/aTA	6	0.68%	0.69%	3.36%	0.58%	0.59%	3.14%
Cost: Time deposits over $100M	3	#N/A	0.84%	1.05%	#N/A	0.86%	0.85%
*Noninterest expense/aTA	1	3.47%	3.47%	2.75%	3.12%	3.12%	2.72%
*PLL/aTA	1	0.34%	0.34%	0.32%	0.22%	0.22%	0.14%
Avg. interest–bearing debt/aTA	1	71.07%	77.08%	77.80%	75.00%	77.64%	77.39%
Cost of interest–bearing funds	3	0.38%	0.36%	0.60%	0.32%	0.31%	0.47%
Efficiency Ratio	**3**	**67.68%**	**67.68%**	**61.53%**	**61.87%**	**61.87%**	**62.82%**

The equity multiplier (EM) is obtained from equation 3.8 by solving for EM; "aTA" is average total assets from Exhibit 3.7. For consistency with the UBPR page 6, however, all "mix" or composition values use averages of current and prior period. For example, numerator and denominator averages for "Total deposits (avg.)/aTA" are both calculated using end-of-period annual average data.

Note: Short-term noncore funding from March 31, 2011 forward equals the sum of time deposits of more than $250,000 with a remaining maturity of one year or less + brokered deposits issued in denominations of $250,000 and less with a remaining maturity of one year or less + other borrowed money with a remaining maturity of one year or less + time deposits with a remaining maturity of one year or less in foreign offices + securities sold under agreements to repurchase and federal funds purchased. Prior to March 31, 2011 the definition used deposits of $100,000 or more. Due to the lack of detailed data, *calculated* volatile liabilities does not include brokered deposits.

EXHIBIT 3.8 (continued)

		Community National Bank					
		Dec–12			Dec–13		
Profitability Ratios	**Pg #**	**CALC**	**BANK**	**PG 5**	**CALC**	**BANK**	**PG 5**
ROE	**11**	**14.21%**	**14.39%**	**8.70%**	**18.67%**	**18.61%**	**9.58%**
ROA	1	1.16%	1.16%	0.90%	1.50%	1.50%	1.01%
EM = ROE/ROA	calc	12.25×	12.41×	9.67×	12.45×	12.41×	9.49×
AU (income)	***sum**	**6.43%**	**6.44%**	**5.37%**	**6.40%**	**6.41%**	**5.06%**
*Interest income/aTA	1	5.67%	5.68%	4.69%	5.88%	5.88%	4.34%
Average loans/aTA	6	86.80%	87.21%	62.97%	86.37%	86.75%	60.51%
Rate: Total Loans	3	6.46%	6.46%	6.23%	6.68%	6.68%	6.01%
Investment secs./aTA	6	3.73%	3.49%	21.02%	2.98%	2.73%	22.62%
Rate: Investment secs. (TE)	3	1.00%	1.11%	3.27%	1.92%	2.07%	2.75%
*Noninterest income/aTA	1	0.76%	0.76%	0.65%	0.53%	0.53%	0.67%
*Securities gains and losses/ aTA	1	0.00%	0.00%	0.03%	0.00%	0.00%	0.05%
Avg. earning assets/aTA	6	90.00%	90.34%	91.32%	90.55%	90.66%	91.36%
Yield on earning assets	1	6.19%	6.21%	5.10%	6.50%	6.38%	4.72%
Net Interest Margin	**1**	**5.27%**	**5.29%**	**4.12%**	**5.78%**	**5.67%**	**4.00%**
ER (expenses)	***sum**	**5.27%**	**5.27%**	**4.20%**	**4.90%**	**4.90%**	**3.79%**
*Interest expense/aTA	1	0.84%	0.84%	0.88%	0.65%	0.65%	0.65%
Demand deposits/aTA	6	16.87%	16.61%	12.93%	16.89%	16.91%	14.51%
Core deposits/aTA	6	81.68%	81.86%	79.48%	81.01%	80.35%	80.25%
Cost: Transaction accts	3	#N/A	0.36%	0.37%	#N/A	0.30%	0.26%
CD's below insurance limit/aTA	6	39.37%	39.10%	32.27%	37.86%	38.58%	29.42%
Cost: All Other Time Deps	3	#N/A	1.46%	1.63%	#N/A	1.12%	1.27%
Short–term noncore/aTA	6	4.01%	9.08%	7.17%	4.92%	7.99%	4.97%
Time Deps Above Ins Limit/aTA	6	4.01%	3.99%	4.45%	4.92%	5.04%	4.14%
Cost: Time deposits over $100M	3	#N/A	1.40%	1.62%	#N/A	1.07%	1.28%
*Noninterest expense/aTA	1	4.22%	4.22%	3.00%	4.17%	4.17%	2.93%
*PLL/aTA	1	0.21%	0.21%	0.32%	0.08%	0.08%	0.21%
Avg. interest–bearing debt/aTA	1	76.21%	73.70%	75.39%	74.67%	74.92%	73.93%
Cost of interest–bearing funds	3	1.10%	1.14%	1.17%	0.87%	0.87%	0.87%
Efficiency Ratio	**3**	**75.55%**	**75.54%**	**67.23%**	**72.47%**	**72.47%**	**66.90%**

Source: Timothy Koch and S. Scott MacDonald; from FFIEC, Uniform Bank Performance Report, www2.fdic.gov/ubpr/UbprReport/SearchEngine/Default.asp.

(more demand deposits), more core deposits and generally lower rates paid on core deposits were the primary drivers of PNC's lower interest expense.

Risk Analysis for PNC in 2013

High-performance banks produce higher returns than those of competitors carrying similar risk. To be considered a high-performance bank, PNC's greater aggregate profitability should not be associated with a significantly greater risk position. The following discussion examines whether key financial ratios are consistent with PNC having a lower or comparable risk profile versus peers. One of the problems inherent in the process of evaluating financial statements is that historical data may not be an accurate representation the current or future financial position of the company. This certainly was the case with the many financial firms that owned large amounts of problem loans in early 2008. Under mark-to-market accounting rules, they ultimately took large write-downs and depleted accounting capital. The true risk of a bank's portfolio will be reflected in the cash flows ultimately produced by the portfolio and the losses that arise when principal and interest payments are not made as scheduled. See the Contemporary Issues box: "Special-Purpose Entities Since Enron."

CONTEMPORARY ISSUES

Special-Purpose Entities since Enron

Most financial analysts would presume that the words "special" and "vehicle" no longer exist after Enron. After all, it was Enron's "special-purpose entities" that allowed them to surprise the market with losses not readily apparent from the reading of financial statements. Some of the subprime surprises in 2007–2009 arose from "structured investment vehicles," or SIVs, which in many ways are the functional equivalent of special-purpose entities. Consider a simplified example of an SIV. Citigroup originates $300 million in subprime mortgages carrying 6.5 percent yields that it pools and securitizes (it issues securities collateralized by the subprime mortgages). It "sells" these securities to a third party that puts up just $5 million in equity and issues $295 million in asset-backed commercial paper that pays 3 percent to finance the purchase. The commercial paper matures every 28 days—at which time the issuer expects to refinance with other commercial paper (investors rollover the existing commercial paper). The SIV expects to profit from the spread (6.5 percent rate on the subprime mortgages versus the 3 percent rate on the commercial paper). In the event that the SIV cannot borrow via new commercial paper offerings, Citigroup agrees to make a loan to the SIV. Has Citigroup effectively transferred all risks to the SIV? What happens if the subprime mortgages default or the holders of the commercial paper refuse to roll over the investment and other lenders do not step in to purchase the paper? The latter situation in fact occurred with such high frequency that Citigroup and other SIV creators moved the subprime mortgages back onto their balance sheets in 2008.

Congress passed a law, Sarbanes–Oxley, that should have made these off-balance sheet surprises a thing of the past. Sarbanes–Oxley attempted to add transparency to financial statement reporting of off-balance sheet activities. Rule FIN 46-R, passed after Enron, says that companies can keep special-purpose entities off their books if they conclude that the majority of the risks and returns lie with other parties. The unfortunate aspect of this interpretation is that it assumes that the company taking the special-purpose entity off its books is the appropriate judge of where the majority of the risk lies. Under FIN 46-R it seems that the risk of off-balance sheet activities is that losses are not actually reported until they are actually realized!

It is very clear that several companies with large positions in subprime mortgages and collateralized debt obligations (CDOs) did not fully understand the risk, or assumed that senior CDO tranches had more than sufficient cash flow to prevent losses. The pool of debt in many of these CDO positions was subprime debt with "teaser" rates and when the rates went up, the debt payment requirements were out of reach of almost all borrowers in the pool of debt. Hence, there was not sufficient cash flow in any tranche. Unfortunately, creative math cannot wish bad debt away!

Often, an analyst must dig deeper into the actual credit files, the footnotes to the balance sheet, and any off-balance sheet activities to discover risk not reported on these financials. With this said, the section of this chapter titled "Financial Statement Manipulation" will discuss the analysis of reported financial statements, with the understanding that the analysis is only as accurate as the reported data.

Selected risk ratios for PNC and CNB appear in Exhibit 3.9. Additional data used to calculate some of the risk ratios, including loan charge-offs, past-due loans, and noncurrent loans are taken from the supplemental data in Exhibit 3.7 and the UBPR for PNC included in this chapter's appendix. Exhibit 3.9 lists selected risk measures categorized under the risk types introduced earlier.

EXHIBIT 3.9 Risk Measures for PNC Bank and Community National Bank, 2012–2013

		PNC Bank, National Association					
		Dec–12			Dec–13		
Risk Ratios	**Pg #**	**CALC**	**BANK**	**PG 1**	**CALC**	**BANK**	**PG 1**
Credit Risk Ratios:							
Charge–offs (net losses)/Total loans	1	0.72%	0.72%	0.61%	0.56%	0.56%	0.30%
Total noncurrent/Total loans	1	3.85%	3.85%	2.22%	3.06%	3.06%	1.46%
Noncurrent LN&LS/Total capital	8A	20.15%	20.15%	11.69%	16.64%	16.64%	8.01%
Loan loss allow./Total loans	1	2.13%	2.13%	1.68%	1.82%	1.82%	1.43%
Const and Development LN&LS/Total loans	7B	#N/A	17.81%	24.74%	#N/A	20.74%	26.63%
Non–owner OCC CRE/ Total loans	7B	#N/A	78.52%	137.59%	#N/A	80.49%	150.08%
Liquidity Ratios:							
Core deposits/aTA	10	71.13%	71.13%	68.38%	70.18%	70.18%	69.41%
Short–term noncore funding/aTA	10	#N/A	8.95%	11.26%	#N/A	7.58%	10.94%
Memo: Volatile Liab./aTA	N/A	7.02%	#N/A	#N/A	6.12%	#N/A	#N/A
Short–term investments/aTA	10A	#N/A	2.08%	7.19%	#N/A	4.81%	5.56%
Net loans to total deposits	10	85.68%	85.68%	77.40%	86.23%	86.23%	80.33%
Market Risk:							
Net position (GAP) 1 year/Total assets	9	#N/A	34.48%	44.69%	#N/A	32.18%	47.69%
Net position (GAP) 3 year/Total assets	9	#N/A	30.91%	35.01%	#N/A	30.94%	39.87%
Operational Risk							
Assets per employee ($millions)	3	$5.51	$5.51	$9.44	$6.11	$6.11	$9.07
Loans per employee ($millions) (= Loans to assets × Assets per employee)	1 & 3	$3.47	$3.39	$5.73	$3.84	$3.89	$5.67
Net income per employee ($000) (= ROA × Assets per employee)	1 & 3	$49.81	$51.79	$97.23	$69.09	$72.71	$91.61
Capital Ratios:							
Total Bank Capital & Minority Ints./TA	11	12.29%	13.02%	11.81%	11.78%	12.36%	11.79%
Growth in equity	11	14.64%	14.64%	8.24%	0.65%	0.65%	5.18%
Total risk–based capital	11A	14.22%	14.22%	15.43%	14.33%	14.33%	14.73%

EXHIBIT 3.9 (continued)

		Community National Bank					
		Dec–12			Dec–13		
Risk Ratios	**Pg #**	**CALC**	**BANK**	**PG 4**	**CALC**	**BANK**	**PG 4**
Credit Risk Ratios:							
Charge–offs (net losses)/Total loans	1	0.10%	0.10%	0.48%	0.15%	0.15%	0.33%
Total noncurrent/Total loans	1	3.36%	3.36%	1.86%	1.63%	1.63%	1.64%
Noncurrent LN&LS/Total capital	8A	37.25%	37.25%	11.40%	16.86%	16.86%	9.34%
Loan loss allow./Total loans	1	0.68%	0.68%	1.66%	0.60%	0.60%	1.62%
Const and Development LN&LS/Total loans	7B	#N/A	49.92%	28.87%	#N/A	33.10%	25.58%
Non–owner OCC CRE/ Total loans	7B	#N/A	218.5%	100.9%	#N/A	151.0%	94.2%
Liquidity Ratios:							
Core deposits/aTA	10	82.47%	82.47%	79.87%	79.63%	79.63%	80.66%
Short–term noncore funding/aTA	10A	#N/A	6.15%	5.27%	#N/A	8.48%	4.72%
Memo: Volatile Liab./aTA	N/A	4.01%	#N/A	#N/A	4.92%	#N/A	#N/A
Short–term investments/aTA	10	#N/A	1.53%	7.81%	#N/A	4.39%	8.87%
Net loans to total deposits	10	95.66%	95.66%	71.33%	93.18%	93.18%	68.83%
Market Risk:							
Net position (GAP) 1 year/Total assets	9	#N/A	20.17%	47.07%	#N/A	17.56%	47.87%
Net position (GAP) 3 year/Total assets	9	#N/A	16.11%	34.30%	#N/A	16.97%	37.03%
Operational Risk							
Assets per employee ($millions)	3	$2.64	$2.64	$3.69	$2.80	$2.80	$3.85
Loans per employee ($millions) (Loans to assets × Assets per employee)	1 & 3	$2.30	$2.29	$2.29	$2.37	$2.41	$2.29
Net income per employee ($000) (ROA × Assets per employee)	1 & 3	$28.61	$30.62	$33.21	$40.96	$42.00	$38.89
Capital Ratios:							
Total Bank Capital & Minority Ints./TA	11	7.91%	7.91%	10.33%	8.21%	8.21%	10.37%
Growth in equity	11	7.79%	7.79%	8.82%	10.13%	10.13%	5.73%
Total risk–based capital	11A	10.35%	10.35%	15.96%	11.03%	11.03%	16.37%

Source: Timothy Koch and S. Scott MacDonald; from FFIEC, Uniform Bank Performance Report, www2.fdic.gov/ubpr/UbprReport/SearchEngine/Default.asp.

In terms of credit risk in 2013, PNC's net loan losses and noncurrent loans (those past due and in nonaccrual) were higher than those of peers. Net losses to average total loans and leases was 0.56 percent versus peers of only 0.30 percent. PNC's noncurrent loans were likewise more than double peers—at 3.06 percent of average loans versus 1.46 percent for peers. While both net loan losses and noncurrent loans were down from 2012 levels, they remained much higher than peers. With respect to potential losses, if noncurrent loans are an accurate predictor of future losses, the much higher levels of noncurrent loans are an indicator of a "lower-quality" loan portfolio, which exhibits higher potential default risk, and will likely result in higher future loan losses and less profitability in the future. Consistent with this assessment, PNC's ALLL was 1.82 percent of total loans compared to 1.43 percent for peers. This is a positive sign that PNC's management recognizes the greater potential risk in the loan portfolio.

In general, stock analysts and regulators want to be sure that management fully recognizes the existing risk of the portfolio. Banks that are least attractive as investments, and under greater regulatory scrutiny, are those in which stock analysts or regulators do not feel management is fully aware of the potential risk or is not preparing the institution for it. Hence, if the higher loan loss reserve is sufficient to account for potential future losses, the bank's provisions for loan losses (an expense) might be appropriate. Nevertheless, if losses continue to be above peers, then their provisions for loan losses might be "understated." If this were the case, it would suggest that PNC's net income is overstated relative to the risk of its loan portfolio. Obviously, how PNC's loan portfolio performs in the future will be the final determinant.

One area of concern for PNC is commercial real estate. In 2006, federal bank regulators announced an interagency guidance, "Concentrations in Commercial Real Estate Lending, Sound Risk Management Practices." These guidelines were specifically designed to address concentration risks that might not be fully reflected in the balance sheet. The regulatory agencies designated a concentration as any loan category that makes up 25 percent or more of total capital. Two key measures defined in the guidance were:

1. *Construction concentration criterion:* An institution's construction and land development (CLD) loan concentration levels represent 100 percent or more of its total risk-based capital (the CLD ratio)
2. *Total CRE concentration criterion:* An institution's total non-owner-occupied CRE loans (including CLD loans), as defined in the guidance, represent 300 percent or more of its total risk-based capital (the total ratio), and its non-owner-occupied CRE loans have increased by 50 percent or more during the previous 36 months (the growth component).[48]

The OCC expects that concentrations in excess of the guidelines will be accompanied by enhanced risk management practices. Although the exact ratios are not available in the UBPR, they can be approximated by *Construction & Development Loans and Leases as a % of Total Capital* and *Non-owner OCC Commercial Real Estate as a % of Total Capital* on page 7B of the UBPR. PNC's concentrations do not exceed the regulatory guidelines and were below peers. PNC's construction and development loans, as a percent of capital, were 20.74 percent (26.63 percent for peers) while total non-owner-occupied commercial real estate loans as a percent of capital were 80.49 percent (150.08 percent for peers).

According to the measures provided, PNC's liquidity risk appears somewhat mixed. PNC's percent higher level of core deposits (based on end-of-period data from page 10

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[48] Office of the Comptroller of the Currency, Board of Governors of the Federal Reserve System, Federal Deposit Insurance Corporation, "Concentration in Commercial Real Estate Lending, Sound Risk Management Practices", December 12, 2006, http://www.federalreserve.gov/boarddocs/srletters/2007/SR0701a2.pdf.

EXHIBIT 3.10 Composition of Noninterest Income in 2013 as a Percentage of Total Assets*

	PNC Dec–13	Banks Assets >$10B*
Number of institutions reporting	1	90
Total noninterest income	1.85%	1.84%
Fiduciary activities	0.24%	0.24%
Service charges on deposit accounts	0.35%	0.24%
Trading account gains & fees	0.08%	0.20%
Additional noninterest income	1.17%	1.17%
Investment banking, advisory, brokerage, and underwriting fees and commissions	0.12%	0.08%
Venture capital revenue	0.00%	0.00%
Net servicing fees	0.17%	0.14%
Net securitization income	0.00%	0.01%
Insurance commission fees and income	0.01%	0.02%
Insurance underwriting income	0.00%	0.00%
Other insurance commissions and fees	0.00%	0.02%
Net gains(losses) on sales of loans	0.06%	0.05%
Net gains (losses) on sales of other real estate owned	–0.01%	0.00%
Net gains (losses) on sales of other assets (excluding securities)	0.08%	0.02%
Other noninterest income	0.74%	0.84%

*Peer data for banks with assets of more $10 billion are taken from the FDIC's Statistics on Depository Institutions (SDI) system, and not the UBPR. The UBPR data presented "trim" the upper 5 percent and lower 5 percent of data to adjust for outliers; the peer group data, PG 1 in the UBPR is for banks with assets of more than $3 billion rather than $10 billion as reported above. The data presented in the table above represent all banks in the respective asset category.

Source: FDIC, Statistics on Depository Institutions, www2.fdic.gov/sdi/main.asp.

of the UBPR rather than average data from page 6), lower dependence on short-term noncore funding and greater equity levels provide for greater borrowing capacity. In contrast, the larger loan portfolio relative to deposits, greater net loan losses and noncurrent loans indicate lower asset quality and hence lower borrowing capacity.[49]

Finally, PNC's lower level of short-term investments at 4.81 percent compared with peers of 5.56 percent of average total assets probably means the bank holds fewer liquid assets. With PNC's low level of short-term investments, the bank's liquidity will be more dependent on its ability to acquire large or volatile borrowings. This profile is typical for a large institution that relies on borrowing for liquidity.

Although the bank seems to have good borrowing capacity in 2013, noncore borrowings can be "asset-quality sensitive." This lesson became very clear to several financial firms after the discovery of subprime-related problems. In March 2008, Bear Stearns's liquidity disappeared as many market participants, concerned about the firm's subprime portfolio, refused to lend funds and demanded payment. JPMorgan Chase stepped in with loan guarantees from the Federal Reserve to lend Bear Stearns the needed funds.

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[49] Often, analysts use end-of-period data to measure risk, as they do not think the past average is relevant to the "current" risk position. An old airline pilot saying is, "altitude above you is irrelevant." We often use the average position to measure profitability because income is earned "over-time."

Bear Stearns, which had traded for as much as $159 a share a year earlier, eventually sold to JPMorgan Chase for $10 a share. JPMorgan Chase's original offer was at only $2 a share! Bear Stearns's crisis demonstrated how liquidity, provided through borrowing, can dry up when a company needs it the most. A few months later, the same type of crisis hit Lehman Brothers and Wachovia. Lehman Brothers failed, while Wachovia was acquired by Wells Fargo.

Higher-risk banks are expected to operate with greater levels of capital versus peer banks. PNC's total bank capital ratio indicates that PNC had a great level of capital to total assets, 12.36 percent versus peers' 11.79 percent. In order to meet the regulatory minimum of being "well capitalized," PNC's total bank capital must be at least 5 percent of assets while its total risk-based capital ratio must be at least 10 percent of risk-weighted assets. These minimum capital requirements are just that however, minimum and not "well capitalized," as might be indicated by the regulatory term (see Chapter 12 for details on risk-based capital). Both PNC's capital ratios far exceeded these regulatory thresholds although the total risk-based capital ratio is below the peer ratio.

PNC's interest rate risk position (under Market Risk) is indicated by the difference between repriceable assets and liabilities, denoted as the GAP, divided by total assets. Unfortunately, UBPR data on interest rate risk are very limited. PNC's net interest rate risk exposure measures are positive for over one year as well as for over three years, which suggests that PNC has more repriceable assets than repriceable liabilities over the one and three year periods. Increases in interest rates should mean that the bank's interest income should increase more than its interest expense, thus increasing net interest income. Unfortunately, these measures do not tell the full story. Total interest rate risk cannot be completely evaluated without more detailed rate sensitivity data and duration measures, which will be discussed in Chapters 7 and 8.

Operational risk is also difficult to assess because only limited information is available. From a purely operational-efficiency point of view, PNC operates with fewer total assets and fewer total loans per employee. It also generates less income per employee. Hence, the bank employs more people relative to its asset base, which leads to a higher efficiency ratio, indicative of greater noninterest expense and lower profitability. The ratio of personnel expense to number of employees is indicative of their larger branch network, which typically employ more people at lower salaries.

In summary, data for 2013 suggest that PNC operated with much higher levels of capital; more credit risk; a mixed to somewhat higher liquidity risk position; as well as greater operational risk relative to peers. Even though PNC held a larger loan portfolio and its net loan losses were higher, they were able to avoid many of the more severe asset-quality problems of 2008 that were associated with subprime mortgages and other problem loans. PNC's profitability and risk measures have not recovered to their pre-financial crisis levels but appear to be improving.[50]

PNC's Profitability versus Risk: 2006–2013

PNC's 2013 performance can be better understood by examining trends in the performance ratios since 2006. The financial crisis of 2008 and 2009 was a unique period; hence the UBPR data for PNC presented in the Appendix spans the period. Year-end data are provided for December 2006, 2007, 2009, 2012, and 2013. The year 2009 was chosen as it was the worst performing year for PNC over the period as well as for most financial institutions. The year 2009 was the worst year for profitability for the industry, but 2008 was the worst year with respect to net credit losses. Page 1 of the UBPR

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[50] PNC acquired National City Bank in 2009 which added to its portfolio of problem assets.

presented in the appendix to this chapter presents key profitability and risk ratios over the period 2006–2013. During this period, average assets for PNC increased significantly, from 86.2 billion in 2006 to $240 billion in 2013, primarily through acquisitions, including the U.S. division of RBC Bank USA and the acquisition of National City Corporation, but also through organic growth. While net income exhibited some volatility during this period, PNC's ROA has generally been below industry peers with the exception of 2009. Even though 2009 was a bad year for the industry in general, PNC performed relatively better. Profitability at PNC during the period was negatively affected by several factors including: the financial crisis of 2008 and 2009; a decline in interest income and noninterest income; a significant increase in provisions for loan losses; as well as an increase in noninterest expenses relative to assets over the period. PNC's net interest margin, which had been declining, increase sharply in 2009 due mostly to historically low interest rates established since 2008. The Federal Reserve's Federal Open Market Committee (FOMC) lowered the fed funds rate to between zero and 25 basis points at the end of 2008, which drove down the basic cost of funds for the largest institutions.

CONTEMPORARY ISSUES

The Fall in Bank Profitability During the Great Recession.

Bank profitability fell significantly from 2006 to 2008. In 2006, banks on average earned over 13 percent return to shareholders (ROE) and over 1.3 percent return on assets (ROA). ROE and ROA fell significantly between 2006 and 2009 and bottomed out in 2009, at 0.85 percent and 0.09 percent, respectively. Average capital levels fell from 10.2 percent to 9.45 percent in 2008 and would have been even lower if not for the $234 billion in TARP funds invested in the banking industry in the fourth quarter.[51] Most of the remainder of the $700 billion in TARP funds were deployed in 2009, which lifted capital levels in the industry. The much lower return on assets and lower capital levels in 2008 resulted in a weak 2.11 percent return on equity in 2008. Return on assets continued to fall in 2009 and capital levels were up, due primarily to TARP, producing the lowest average annual return on equity for the financial crisis in 2009 of 0.85 percent.

Profitability has slowly returned, and ROA stood at 1.07 percent by the end of 2013. Many experts question, however, if the industry will be able to return to the higher profitability levels pre-financial crisis. This is due to several external factors: significantly higher regulatory and compliance costs, new regulation reducing profitable sources of income, and higher capital requirements. New regulations, such as Dodd–Frank and other burdensome compliance requirements, as well as the new Consumer Financial Protection Bureau, have all significantly changed the environment in which the banks operate and have dramatically increased the cost of doing business. The Dodd–Frank Act has also had a significant impact on several sources of income, such as debit and credit card fees and profits from proprietary trading activities. Finally, higher capital levels have also made the return to shareholders fall due to lower financial leverage. Because of the numerous changes in the industry, many banks will have to re-evaluate their business model to make up for the higher cost of doing business as well as the loss of some revenue sources.

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[51] Note that the capital level of 9.45 percent in 2008 is an average of the year. Hence, the TARP funds only affected this value for one quarter, but affected capital levels for the entire year of 2009.

The primary driver of the lower ROAs in 2008 and 2009 was the much larger provisions for loan losses, due to much higher loan losses. The fall in noninterest income, in addition, also contributed to the lower returns, but the higher provisions were the major reason for the dramatic fall in profitability.

Examining risk ratios, we find that asset quality deteriorated significantly, with net charge-offs and noncurrent loans and OREO (other real-estate owned) to capital increasing. The ratio "*Noncurrent assets plus OREO*" to capital is what some in the industry call the ***Texas Ratio***, getting its nickname during the 1980s based on the problems Texas banks had during that period. The *Texas Ratio* is the ratio of nonperforming loans to equity capital, which is noncurrent loans plus other real-estate owned to equity capital. Obviously, if this number is 100 percent or more, that implies that the bank's nonperforming loans are in excess of the bank's capital. Note that the *Texas Ratio* increased from 0.51 percent in 2006 to over 39 percent for the industry by 2009.

	All Commercial Banks				
	2006	**2008**	**2009**	**2010**	**2013**
Number of institutions reporting	7,402	7,085	6,839	6,529	5,876
% of unprofitable institutions	7.30	21.80	29.40	20.60	6.90
% of institutions with earn gains	59.60	36.80	39.00	67.00	55.30
Performance ratios (%)					
Return on equity	13.06	2.11	0.85	5.99	9.60
Return on assets	1.33	0.21	0.09	0.66	1.07
Equity capital ratio	10.21	9.45	11.07	11.10	11.12
Net interest margin	3.39	3.23	3.50	3.81	3.25
Earning assets to total assets	86.48	84.28	85.43	86.26	88.39
Efficiency ratio	56.29	58.30	55.35	57.12	60.53
Burden ratio	0.87	1.30	1.07	1.37	1.29
Noninterest income to earn assets	2.59	1.96	2.36	2.11	1.95
Noninterest expense to earn assets	3.46	3.26	3.43	3.48	3.24
Provisions for LN&LS to assets	0.26	1.30	1.90	1.22	0.21
Asset Quality (%)					
Net charge-offs to LN&LS	0.40	1.31	2.57	2.67	0.69
Noncurrent assets plus OREO to capital	0.51	1.82	39.30	35.70	17.44
Loss allow to Noncurrent LN&LS	147.0	78.6	59.2	66.4	66.09
LN&LS provision to net charge-offs	109.4	172.0	133.1	83.0	56.99
Net LN&LS to deposits	87.83	82.71	75.45	74.91	68.53
Capital Ratios					
Core capital (leverage) ratio	7.87	7.42	8.55	8.74	9.29
Tier One risk-based capital ratio	9.79	9.75	11.38	12.33	12.84
Total risk-based capital ratio	12.37	12.75	14.15	15.02	14.68

Note: LN&LS is loan and lease.

All risk ratios deteriorated dramatically over the 2008–2009 period. In particular, net losses to average total loans for PNC increased from less than 30 basis points in 2006 to 168 basis points in 2009. Peer data for net losses similarly increased from 17 basis points to 186 basis points over the same period. Net losses had come back down to more reasonable levels by 2013, but still were above levels seen prior to the financial crisis.

At least two other significant trends can be seen from the data for PNC and peers from prior to the financial crisis until 2013. Due, in part the liquidity crisis during 2008–2009, most banks either chose or were forced by the market to reduce their dependence on net non-core funding. PNC's net non-core funding dependence fell from a high of 37.86 in 2007 to only 9.53 percent by the end of 2013. Peer group net non-core funding dependence fell as well over this same period although not as much.[52] The second significant trend was the increase in capital ratios. PNC's tier one capital ratio increased from 7.18 percent in 2006 to 9.78 by the end of 2013, due primarily to the $7.58 billion in TARP capital the bank received on the first day of 2009.

CAMELS Ratings

Regulators use a rating system called **CAMELS** to assess the quality of banks' earnings and risk management practices. Federal and state regulators regularly assess the financial condition of each bank and specific risks faced via on-site examinations and periodic reports. Federal regulators rate banks according to the Uniform Financial Institutions Rating system, which now encompasses six general categories of performance under the label CAMELS. Each letter refers to one of six specific categories:

C = Capital adequacy
A = Asset quality
M = Management quality
E = Earnings
L = Liquidity
S = Sensitivity to market risk

The ***capital adequacy (C)*** component signals the institution's ability to maintain capital commensurate with the nature and extent of all types of risk, and the ability of management to identify, measure, monitor, and control these risks. ***Asset quality (A)*** reflects the amount of existing credit risk associated with the loan and investment portfolio, as well as off-balance sheet activities. The ***management quality (M)*** category reflects the adequacy of the board of directors and senior management systems and procedures in the identification, measurement, monitoring, and control of risks. Regulators emphasize the existence and use of policies and processes to manage risks within targets. ***Earnings (E)*** reflects not only the quantity and trend in earnings, but also the factors that may affect the sustainability or quality or earnings. ***Liquidity (L)*** reflects the adequacy of the institution's current and prospective sources of liquidity and funds-management practices. Finally, the last category, ***sensitivity to market risk (S)***, reflects the degree to which changes in interest rates, foreign exchange rates, commodity prices, and equity prices can adversely affect earnings or economic capital.

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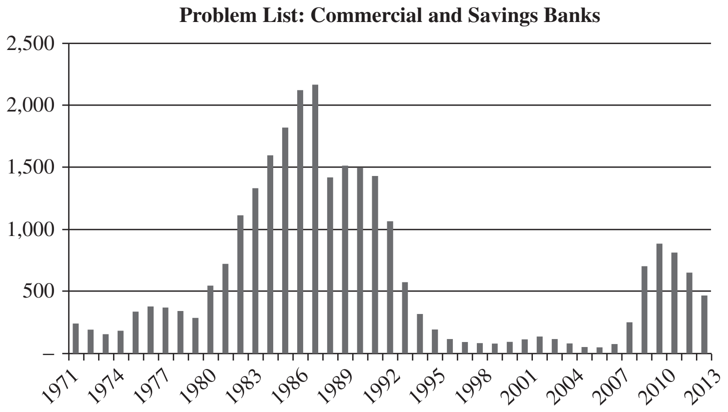
[52] One might note the difference in the ratios *Net Non Core Fund Dep $250M* on page 1 of the UBPR and *Short-Term Non Core Funding* on page 10 of the UBPR and used in Exhibit 3.9. The UBPR includes slightly different items in the two ratios. For the exact definition, see the UBPR User's Manual on the FFIEC's website, www.ffiec.gov.

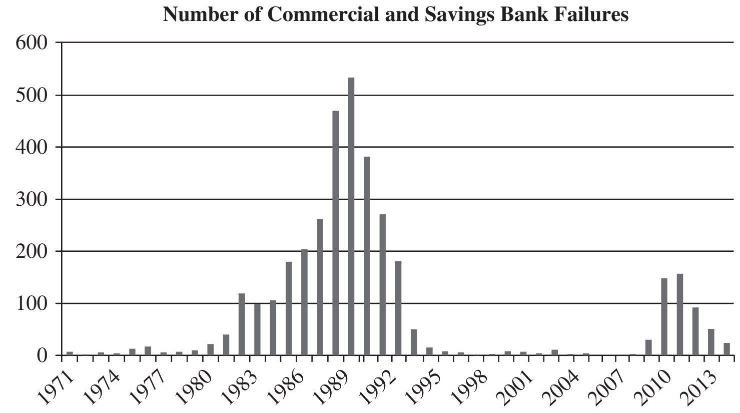
Regulators numerically rate each bank in each of the six categories, ranging from the highest or best rating (1) to the worst or lowest rating (5). Regulators also assign a composite rating for the bank's overall operation. A composite rating of 1 or 2 indicates a fundamentally sound bank. A rating of 3 indicates that the bank shows some underlying weakness that should be corrected. A rating of 4 or 5 indicates a problem bank with some near-term potential for failure.

Exhibit 3.11 shows a dramatic increase in the number of commercial banks and savings banks on the FDIC's problem list (those with 4 and 5 ratings) from 1984 through 1987 when over 2,000 institutions were on the problem list. It also shows a sharp decline from 1992–1999 when only 79 banks were given these lowest ratings. The mid- to late 1980s were considered the "worst of times" for banking, while the mid- to late 1990s were considered the "best of times." As economic conditions deteriorated in the early 2000s, the number of problem institutions again increased but remained well below those of the 1980s.

After 2007, the number of problem institutions increased again as a result of the subprime mortgage crisis and problem commercial real estate and construction loans and reached a peak of 884 by 2008. The number of problem institutions on the problem list

EXHIBIT 3.11 **Number of Commercial and Savings Banks on the FDIC's "Problem List" and the Number of Failures 1971–2013**


Problem List: Commercial and Savings Banks


Number of Commercial and Savings Bank Failures

Source: FDIC Quarterly Banking Profile, www.fdic.gov/, www2.fdic.gov/qbp.

never reached the level of the 1980s, but then again there were about half as many institutions at the beginning of the financial crisis as there were in the 1980s. It is interesting to note, however, that even considering there were about twice as many institutions in the 1980s, there were relatively more institutions on the problem list as well as total number of failures in the 1980s. Failures increased significantly during the financial crisis of 2008–2009, with total failures reaching a maximum for 157 in 2010 before falling to just over 50 in 2012 and 24 in 2013.

Performance Characteristics of Banks by Size

Commercial banks of different sizes exhibit sharply different operating characteristics. Some differences reflect government regulation; others are associated with variances in the markets served. Prior to the mid-1980s, small banks generated higher ROAs, on average, and generally assumed less risk. This has changed with increased competition, expansion into new product lines and geographic markets, and more recently with economic events. This section examines differences in the risk-return performance of different-sized commercial banks.

Summary profitability and risk measures for all U.S. commercial banks, as of year-end 2013, appear in Exhibit 3.12. The commercial banks are divided into four groups by total assets. The fifth column indicates general trends in each ratio—from the smallest commercial banks with less than $100 million in assets to the largest commercial banks with assets greater than $10 billion. The final column provides average performance ratios for all commercial banks.

According to the data shown in Exhibit 3.12, the most profitable commercial banks according to ROE and ROA are those with more than $1 billion in assets. Interestingly, banks with more than $10 billion in assets report the highest average pre-tax ROEs and ROAs but lower after-tax figures. As indicated by the "Trend with Size" column, many of the ratios exhibit a consistent relationship to size. In 2013, ROE and ROA generally increased with size except for the largest banks, which saw their ROEs and ROAs fall lower than banks in the $1 billion to $10 billion in size category.

Most institutions have recently increased equity capital as a percentage of assets, but there does not appear to be a trend with size in 2013. Net interest margin is smallest for the largest institutions as is the yield on earning assets, the cost of funding earning assets, and earning assets to total assets. Thus, the lower returns for banks less than $10 billion reflect significantly lower noninterest income and somewhat higher noninterest expense as a fraction of assets. The banks' burdens wipe out the benefit of higher interest margins associated with higher earning asset yields and lower average funding costs. Larger commercial banks' extensive branch networks and use of technology increase costs, but allow them to produce more noninterest income. On average, banks with assets greater than $10 billion produce sharply lower efficiency ratios, which suggests the lowest operating expense per $1 of operating revenue.

With respect to risk, the popular argument is that smaller commercial banks exhibit greater credit risk due to difficulties in diversification. This perception, however, was not confirmed during the most recent financial crisis. The largest institutions' loan losses were much higher and increased significantly more than at smaller institutions. This notion is also not seen in the summary risk data for 2013. The smallest banks have lower loan-to-deposit ratios, lower charge-offs, lower noncurrent assets. They generally report higher loan loss provisions and ALLLs relative to noncurrent loans.

The higher presumed risk of smaller banks is often due to their geographic and product concentrations that are not reflected in balance sheet data. Smaller banks are more dependent on their local economies as well as on a specialized type of lending, such as

EXHIBIT 3.12 Summary Profitability and Risk Measures for Different-Sized Commercial Banks, December 31, 2013

Assets Size	<$100M	$100M–$1B	$1B–$10B	>$10B	Trend with Size	All Commercial Banks
Number of institutions reporting	1814	3522	450	90	↓	5876
Performance ratios (%)						
Return on equity	6.63	8.76	10.42	9.61	↑~↓	9.60
Pretax ROE	7.62	10.89	13.29	14.30	↑	13.94
Return on assets	0.76	0.93	1.23	1.07	↑~↓	1.07
Pretax ROA	0.86	1.14	1.55	1.59	↑	1.55
Equity capital ratio	11.28	10.47	11.66	11.12	~	11.12
Net interest margin	3.66	3.72	3.98	3.12	~↓	3.25
Yield on earning assets	4.19	4.27	4.46	3.49	~↓	3.64
Cost of funding earning assets	0.53	0.55	0.48	0.37	~↓	0.39
Earning assets to total assets	91.29	92.03	90.84	87.77	~↓	88.39
Burden ratio	2.59	2.31	2.09	1.08	↓	1.29
Noninterest income to earn assets	1.09	1.08	1.41	2.11	↑	1.95
Noninterest expenses to earn assets	3.68	3.39	3.50	3.19	↓~	3.24
Efficiency ratio	77.32	70.36	63.89	59.13	↓	60.53
Net charge-offs to LN&LS	0.34	0.37	0.39	0.77	↑	0.69
LN&LS loss provision to assets	0.14	0.18	0.18	0.21	↑~	0.21
Asset Quality (%)						
Net charge-offs to LN&LS	0.34	0.37	0.39	0.77	↑	0.69
Loss allow to Noncurr LN&LS	97.07	93.47	83.28	62.35	↓	66.09
LN&LS provision to net charge-offs	76.53	78.89	72.69	54.67	~↓	56.99
Loss allowance to LN&LS	1.70	1.67	1.62	1.77	↑	1.75
Net LN&LS to deposits	64.38	73.62	80.98	66.66	↑~↓	68.53
Noncurr assets plus OREO to capital	15.43	17.73	16.84	17.44	~	17.44
Capital Ratios (%)						
Core capital (leverage) ratio	11.15	10.32	10.33	9.06	↓	9.29
Tier one risk-based capital ratio	18.04	15.02	14.21	12.45	↓	12.84
Total risk-based capital ratio	19.14	16.19	15.41	14.43	↓	14.68
Structural Changes						
New Charters	1	0	0	0		1
Banks absorbed by mergers	74	112	16	2	↓	204
Failed banks	12	10	1	0	↓	23

Source: FDIC Quarterly Banking Profile, www.fdic.gov/, www2.fdic.gov/qbp.

agricultural or residential construction lending. Smaller banks tend to rely more "soft" information when making lending decisions, whereas larger banks use more "hard" data.[53] This tends to result in great volatility in the charge-off patterns of the largest banks and in relatively low charge-offs for relationship-driven community banks. Still, heavy loan concentrations can produce large losses if the local economy or industry is negatively affected.

Larger banks hold a larger percentage of assets in loans relative to deposits but, due to smaller investment portfolios, hold a smaller percentage of earning assets. This asset mix is a reflection of two distinct factors. First, smaller banks generally operate with proportionately more core deposits and fewer volatile liabilities as compared with the largest banks. This liability mix reflects the fact that large banks have far greater access to purchased funds in the money and capital markets. Second, the lower earnings base of the largest banks reflects their de-emphasis of loans and lending and their increased emphasis on products and services and the generation of fee income.

Financial Statement Manipulation

The usefulness of bank financial statements depends on the quality and consistency of the data. Ideally, financial institutions would use the same accounting rules in each period and isolate the effects of nonrecurring events. This would make comparisons over time and between banks simple. Unfortunately, financial institutions have wide discretion in reporting certain items and can use extraordinary transactions to disguise unfavorable events or trends. Analysts should delete the impact of any unusual changes to make valid comparisons. Banks use numerous techniques to manage earnings or, as some would say, to manipulate their financial statements. The primary techniques are the use of nonrecurring extraordinary transactions, discretionary interpretation of reporting requirements, goodwill reporting, discretionary timing of reported loan charge-offs, off-balance sheet special-purpose entities, and accounting changes that mask true operating performance. The net effect is to potentially distort the magnitude of period-ending balance sheet figures, net income, and related ratios, which makes comparisons difficult over time and versus peers. In most cases, banks do not violate federal regulations or generally accepted accounting principles. Often, the reporting techniques are mandated.

Off-Balance Sheet Activities

Both the failure of Enron and the subprime crisis of 2008–2009 are indicative of the problems associated with special-purpose entities and off-balance sheet activities, the ambiguous accounting requirements associated with them, and the lack of guidance from the regulatory authorities on what is or is not acceptable. In general, parent companies create a "structured investment vehicle" (SIV) as an independent company. The SIV acquires funds from lenders and investors. The parent company then sells assets to the SIV, such as loans or shares of stock, and in return gets the proceeds from the lenders and investors. Rather than counting the funds as debt on the books of the parent company, however, it counts them as debt to the SIV, thereby possibly understating the parent's risk. Income, on the other hand, is reported by the parent company, and is thereby possibly overstated. Everything works well unless the SIV fails and the parent is required to "make good" on the loans to the SIV. The real issue is to what degree the

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[53] "Soft" information is information that is generally not published, such as the loan officer's personal knowledge of the customers and their business.

parent company has exposure to the debts of the SIV. If the majority of the risk and returns belong to other parties, accounting rules generally allow these off-balance sheet activities to remain off the balance sheet. Unfortunately, there is vague guidance on when and how the activities of SIVs must be consolidated into the financial statements of the parent. As in the case of the subprime crisis of 2007–2009, it was only *after* significant impairment of the value of the SIV's assets that companies reported the impairment!

Window Dressing. Many banks have long engaged in window dressing for size purposes, or have increased period-ending assets or deposits, and SIVs are only one method. Some banks want to be the largest or fastest-growing bank in its market because customers like to associate with "bigness." One technique used to increase total assets is to encourage large business customers to borrow from the bank temporarily rather than issue commercial paper. The bank finances the loans in the federal funds market. Another technique involves inducing those institutions to which the bank provides correspondent services to increase their deposit balances at the bank. Some large banks similarly solicit short-term deposits from overseas entities. None of these transactions materially alters earnings, but all give a false impression of true size.

In some instances, banks engage in transactions that substantially improve their perceived operating performance. Some banks eliminate borrowing from Federal Reserve Banks because of the perception that such borrowing indicates weakness, and pay off Federal Reserve loans just prior to the reporting date. The biggest reporting problems arise when banks attempt to offset declines in reported net income or improve credit quality measures. Some banks smooth earnings by underreporting provisions for loan losses when profits are otherwise low, and overreporting provisions for loan losses when profits are otherwise high. This reduces the volatility in earnings and helps management meet earnings targets set by the board of directors or stock analysts. They might also sell nonconventional assets for one-time profits or understate problem loans. In many cases, banks have temporarily sold loan participations just before reporting periods to reduce loan exposures. Transactions and reporting requirements involving preferred stock, nonperforming loans, securities transactions, and nonrecurring asset sales complicate the evaluation process.

Preferred Stock. Preferred stock can help a bank meet equity capital requirements imposed by regulators but it does not pay interest; rather, it pays dividends out of earnings available for common stockholders. Banks that use preferred stock overstate their NIM, NI, ROE, and ROA, as well as other profitability measures relative to actual fixed charges, as compared with banks that don't use preferred stock. Preferred stock is not FDIC insured, and although dividends do not theoretically have to be paid, it can be almost devastating to a bank to pay preferred stock dividends. Hence, preferred stock more closely resembles debt and operating performance and is best evaluated by netting preferred dividends from income when computing profit measures.

Nonperforming Loans. Loans are designated as nonperforming when they are placed on nonaccrual status or when the terms are substantially altered in a restructuring. Nonaccrual means that banks deduct all interest on the loans that was recorded but not actually collected. In the past, banks traditionally stopped accruing interest when debt payments were more than 90 days past due. However, the interpretation of when loans qualified as past due varies widely. Many banks did not place loans on nonaccrual status if they were brought under 90 days past due by the end of the reporting period. This permitted borrowers to make late partial payments and the banks to report all interest as accrued, even when it was not collected. On occasion, banks would lend the borrower the funds that were used to make the late payment.

The impact of this practice on financial statements is twofold. First, nonperforming loans are understated on the balance sheet, so that credit risk is actually higher than it appears. Second, interest accrued but not collected increases net interest income, thus overstating NIM, ROA, and ROE. In response to foreign loan problems at large banks in 1983 and 1984, federal regulators formally tightened the accounting rules for nonperforming loans. On July 1, 1984, loans were put on nonaccrual as soon as any repayment went beyond 90 days past due. Interest could not be recorded until the bank received an actual payment or the loan was made current.

Allowance for Loan Losses. A related factor that distorts financial reports is the bank's provisions for loan losses and the ALLL. For tax purposes, the maximum size of the reserve and the allowable deduction for losses is set by IRS regulations. However, management uses discretion in determining how much it should report as provisions for loan losses in financial statements. During some periods, banks have minimized the provision, understating the reported reserve for losses and overstating earnings. Severe loan problems in the early 1980s forced many banks to report large provisions for losses to compensate for prior understatements.

Securities Gains and Losses. FASB 115 requires financial companies to designate the objective behind buying investment securities as either held-to-maturity, trading, or available-for-sale. Held-to-maturity securities are recorded on the balance sheet at amortized cost. Trading account securities are those securities that the institution actively buys and sells, principally to speculate on interest rate movements and profit on price changes. These securities must be marked to market (reported at current market value) on the balance sheet and unrealized gains (losses) reported on the income statement. All other investment securities are classified as available-for-sale and, as such, recorded at market value on the balance sheet with a corresponding change to stockholders' equity as unrealized gains and losses on securities holdings.

There is no reporting of gains or losses on the income statement with these securities. This accounting standard is designed to make the financial statements more closely match the institution's intended purpose when buying the securities. Unfortunately, regulators have often required a bank to report all securities of a certain type, such as Treasury bills, as available-for-sale if the institution ever sells a security prior to maturity. Hence, most depository institutions report all investment securities as "available-for-sale" today due to restrictions against selling a security prior to maturity if the security is classified as "held-to-maturity."

Nonrecurring Sales of Assets. Companies can often bolster earnings with one-time sales of assets. Most sales involve loan sales, real estate, subsidiaries, lease assets, or hidden assets that banks have acquired through debt restructuring and foreclosures. Typically, many foreclosed assets are listed at little value on the bank's books, but may generate large gains if the problem customer's performance improves.

The essential point is that once a firm sells the asset, it cannot do it again. Thus, the gain or loss will have a one-time impact on earnings. A careful analysis requires that these extraordinary gains or losses be excluded from any comparison of the bank's performance with other banks, and with its own performance over time, as the trend behavior will be biased.

Summary

This chapter introduces the financial statements of commercial banks and presents a procedure for analyzing a financial institution's profitability and risks using historical data. The procedure involves decomposing aggregate profit ratios into their components to help identify key factors that influence performance, with the focus on risk management. It then associates financial ratios for credit risk, liquidity risk, market risk, operational risk, reputational risk, legal risk, and capital or solvency risk to demonstrate the trade-off between risks and returns. Actual bank data are provided for PNC Bank and the smaller Community National Bank. The model developed is applied to the actual data for PNC Bank to interpret performance in 2013 versus peer banks, and over the period from 2006 to 2013. The same performance ratios are then used to compare the profitability and risk profile of two different-sized banking groups. The final sections examine profitability across size and asset concentrations of institutions, discuss the regulatory CAMELS ratings, and describe how depository institutions may manipulate financial data to alter summary profit and risk measures.

The emphasis in the chapter is that of risk management. Financial institutions must assume a wide variety of risks—credit risk, liquidity risk, market risk, and so on—in order to earn optimal returns. High-performing institutions are those that manage and control their risks better than other institutions. Hence, the issue is one of the trade-off between risk and return. Clearly, an institution that assumes more risk, and underwrites or manages that risk more effectively, will generate greater profits than an institution assuming less risk. Often, however, institutions assume more risk only to generate an average or below-average return. A lower-risk position is not always a low-performance position and a high-risk position is not always a high-performance position. A high-performance institution is one that earns a greater return for the risk position it has assumed.

Questions

1. What are the major categories of depository institution assets and their approximate percentage contribution to total resources? What are the major categories of depository institution liabilities? What are the fundamental differences between them?
2. Depository institutions typically differentiate between interest and noninterest income and expense. What are the primary components of each? Define net interest income (NIM) and burden. What does a bank's efficiency ratio measure?
3. Using PNC (in Exhibit 3.2) as a typical large depository institution, which balance sheet accounts would be affected by the following transactions? Indicate at least two accounts with each transaction.
   a. Arturo Rojas opens a money market deposit account with $5,000. The funds are lent in the overnight market for one week.
   b. Just as a real estate developer pays off a strip shopping mall loan, a new resident optometrist takes out a mortgage on a home.
   c. The bank hires an investment banker to sell shares of stock to the public. It plans to use the proceeds to finance additional commercial loans.

4. Arrange the following items into an income statement. Label each item, place it in the appropriate category, and determine the bank's bottom-line net income.
   a. Interest paid on time deposits under $100,000: $78,002
   b. Interest paid on jumbo CDs: $101,000
   c. Interest received on U.S. Treasury and agency securities: $44,500
   d. Fees received on mortgage originations: $23,000
   e. Dividends paid to stockholders of $0.50 per share for 5,000 shares
   f. Provisions for loan losses: $18,000
   g. Interest and fees on loans: $189,700
   h. Interest paid on interest checking accounts: $33,500
   i. Interest received on municipal bonds: $60,000
   j. Employee salaries and benefits: $145,000
   k. Purchase of a new computer system: $50,000
   l. Service charge receipts from customer accounts: $41,000
   m. Occupancy expense for bank building: $22,000
   n. Taxes of 34 percent of taxable income are paid
   o. Trust department income equals: $15,000
5. What are the primary sources of risk that depository institution managers face? Describe how each risk type potentially affects performance. Provide one financial ratio to measure each type of risk and explain how to interpret high versus low values.
6. Bank L operates with an equity-to-asset ratio of 6 percent, while Bank S operates with a similar ratio of 10 percent. Calculate the equity multiplier for each bank and the corresponding return on equity if each bank earns 1.5 percent on assets. Suppose, instead, that both banks report an ROA of 1.2 percent. What does this suggest about financial leverage?
7. Define each of the following components of the return on equity model and discuss their interrelationships:
   a. ROE
   b. ROA
   c. EM
   d. ER
   e. AU
8. Explain how and why profitability ratios at small banks typically differ from those at the largest money center banks.
9. Regulators use the CAMELS system to analyze bank risk. What does CAMELS stand for and what financial ratios might best capture each factor?
10. Rank the following assets from lowest to highest liquidity risk:
    a. Three-month Treasury bills with one-year construction loan
    b. Four-year car loan with monthly payments
    c. Five-year Treasury bond with five-year municipal bond
    d. One-year individual loan to speculate in stocks
    e. Three-month Treasury bill pledged as collateral

11. In each pair below, indicate which asset exhibits the greatest credit risk. Describe why.
    a. Commercial loan to a Fortune 500 company or a loan to a corner grocery store
    b. Commercial loans to two businesses in the same industry; one is collateralized by accounts receivable from sales, while the other is collateralized by inventory as work-in-process
    c. Five-year Baa-rated municipal bond or a five-year agency bond from the Federal Home Loan Bank system
    d. One-year student loan (college) or a one-year car loan
12. What ratios on common-sized financial statements would indicate a small bank versus a large, multibank holding company? Cite at least five.
13. In some instances, when a depository institution borrower cannot make the promised principal and interest payment on a loan, the bank will extend another loan for the customer to make the payment.
    a. Is the first loan classified as a nonperforming loan?
    b. What is the rationale for this type of lending?
    c. What are the risks in this type of lending?
14. Suppose that your bank had reported a substantial loss during the past year. You are meeting with the bank's board of directors to discuss whether the bank should make its traditional (25 years straight) dividend payment to common stockholders. Provide several arguments for why the bank should authorize and make the dividend payment. Then, provide several arguments for why it should not make the payment. What should decide the issue?
15. Explain how each of the following potentially affects a bank's liquidity risk:
    a. Most (95 percent) of the bank's securities holdings are classified as held-to-maturity.
    b. The bank's core deposit base is a low (35 percent) fraction of total assets.
    c. The bank's securities all mature after eight years.
    d. The bank has no pledged securities out of the $10 million in securities it owns.

Problems

1. Evaluate the performance of Community National Bank relative to peer banks using the data in Exhibits 3.2, 3.4, 3.7, 3.8, and 3.9. Did the bank perform above or below average in 2013? Did it operate with more or less relative risk?
    a. Conduct a return on equity decomposition analysis for 2013, identifying where the bank's performance compared favorably and unfavorably with peer banks.
    b. Compare the bank's risk measures with those of peer banks. What are the implications of any significant differences?
    c. What recommendations would you make to adjust the bank's risk and return profile to improve its performance?
2. The summary UBPR page for Wells Fargo Bank, NA is shown in the table on page 138. Average total assets for Wells Fargo was quite high as of December 31, 2013. Use the data from December 31, 2013, to explain whether this bank was a high- or low-performance bank compared with peers. Discuss specifically (1) financial leverage,

(2) expense control, and (3) the contribution of interest and noninterest income to overall bank profitability. List three areas that management should focus on to improve performance. Using the limited information provided, evaluate Wells Fargo's credit, liquidity, and capital risk.

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Summary Ratios from Well Fargo's 2008–2012 UBPR

FDIC Certificate # 3531
OCC Charter # 1 **County: MINNEHAHA**
Public Report

WELLS FARGO BANK, NA ; SIOUX FALLS, SD
Summary Ratios–Page 1

Summary Ratios

	12/31/2013			**12/31/2012**			**12/31/2011**			**12/31/2010**			**12/31/2009**		
Earnings and Profitability	BANK	PG 1	PCT	BANK	PG 1	PCT	BANK	PG 1	PCT	BANK	PG 1	PCT	BANK	PG 1	PCT
Percent of Average Assets:															
Interest Income (TE)	3.41	3.61	36	3.78	3.82	46	3.98	4.02	43	4.34	4.14	55	4.47	4.36	51
– Interest Expense	0.24	0.36	31	0.28	0.46	28	0.42	0.62	26	0.57	0.85	30	0.94	1.29	30
Net Interest Income (TE)	3.17	3.22	46	3.50	3.33	59	3.56	3.36	63	3.77	3.25	75	3.53	3.02	74
+ Noninterest Income	1.87	1.05	84	1.63	1.13	75	1.79	1.10	81	1.82	1.24	75	1.97	1.38	78
– Noninterest Expense	3.12	2.72	72	3.47	2.75	83	3.39	2.78	81	3.27	2.80	75	3.20	2.83	70
– Provision: Loan & Lease Losses	0.22	0.14	72	0.34	0.32	63	0.43	0.47	53	1.02	1.03	58	1.46	1.72	50
Pretax Operating Income (TE)	1.70	1.43	69	1.31	1.42	42	1.53	1.22	62	1.31	0.75	63	0.83	−0.09	57
+ Realized Gains/Losses Sec	0.03	0.02	75	0.03	0.04	61	0.04	0.05	57	0.04	0.04	64	−0.01	0.02	23
Pretax Net Operating Income (TE)	1.73	1.45	67	1.35	1.47	42	1.57	1.26	63	1.34	0.80	64	0.82	−0.13	59
Net Operating Income	1.24	1.02	75	0.94	1.03	46	1.10	0.87	65	0.94	0.50	67	0.56	−0.21	59
Adjusted Net Operating Income	1.09	0.97	65	0.84	0.96	42	0.89	0.71	58	0.82	0.43	57	1.03	0.21	70
Net Inc Attrib to Min Ints	0.04	0.00	97	0.01	0.00	92	0.01	0.00	92	0.01	0.00	88	0.00	0.00	2
Net Income Adjusted Sub S	1.19	1.00	69	0.94	1.02	46	1.09	0.85	65	0.94	0.49	67	0.57	−0.24	60
Net Income	1.19	1.01	69	0.94	1.03	46	1.09	0.87	64	0.94	0.49	67	0.57	−0.24	60
Margin Analysis:															
Avg Earning Assets to Avg Assets	88.94	92.04	25	87.21	91.88	12	87.39	91.51	18	88.00	91.53	21	87.53	92.28	12
Avg Int-Bearing Funds to Avg Assets	77.64	77.39	41	77.08	77.80	36	76.88	78.59	36	78.37	80.27	35	79.40	81.24	35
Int Inc (TE) to Avg Earn Assets	3.84	3.93	40	4.33	4.16	56	4.55	4.40	53	4.93	4.54	64	5.10	4.75	64
Int Expense to Avg Earn Assets	0.27	0.39	34	0.32	0.50	30	0.48	0.68	30	0.65	0.94	32	1.07	1.40	32
Net Int Inc-TE to Avg Earn Assets	3.56	3.50	53	4.01	3.63	73	4.07	3.67	69	4.28	3.57	81	4.03	3.29	82
Loan & Lease Analysis:															
Net Loss to Average Total LN&LS	0.56	0.30	84	0.72	0.61	67	1.06	0.93	59	1.87	1.66	64	1.68	1.86	56
Earnings Coverage of Net Losses (X)	5.09	16.75	27	3.55	10.28	38	3.00	5.58	49	2.01	3.26	48	2.28	3.30	58
LN&LS Allowance to LN&LS Not HFS	1.84	1.44	77	2.17	1.73	74	2.73	1.99	78	3.24	2.36	78	3.21	2.53	73
LN&LS Allowance to Net Losses (X)	3.35	8.83	33	3.13	5.00	46	2.65	2.91	61	1.66	1.87	57	1.87	1.86	65
LN&LS Allowance to Total LN&LS	1.82	1.43	77	2.13	1.68	74	2.68	1.91	78	3.17	2.30	78	3.16	2.46	75
Total LN&LS-90+ Days Past Due	1.27	0.29	87	2.07	0.47	87	2.65	0.62	88	2.90	0.54	89	3.52	0.35	96
–Nonaccrual	1.80	1.05	82	1.78	1.54	65	2.30	2.21	66	3.05	2.99	61	3.35	3.77	54
–Total	3.06	1.46	88	3.85	2.22	83	4.95	3.16	78	5.95	3.85	79	6.87	4.33	80
Liquidity															
Net Non Core Fund Dep New $250M	9.53	12.89	40	10.60	11.89	49	11.60	15.09	48	12.96	17.28	47	19.02	30.36	27
Net Loans & Leases to Assets	62.79	63.36	41	62.94	60.79	47	59.92	60.33	41	58.17	60.59	36	59.61	62.96	34
Capitalization															
Tier One Leverage Capital	9.78	9.86	52	10.08	9.76	59	10.05	9.59	62	10.04	9.17	72	9.31	8.68	71
Cash Dividends to Net Income	81.47	42.97	79	90.21	45.69	78	83.44	29.78	86	68.04	20.54	85	67.12	20.54	82
Retained Earnings to Avg Total Equity	1.79	4.25	27	0.74	3.71	25	1.46	3.85	24	2.52	1.36	40	1.77	−5.37	60
Rest+Nonac+RE Acq to Eqcap+ALLL	13.45	11.48	65	13.73	14.81	52	15.65	19.77	45	16.97	23.46	41	22.35	27.04	50
Growth Rates															
Total Assets	5.08	5.90	62	12.05	7.79	73	2.60	7.93	42	−1.41	2.91	38	84.91	4.26	96
Tier One Capital	1.34	7.83	16	11.03	7.43	74	3.29	11.07	25	0.94	9.83	21	193.74	9.56	98
Net Loans & Leases	4.82	9.47	44	17.70	9.19	79	5.69	8.55	58	−3.79	0.94	43	107.96	−1.28	98
Short Term Investments	142.96	4.88	91	63.85	23.33	77	−32.80	24.16	27	−18.52	63.67	34	−16.80	236.29	29
Short Term Non Core Funding	−11.00	10.67	25	14.96	−2.27	72	−6.49	−23.66	71	−8.43	−13.32	62	6.42	−14.02	77
Average Total Assets		293,964,224			284,903,864			256,540,904			256,207,798			271,327,621	
Total Equity Capital		36,502,602			36,267,544			31,636,420			30,575,352			28,508,620	
Net Income		3,505,355			2,666,967			2,793,185			2,396,696			1,535,763	
Number of banks in Peer Group			199			188			179			173			180

Source: Wells Fargo, Uniform Bank Performance Report, https://cdr.ffiec.gov/public/ManageFacsimiles.aspx?ReportType=283.

APPENDIX

FDIC Certificate # 6384	FRB District/ID_RSSD 3/817824	PNC BANK, NATIONAL ASSOCIATION; WILMINGTON, DE	Table of Contents
OCC Charter # 1316	County: NEW CASTLE	December 31, 2013 Uniform Bank Performance Report	5/8/2014 5:48:15 PM
Public Report			

Information

Introduction

This uniform bank performance report covers the operations of a bank and that of a comparable group of peer banks. It is provided as a bank management tool by the Federal Financial Institutions Examination Council. Detailed information concerning the content of this report is provided in the Users Guide for the Uniform Bank Performance Report found online at www.ffiec.gov. This report has been produced for the use of the federal regulators of financial institutions in carrying out their supervisory responsibilities. All information contained herein was obtained from sources deemed reliable however no guarantee is given as to the accuracy of the data. The information contained in this report are not to be construed as a rating or other evaluation of a financial institution by a federal banking regulator. The quarterly report of condition and income is the principal source of information for this report. Please refer to that document for additional financial information and an explanation of the accounting standards that underlie data shown herein. For questions regarding content of reports contact:
1-888-237-3111 or email: cdr.help@ffiec.gov

Financial Institution Address:
PNC BANK, NATIONAL ASSOCIATION
222 DELAWARE AVENUE
WILMINGTON DE19899-

The Current Federal Regulator is:
Office of Comptroller of the Currency

The bank was established on: 1/1/1864

The current peer group for this bank is: 1
Insured commercial banks having assets greater than $3 billion

Footnotes:

Financial data in the Uniform Bank Performance Report may have been adjusted as a result of information shown in footnotes below. Please refer to the Uniform Bank Performance Report Users Guide online for details.

##One or more mergers, consolidations or purchases have occurred during one or more of the quarters listed. Consequently assets prior to the date of merger may be excluded from earnings analysis.

Table of Contents

Section

Bank Holding Company Information:

FRB District/ID_RSSD 3/1069778
PNC FINANCIAL SERVICES GROUP, INC.,
THE PITTSBURGH, PA

FDIC Certificate # 6384 FRB District/ID_RSSD 3 / 817824 PNC BANK, NATIONAL ASSOCIATION; WILMINGTON, DE Summary Ratios
OCC Charter # 1316 County: NEW CASTLE Summary Ratios–Page 1 5/8/2014 5:48:15 PM

	12/31/2013			12/31/2012			12/31/2009			12/31/2007			12/31/2006		
Earnings and Profitability	BANK	PG 1	PCT	BANK	PG 1	PCT	BANK	PG 1	PCT	BANK	PG 1	PCT	BANK	PG 1	PCT
Percent of Average Assets:															
Interest Income (TE)	3.41	3.61	36	3.78	3.82	46	4.47	4.36	51	4.92	6.17	6	5.08	5.95	13
– Interest Expense	0.24	0.36	31	0.28	0.46	28	0.94	1.29	30	2.45	2.96	21	2.54	2.70	40
Net Interest Income (TE)	3.17	3.22	46	3.50	3.33	59	3.53	3.02	74	2.47	3.19	18	2.54	3.24	21
+ Noninterest Income	1.87	1.05	84	1.63	1.13	75	1.97	1.38	78	1.85	1.25	77	2.32	1.29	84
– Noninterest Expense	3.12	2.72	72	3.47	2.75	83	3.20	2.83	70	2.72	2.66	54	3.00	2.56	69
– Provision: Loan & Lease Losses	0.22	0.14	72	0.34	0.32	63	1.46	1.72	50	0.21	0.30	47	0.14	0.13	55
Pretax Operating Income (TE)	1.70	1.43	69	1.31	1.42	42	0.83	–0.09	57	1.39	1.54	37	1.73	1.92	38
+ Realized Gains/Losses Sec	0.03	0.02	75	0.03	0.04	61	–0.01	0.02	23	0.00	–0.02	28	–0.24	–0.01	3
Pretax Net Operating Income (TE)	1.73	1.45	67	1.35	1.47	42	0.82	–0.13	59	1.38	1.51	38	1.49	1.91	25
Net Operating Income	1.24	1.02	75	0.94	1.03	46	0.56	–0.21	59	0.93	0.98	42	1.02	1.24	27
Adjusted Net Operating Income	1.09	0.97	65	0.84	0.96	42	1.03	0.21	70	0.98	1.09	36	1.00	1.25	25
Net Inc Attrib to Min Ints	0.04	0.00	97	0.01	0.00	92	0.00	0.00	2	N/A	0.00	N/A	N/A	0.00	N/A
Net Income Adjusted Sub S	1.19	1.00	69	0.94	1.02	46	0.57	–0.24	60	0.93	0.97	43	1.02	1.24	26
Net Income	1.19	1.01	69	0.94	1.03	46	0.57	–0.24	60	0.93	0.97	43	1.02	1.24	26
Margin Analysis:															
Avg Earning Assets to Avg Assets	88.94	92.04	25	87.21	91.88	12	87.53	92.28	12	86.74	91.54	14	86.95	91.79	14
Avg Int-Bearing Funds to Avg Assets	77.64	77.39	41	77.08	77.80	36	79.40	81.24	35	76.50	81.54	19	77.35	81.55	22
Int Inc (TE) to Avg Earn Assets	3.84	3.93	40	4.33	4.16	56	5.10	4.75	64	5.67	6.75	9	5.85	6.50	19
Int Expense to Avg Earn Assets	0.27	0.39	34	0.32	0.50	30	1.07	1.40	32	2.82	3.25	24	2.92	2.96	47
Net Int Inc-TE to Avg Earn Assets	3.56	3.50	53	4.01	3.63	73	4.03	3.29	82	2.84	3.51	21	2.92	3.55	22
Loan & Lease Analysis:															
Net Loss to Average Total LN&LS	0.56	0.30	84	0.72	0.61	67	1.68	1.86	56	0.29	0.29	57	0.28	0.17	75
Earnings Coverage of Net Losses (X)	5.09	16.75	27	3.55	10.28	38	2.28	3.30	58	9.77	16.15	45	11.51	30.60	34
LN&LS Allowance to LN&LS Not HFS	1.84	1.44	77	2.17	1.73	74	3.21	2.53	73	1.14	1.25	37	1.12	1.15	48
LN&LS Allowance to Net Losses (X)	3.35	8.83	33	3.13	5.00	46	1.87	1.86	65	3.78	6.97	34	3.86	10.85	24
LN&LS Allowance to Total LN&LS	1.82	1.43	77	2.13	1.68	74	3.16	2.46	75	1.08	1.22	32	1.06	1.11	42
Total LN&LS-90+ Days Past Due	1.27	0.29	87	2.07	0.47	87	3.52	0.35	96	0.16	0.13	66	0.11	0.09	66
–Nonaccrual	1.80	1.05	82	1.78	1.54	65	3.35	3.77	54	0.62	0.77	47	0.29	0.38	40
–Total	3.06	1.46	88	3.85	2.22	83	6.87	4.33	80	0.78	0.96	47	0.40	0.51	42
Liquidity															
Net Non Core Fund Dep New $250M	9.53	12.89	40	10.60	11.89	49	19.02	30.36	27	36.87	35.94	52	25.99	36.30	33
Net Loans & Leases to Assets	62.79	63.36	41	62.94	60.79	47	59.61	62.96	34	54.10	65.48	21	55.09	63.95	25
Capitalization															
Tier One Leverage Capital	9.78	9.86	52	10.08	9.76	59	9.31	8.68	71	6.84	8.05	22	7.18	8.18	29
Cash Dividends to Net Income	81.47	42.97	79	90.21	45.69	78	67.12	20.54	82	82.97	62.59	61	68.37	47.82	63
Retained Earnings to Avg Total Equity	1.79	4.25	27	0.74	3.71	25	1.77	–5.37	60	1.50	2.01	44	4.25	5.63	44
Rest+Nonac+RE Acq to Eqcap+ALLL	13.45	11.48	65	13.73	14.81	52	22.35	27.04	50	3.39	5.69	37	2.17	2.76	44
Growth Rates															
Total Assets	5.08	5.90	62	12.05	7.79	73	84.91	4.26	96	38.43	12.30	88	8.77	12.61	48
Tier One Capital	1.34	7.83	16	11.03	7.43	74	193.74	9.56	98	27.48	9.15	88	8.17	14.05	38
Net Loans & Leases	4.82	9.47	44	17.70	9.19	79	107.96	–1.28	98	35.93	14.14	87	1.86	13.61	15
Short Term Investments	142.96	4.88	91	63.85	23.33	77	–16.80	236.29	29	57.80	40.18	68	104.99	160.11	70
Short Term Non Core Funding	–11.00	10.67	25	14.96	–2.27	72	6.42	–14.02	77	93.51	23.57	92	2.66	22.96	28
Average Total Assets	293,964,224			284,903,864			271,327,621			119,274,584			86,167,980		
Total Equity Capital	36,502,602			36,267,544			28,508,620			12,625,124			6,760,198		
Net Income	3,505,355			2,666,967			1,535,763			1,109,757			878,639		
Number of banks in Peer Group	199			188			180			187			182		

FDIC Certificate # 6384 FRB District/ID_RSSD 3 / 817824 PNC BANK, NATIONAL ASSOCIATION; WILMINGTON, DE Income Statement $
OCC Charter # 1316 County: NEW CASTLE Income Statement $–Page 2

	12/31/2013	12/31/2012	12/31/2009	12/31/2007	12/31/2006	Percent Change 1 Year
Interest and Fees on Loans	7,756,257	8,171,129	8,973,613	4,156,769	3,113,941	–5.08
Income From Lease Financing	265,588	277,359	273,257	51,839	101,739	–4.24
Tax-Exempt	226,465	205,193	45,337	35,155	33,738	10.37
Estimated Tax Benefit	121,663	110,243	21,829	12,582	11,339	10.36
Income on Loans & Leases (TE)	8,143,508	8,558,731	9,268,699	4,221,190	3,227,019	–4.85
US Treas & Agency (Excl MBS)	45,340	62,971	134,719	12,446	100,427	–28.00
Mortgage Backed Securities	1,403,494	1,668,960	2,195,973	1,234,296	825,419	–15.91
Estimated Tax Benefit	43,497	36,314	22,474	2,089	1,304	19.78
All Other Securities	297,508	299,712	340,998	141,639	80,973	–0.74
Tax-Exempt Securities Income	80,966	67,591	46,677	5,839	3,881	19.79
Investment Interest Income (TE)	1,789,839	2,067,957	2,694,164	1,390,470	1,008,123	–13.45
Interest on Due From Banks	12,234	4,481	9,069	1,735	281	173.02
Int on Fed Funds Sold & Resales	8,223	22,628	42,479	122,415	66,907	–63.66
Trading Account Income	19,445	49,418	49,152	80,263	43,564	–60.65
Other Interest Income	62,729	66,473	51,462	47,591	34,785	–5.63
Total Interest Income (TE)	10,035,979	10,769,688	12,115,025	5,863,665	4,380,679	–6.81
Int on Deposits in Foreign Off	9,753	15,427	19,949	295,121	239,966	–36.78
Interest on Time Dep Over $100M	55,857	80,817	578,167	231,125	261,020	–30.88
Interest on All Other Deposits	285,080	300,540	1,153,619	1,524,995	1,097,384	–5.14
Int on Fed Funds Purch & Repos	5,727	9,549	16,795	362,214	253,518	–40.03
Int Trad Liab & Oth Borrowings	131,644	163,946	428,714	400,800	217,259	–19.70
Int on Sub Notes & Debentures	227,733	227,450	350,067	108,229	122,189	0.12
Total Interest Expense	715,794	797,729	2,547,311	2,922,484	2,191,336	–10.27
Net Interest Income (TE)	9,320,185	9,971,959	9,567,714	2,941,181	2,189,343	–6.54
Non-interest Income	5,492,207	4,635,852	5,338,210	2,210,563	2,000,159	18.47
Adjusted Operating Income (TE)	14,812,392	14,607,811	14,905,924	5,151,744	4,189,502	1.40
Non-Interest Expense	9,164,894	9,886,768	8,693,076	3,239,506	2,581,915	–7.30
Provision: Loan & Lease Losses	651,026	977,178	3,969,456	256,273	120,423	–33.38
Pretax Operating Income (TE)	4,996,472	3,743,865	2,243,392	1,655,965	1,487,164	33.46
Realized G/L Hld-to-Maturity Sec	0	0	0	0	0	N/A
Realized G/L Avail-for Sale Sec	82,680	92,568	–30,548	–4,755	–204,502	–10.68
Pretax Net Operating Inc (TE)	5,079,152	3,836,433	2,212,844	1,651,210	1,282,662	32.39
Applicable Income Taxes	1,276,998	997,790	637,682	526,781	391,380	27.98
Current Tax Equiv Adjustment	165,161	146,557	44,303	14,672	12,643	12.69
Other Tax Equiv Adjustments	0	0	0	0	0	N/A
Applicable Income Taxes (TE)	1,442,159	1,144,347	681,985	541,453	404,023	26.02
Net Operating Income	3,636,993	2,692,086	1,530,859	1,109,757	878,639	35.10
Net Extraordinary Items	0	0	0	0	0	N/A
Net Inc Noncontrolling Minority Interests	131,638	25,119	–4,904	N/A	N/A	424.06
Net Income	3,505,355	2,666,967	1,535,763	1,109,757	878,639	31.44
Cash Dividends Declared	2,855,750	2,405,750	1,030,750	920,750	600,750	18.71
Retained Earnings	649,605	261,217	505,013	189,007	277,889	148.68
Memo: Net International Income	0	0	0	0	0	N/A

FDIC Certificate # 6384 FRB District/ID_RSSD 3 / 817824 PNC BANK, NATIONAL ASSOCIATION; WILMINGTON, DE Non Int Inc, Exp, Yields
OCC Charter # 1316 County: NEW CASTLE Noninterest Income, Expenses and Yields–Page 3

	12/31/2013			12/31/2012			12/31/2009			12/31/2007			12/31/2006		
Percent of Average Assets	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**
Personnel Expense	1.43	1.32	57	1.46	1.32	59	1.37	1.17	69	1.14	1.27	37	1.28	1.28	50
Occupancy Expense	0.42	0.33	74	0.44	0.33	77	0.41	0.33	71	0.36	0.35	57	0.40	0.34	69
Other Oper Exp (Incl Intangibles)	1.27	1.02	77	1.57	1.07	85	1.43	1.25	70	1.21	1.00	73	1.32	0.91	84
Total Overhead Expense	3.12	2.72	72	3.47	2.75	83	3.20	2.83	70	2.72	2.66	54	3.00	2.56	69
Overhead Less Nonint Inc	1.25	1.61	29	1.84	1.58	65	1.24	1.34	39	0.86	1.35	19	0.68	1.20	20
Other Income & Expense Ratios:															
Efficiency Ratio	61.87	62.82	45	67.68	61.53	67	58.32	64.95	38	62.88	58.36	67	61.63	55.90	71
Avg Personnel Exp Per Empl($000)	82.91	89.19	48	77.82	86.69	47	76.32	76.01	59	70.02	72.17	56	69.36	72.04	58
Assets Per Employee ($Million)	6.11	9.07	49	5.51	9.44	42	5.35	12.49	41	6.43	7.54	65	5.67	7.90	55
Yield on or Cost of:															
Total Loan & Leases (TE)	4.22	4.74	26	4.77	5.09	37	5.75	5.26	72	6.30	7.34	9	6.42	7.17	17
Loans in Domestic Offices	4.17	4.71	26	4.72	5.06	36	5.79	5.23	75	6.36	7.33	10	6.52	7.17	19
Real Estate	4.60	4.72	53	4.95	5.04	50	5.86	5.21	84	6.10	7.23	9	6.02	7.07	11
Secured by 1-4 Fam Resi Prop	4.78	4.48	71	5.08	4.72	76	5.93	5.33	77	N/A	0.00	N/A	N/A	0.00	N/A
All Other Loans Sec Real Estate	4.29	4.93	26	4.72	5.26	28	5.73	5.10	72	N/A	0.00	N/A	N/A	0.00	N/A
Commercial & Industrial	4.25	4.55	41	5.09	4.91	57	6.78	4.96	89	7.22	7.66	30	7.66	7.61	52
Individual	3.03	6.08	13	3.24	6.38	12	4.48	6.82	13	5.37	8.11	4	5.90	7.75	10
Credit Card	11.52	8.85	71	11.61	9.01	65	6.26	9.54	20	4.79	10.40	14	5.03	11.33	14
Agricultural	3.81	4.54	32	4.06	5.01	27	4.24	5.04	27	4.02	7.87	4	10.47	7.77	98
Loans in Foreign Offices	5.03	3.75	70	5.33	5.05	68	2.40	4.96	21	N/A	6.43	N/A	0.00	5.88	3
Total Investment Securities (TE)	3.11	2.36	83	3.38	2.62	82	4.80	4.10	81	5.00	5.11	38	4.84	4.82	55
Total Investment Securities (Book)	3.04	2.18	90	3.32	2.44	90	4.76	3.99	85	4.99	4.92	57	4.84	4.65	65
US Treas & Agency (Excl MBS)	1.76	1.42	67	2.26	1.63	75	2.10	2.85	28	6.17	4.74	96	4.42	4.40	51
Mortgage Backed Securities	3.37	2.20	93	3.82	2.53	93	5.34	4.54	88	5.03	4.99	56	4.87	4.76	61
All Other Securities	2.24	2.87	26	2.04	3.26	16	4.00	3.83	53	4.60	4.89	43	5.03	4.74	61
Interest-Bearing Bank Balances	0.25	0.26	45	0.24	0.26	27	0.14	0.38	11	6.46	4.58	93	5.22	4.21	81
Federal Funds Sold & Resales	0.64	0.35	78	1.27	0.40	87	0.54	0.35	78	3.01	5.20	1	5.03	5.01	42
Total Interest Bearing Deposits	0.18	0.36	18	0.21	0.46	12	0.96	1.47	22	2.88	3.40	23	2.86	3.02	41
Transaction accounts	0.15	0.22	50	0.32	0.25	71	0.60	0.60	60	2.65	1.83	75	2.50	1.71	73
Other Savings Deposits	0.09	0.20	23	0.10	0.23	17	0.51	0.65	39	1.95	2.32	33	2.00	2.03	52
Time Deps Over $100M	0.86	0.85	49	0.84	1.05	34	3.36	2.41	89	4.26	4.77	16	4.97	4.36	88
All Other Time Deposits	0.86	0.89	50	0.85	1.12	30	1.57	2.65	9	4.73	4.58	63	3.85	3.97	37
Foreign Office Deposits	0.21	0.26	50	0.21	0.30	38	0.22	0.55	15	4.34	4.35	37	4.99	4.21	85
Federal Funds Purchased & Repos	0.15	0.50	36	0.21	0.60	46	0.16	1.03	14	4.41	4.58	34	4.88	4.47	75
Other Borrowed Money	0.66	1.88	19	0.83	2.40	17	2.75	2.58	50	4.09	4.89	14	6.02	4.74	88
Subord Notes & Debentures	3.47	3.79	51	4.40	4.32	56	5.20	4.34	66	5.67	5.99	32	6.39	5.74	66
All Interest-Bearing Funds	0.31	0.47	31	0.36	0.60	25	1.18	1.60	29	3.20	3.65	24	3.29	3.34	46
Non-interest Income & Expenses															
Fiduciary Activities	728,276			652,109			598,804			418,807			328,572		
Deposit Service Charges	1,031,935			988,316			1,339,595			534,863			490,440		
Trading, Vent Cap, Securtz Inc	234,665			196,902			147,191			65,079			107,930		
Inv Banking, Advisory Inc	350,209			354,885			326,970			291,334			239,621		
Insurance Comm & Fees	25,879			31,037			81,721			13,380			6,577		
Net Servicing Fees	512,966			493,174			734,337			147,292			108,538		
Loan & Lse Net Gains/Loss	182,818			−472,990			185,471			55,912			119,582		
Other Net Gains/Losses	212,875			223,641			−55,432			15,083			16,124		
Other Non-interest Income	2,212,584			2,168,778			1,979,553			668,813			582,775		
Non-interest Income	5,492,207			4,635,852			5,338,210			2,210,563			2,000,159		
Personnel Expense	4,208,874			4,167,663			3,711,322			1,358,974			1,102,189		
Occupancy Expense	1,230,005			1,249,657			1,114,611			432,030			345,437		
Goodwill Impairment	0			44,840			0			0			0		
Other Intangible Amortiz	146,716			166,897			219,140			70,209			31,926		
Other Oper Exp(incl Intangibles)	3,579,299			4,257,711			3,648,003			1,378,293			1,102,363		
Non-Interest Expense	9,164,894			9,886,768			8,693,076			3,239,506			2,581,915		
Domestic Banking Offices(#)	2,736			2,903			2,526			1,035			824		
Foreign Branches (#)	1			1			1			0			11		
Assets Per Domestic Office	112,165			100,659			102,316			119,028			107,229		

FDIC Certificate # 6384 FRB District/ID_RSSD 3 / 817824 PNC BANK, NATIONAL ASSOCIATION; WILMINGTON, DE Balance Sheet $
OCC Charter # 1316 County: NEW CASTLE Balance Sheet $–Page 4

						Percent Change	
	12/31/2013	12/31/2012	12/31/2009	12/31/2007	12/31/2006	1 Quarter	1 Year
Assets:							
Real Estate Loans	85,507,520	84,702,621	90,306,525	36,595,704	25,246,489	0.42	0.95
Commercial Loans	68,636,927	63,489,326	42,918,502	21,769,395	17,202,849	2.95	8.11
Individual Loans	26,257,534	24,969,293	17,195,962	5,020,045	3,792,397	1.99	5.16
Agricultural Loans	117,967	109,067	143,784	7,669	918	12.77	8.16
Other LN&LS in Domestic Offices	15,071,565	14,861,017	8,328,201	3,809,361	2,679,511	−1.33	1.42
LN&LS in Foreign Offices	2,671,988	1,606,524	1,414,805	1,076,819	1,312,218	1.99	66.32
Loans Held for Sale	2,263,778	3,702,343	2,538,787	3,909,243	2,366,109	−5.98	−38.86
Loans not Held for Sale	195,998,417	186,034,160	157,691,014	64,332,647	47,832,092	1.47	5.36
LN&LS Allowance	3,608,665	4,035,708	5,063,667	734,140	534,585	−2.22	−10.58
Net Loans & Leases	194,653,530	185,700,795	155,166,134	67,507,750	49,663,616	1.45	4.82
U.S. Treasury & Agency Securities	33,746,638	35,499,632	31,868,480	9,139,072	4,460,576	9.15	−4.94
Municipal Securities	3,669,924	2,947,442	1,326,393	188,979	104,791	14.44	24.51
Foreign Debt Securities	1,153,930	1,113,763	1,386,765	0	0	−0.62	3.61
All Other Securities	21,612,153	21,752,329	21,251,138	19,977,265	17,609,119	−1.28	−0.64
Interest-Bearing Bank Balances	12,099,025	3,951,114	4,178,522	3,145	2,736	51.32	206.22
Federal Funds Sold & Resales	2,242,907	1,741,009	2,390,129	3,096,149	1,846,267	105.02	28.83
Trading Account Assets	4,174,830	3,000,248	2,390,933	4,887,891	2,906,020	52.87	39.15
Total Investments	78,699,407	70,005,537	64,792,360	37,292,501	26,929,509	14.06	12.42
Total Earning Assets	273,352,937	255,706,332	219,958,494	104,800,251	76,593,125	4.78	6.90
Nonint Cash & Due From Banks	4,034,133	5,213,060	4,282,748	3,557,298	3,590,886	−17.69	−22.61
Premises, Fix Assts, Cap Leases	4,633,026	4,521,665	3,755,291	1,579,837	1,314,564	1.60	2.46
Other Real Estate Owned	604,503	887,467	596,262	27,361	12,542	−9.38	−31.88
Dir & Indir Inv RE Ventures	0	0	0	0	0	N/A	N/A
Inv in Unconsolidated Subs	0	0	206	1,428	0	N/A	N/A
Acceptances & Oth Assets	27,375,080	28,697,866	31,716,848	14,816,114	8,631,332	−0.39	−4.61
Total Assets	309,999,678	295,026,390	260,309,849	124,782,289	90,142,449	3.86	5.08
Average Assets During Quarter	303,072,731	290,037,593	271,327,621	121,316,826	88,239,171	3.52	4.49
Liabilities:							
Demand Deposits	39,280,715	37,117,705	15,917,849	10,631,314	8,275,895	4.55	5.83
All Now & ATS Accounts	3,688,494	3,501,310	3,573,286	1,945,139	1,701,657	23.90	5.35
Money Market Deposit Accounts	144,240,092	136,768,146	106,285,148	38,809,937	34,133,988	1.47	5.46
Other savings Deposits	12,035,164	11,290,198	8,101,859	2,501,499	1,828,925	1.05	6.60
Time Deps At Or Below Insurance Limit	18,312,116	21,382,958	34,532,565	12,075,517	9,747,432	−3.35	−14.36
Less: Fully Insured Brokered Deposits	99	200,987	3,840,528	4,305,781	3,463,717	−99.49	−99.95
Core Deposits	217,556,482	209,859,330	164,570,179	61,657,625	52,224,180	1.88	3.67
Fully Insured Brokered Deposits	99	200,987	3,840,528	4,305,781	3,463,717	−99.49	−99.95
Time Deps Above Insurance Limit	1,716,366	1,785,623	14,670,377	5,286,977	5,590,228	−0.25	−3.88
Deposits in Foreign Offices	6,465,924	4,897,325	9,962,057	8,116,663	4,001,781	21.88	32.03
Total Deposits	225,738,871	216,743,265	193,043,141	79,367,046	65,279,906	2.34	4.15
Federal Funds Purch & Resale	4,349,832	3,351,286	4,009,623	8,671,288	4,443,808	34.40	29.80
Fed Home Loan Bor Mat < 1 Year	6,092,549	7,960,051	4,230,290	3,634,834	595,584	−14.12	−23.46
Fed Home Loan Bor Mat > 1 Year	6,819,579	1,476,526	6,531,035	4,751,499	1,561	392.44	361.87
Oth Borrowing Mat < 1 Year	5,546,515	8,906,811	2,388,397	3,105,607	745,782	−26.26	−37.73
Oth Borrowing Mat > 1 Year	11,138,049	6,089,605	2,965,428	4,250,024	4,606,664	27.66	82.90
Acceptances & Other Liabilities	4,867,216	6,098,816	8,584,128	3,960,847	4,514,904	−9.30	−20.19
Total Liabilities (Incl Mortg)	264,552,611	250,626,360	221,752,042	107,741,145	80,188,209	4.19	5.56
Subordinated Notes & Debentures	7,142,150	5,990,020	6,729,890	2,104,911	1,599,832	6.39	19.23
Total Bank Capital & Min Int	38,304,917	38,410,010	31,827,917	14,936,233	8,354,408	1.16	−0.27
Total Liabilities & Capital	309,999,678	295,026,390	260,309,849	124,782,289	90,142,449	3.86	5.08
Memoranda:							
Officers, Shareholder Loans (#)	4	3	1	3	2		
Officers, Shareholder Loans ($)	4,907	4,729	12,166	21,404	20,795	−0.69	3.76
Held-to-Maturity Securities	11,686,509	10,353,818	5,228,638	0	0	1.64	12.87
Available-for-Sale Securities	48,496,135	50,959,348	50,604,138	29,305,316	22,174,486	6.17	−4.83
All Brokered Deposits	99	200,987	3,840,528	4,605,781	3,463,717	−99.49	−99.95

FDIC Certificate # 6384 FRB District/ID_RSSD 3 / 817824 PNC BANK, NATIONAL ASSOCIATION; WILMINGTON, DE Off Balance
OCC Charter # 1316 County: NEW CASTLE Off Balance Sheet Items–Page 5 Sheet Items

	12/31/2013			12/31/2012			12/31/2009			12/31/2007			12/31/2006			Percent Change	
Outstanding (% of Total)	BANK	PG 1	PCT	BANK	PG 1	PCT	BANK	PG 1	PCT	BANK	PG 1	PCT	BANK	PG 1	PCT	1 Quarter	1 Year
Home Equity (1-4 Family)	6.05	2.47	85	6.72	2.45	91	7.82	2.70	90	6.66	3.33	80	8.27	3.54	83		
Credit Card	5.40	1.07	89	5.89	1.12	91	6.74	1.04	90	0.00	1.10	47	0.00	1.12	48		
Commercial RE Secured by RE	2.01	2.36	45	1.55	1.70	48	0.96	1.50	37	2.61	4.19	34	3.23	4.25	44		
1-4 Family Residential	0.04	0.39	27	0.06	0.26	34	0.17	0.29	44	1.08	1.13	58	N/A	0.00	N/A		
Comml RE, Oth Const & Land	1.98	1.88	56	1.49	1.40	56	0.80	1.16	39	1.53	3.07	30	N/A	0.00	N/A		
Commercial RE Not Secured by RE	2.41	0.09	99	1.94	0.09	99	1.15	0.11	95	2.35	0.17	96	3.71	0.18	97		
All Other	26.71	11.47	92	25.89	10.79	92	22.50	10.43	88	30.24	12.38	91	33.74	12.49	91		
Total LN&LS Commitments	42.58	19.60	92	41.99	18.15	93	39.18	18.07	92	41.87	24.53	87	48.95	25.43	92		
Securities Underwriting	0.00	0.00	97	0.00	0.00	96	0.00	0.00	97	0.00	0.00	96	0.00	0.03	96		
Standby Letters of Credit	4.47	1.02	94	4.98	1.09	94	4.99	1.66	87	5.23	2.16	85	7.04	2.30	90		
Amount Conveyed to Others	1.03	0.06	96	1.05	0.06	95	1.10	0.10	92	1.34	0.16	90	2.14	0.16	96		
Commercial Letters of Credit	0.07	0.04	81	0.09	0.04	81	0.13	0.04	83	0.12	0.07	76	0.12	0.09	74		
Assets Securitized or Sold w/Rec	4.91	0.64	91	5.95	0.82	91	13.95	0.93	95	10.75	0.86	94	2.57	0.86	84		
Amount of Recourse Exposure	1.25	0.10	91	1.46	0.12	92	2.51	0.16	93	2.81	0.13	97	0.06	0.11	73		
Credit Derivatives Bank as Guarantor	0.89	0.03	94	0.70	0.04	92	0.87	0.03	95	1.68	0.03	95	1.19	0.02	95		
Credit Derivatives Bank as Beneficiary	0.68	0.03	94	0.54	0.03	93	0.73	0.02	94	3.17	0.10	94	3.02	0.07	94		
All Oth Off-Balance Sheet Items	0.00	0.37	74	0.00	0.33	73	2.46	0.34	88	6.72	0.56	92	10.53	0.70	92		
Off-Balance Sheet Items	53.60	25.31	89	54.24	24.80	88	62.33	26.27	87	69.54	36.83	87	73.41	37.63	86		
Outstanding ($000)																	
Home Equity (1-4 Family)	18,754,319			19,814,595			20,366,446			8,315,218			7,450,945			−0.83	−5.35
Credit Card	16,746,350			17,381,235			17,556,396			0			0			−1.33	−3.65
Commercial RE Secured by RE	6,243,490			4,569,605			2,504,825			3,262,803			2,914,501			−3.59	36.63
1-4 Family Residential	119,746			181,504			432,426			1,349,586			N/A			−17.55	−34.03
Commercial RE, Oth Const & Land	6,123,744			4,388,101			2,072,399			1,913,217			N/A			−3.27	39.55
Commercial RE Not Secured by RE	7,464,287			5,736,485			2,983,390			2,933,583			3,341,919			10.62	30.12
All Other	82,785,366			76,374,462			58,565,523			37,728,852			30,413,748			4.03	8.39
Securities Underwriting	0			0			0			0			0			N/A	N/A
Memo: Unused Commit w/mat GT 1 YR	69,150,636			58,239,930			39,817,212			26,584,687			21,420,966			5.75	18.73
Standby Letters of Credit	13,844,991			14,679,225			12,999,322			6,527,235			6,347,071			1.56	−5.68
Amount Conveyed to Others	3,183,626			3,099,424			2,860,137			1,670,021			1,926,347			6.86	2.72
Commercial Letters of Credit	206,102			263,436			347,595			152,805			104,870			−12.10	−21.76
Assets Securitized or Sold w/recourse	15,234,816			17,554,670			36,322,082			13,411,729			2,316,933			−4.90	−13.22
Amount of Recourse Exposure	3,868,275			4,320,009			6,530,694			3,503,070			51,528			−4.52	−10.46
Credit Derivatives Bank as Guarantor	2,769,798			2,052,697			2,270,471			2,099,500			1,071,000			1.87	34.93
Credit Derivatives Bank as Beneficiary	2,102,319			1,587,791			1,911,913			3,956,000			2,720,050			7.71	32.41
All Oth Off-Balance Sheet Items	341			491			6,410,045			8,390,853			9,494,028			−55.77	−30.55
Off-Balance Sheet Items	166,152,179			160,014,692			162,238,008			86,778,578			66,175,065			1.78	3.84

FDIC Certificate # 6384
OCC Charter # 1316

FRB District/ID_RSSD 3 / 817824
County: NEW CASTLE

PNC BANK, NATIONAL ASSOCIATION; WILMINGTON, DE
Derivative Instruments–Page 5A

Derivative Instruments

	12/31/2013	**12/31/2012**	**12/31/2009**	**12/31/2007**	**12/31/2006**
Notional Amount ($000)					
Derivative Contracts	382,422,133	351,135,433	289,242,201	279,498,299	227,704,992
Interest Rate Contracts	366,489,814	339,449,500	281,787,936	258,860,226	218,762,206
Foreign Exchange Contracts	14,688,051	10,951,731	7,110,309	18,778,229	7,006,939
Equity, Comm & Oth Contracts	1,244,268	734,202	343,956	1,859,844	1,935,847
Derivatives Position					
Future and Forwards	73,570,257	79,705,725	54,090,103	53,266,172	20,126,483
Written Options	48,983,966	27,925,271	27,620,912	46,642,516	66,009,383
Exchange Traded	40,750,000	19,100,000	5,640,000	24,792,050	38,750,000
Over-the-Counter	8,233,966	8,825,271	21,980,912	21,850,466	27,259,383
Purchased Options	38,443,431	34,182,874	37,108,973	43,008,914	54,573,992
Exchange Traded	28,950,000	16,150,000	12,940,000	14,340,000	24,209,000
Over-the-Counter	9,493,431	18,032,874	24,168,973	28,668,914	30,364,992
Swaps	221,424,479	209,321,563	170,422,213	136,580,697	86,995,134
Held-for-Trading	180,686,501	158,840,511	132,304,446	261,205,377	213,332,079
Interest Rate Contracts	166,944,566	147,739,476	124,850,181	240,567,304	204,389,293
Foreign Exchange Contracts	13,741,935	10,934,529	7,110,309	18,778,229	7,006,939
Equity, Comm & Oth Contracts	0	166,506	343,956	1,859,844	1,935,847
Non-Traded	201,735,632	192,294,922	156,937,755	18,292,922	14,372,913
Interest Rate Contracts	199,545,248	191,710,024	156,937,755	18,292,922	14,372,913
Foreign Exchange Contracts	946,116	17,202	0	0	0
Equity, Comm & Oth Contracts	1,244,268	567,696	0	0	0
Memo: Marked-to-Market	201,735,632	192,294,922	156,937,755	18,292,922	14,372,913
Derivative Contracts (RBC Def)	210,943,017	217,157,669	197,018,218	167,228,630	133,977,428
One Year or Less	77,920,210	72,732,782	48,996,720	46,071,606	38,563,314
Over 1 Year to 5 Years	73,556,419	89,727,825	95,570,823	73,154,678	56,598,305
Over 5 Years	59,466,388	54,697,062	52,450,675	48,002,346	38,815,809
Gross Negative Fair Value	4,137,197	6,490,121	3,656,481	2,272,112	1,104,679
Gross Positive Fair Value	4,867,087	7,782,846	3,840,890	2,751,259	1,239,643
Held-for-Trading	3,440,682	4,233,991	2,673,245	2,274,623	1,143,962
Non-Traded	1,426,405	3,548,855	1,167,645	476,636	95,681
Memo: Marked-to-Market	1,426,405	3,548,855	1,167,645	476,636	95,681
Curr Credit Exp on RBC Derivatives Contr	2,524,325	3,049,579	2,264,896	2,751,259	1,232,240
Credit Losses Off_BS Derivatives	1,144	1,165	23,917	110	28
Past Due Derivatives Instruments:					
Fair Value Carried as Assets	9	0	17	130	0
Impact Nontraded Derivatives Contracts:					
Increase (Decr) in Interest Inc	N/A	N/A	N/A	N/A	N/A
Increase (Decr) in Interest Exp	N/A	N/A	N/A	N/A	N/A
Increase (Decr) in Nonint ALLOC	N/A	N/A	N/A	N/A	N/A
Increase (Decr) in Net Income	N/A	N/A	N/A	N/A	N/A

FDIC Certificate # 6384 **FRB District/ID_RSSD 3 / 817824** **PNC BANK, NATIONAL ASSOCIATION; WILMINGTON, DE** **Derivative**
OCC Charter # 1316 **County: NEW CASTLE** **Derivative Analysis–Page 5B** **Analysis**

	12/31/2013			**12/31/2012**			**12/31/2009**			**12/31/2007**			**12/31/2006**		
Percent of Notional Amounts	BANK	PG 1	PCT	BANK	PG 1	PCT	BANK	PG 1	PCT	BANK	PG 1	PCT	BANK	PG 1	PCT
Interest Rate Contracts	95.83	84.26	31	96.67	84.72	34	97.42	87.46	35	92.62	70.89	31	96.07	69.43	35
Foreign Exchange Contracts	3.84	4.50	75	3.12	5.02	73	2.46	3.31	73	6.72	5.93	76	3.08	7.18	72
Equity, Comm & Oth Contracts	0.33	0.75	79	0.21	1.03	75	0.12	0.99	76	0.67	1.48	75	0.85	1.23	79
Derivatives Position															
Futures and Forwards	19.24	16.29	69	22.70	21.45	60	18.70	15.09	67	19.06	17.65	66	8.84	18.61	51
Written Options	12.81	9.23	71	7.95	12.02	52	9.55	9.96	67	16.69	7.59	82	28.99	6.71	90
Exchange Traded	10.66	0.02	99	5.44	0.02	98	1.95	0.05	95	8.87	0.04	98	17.02	0.07	98
Over-the-Counter	2.15	8.98	39	2.51	11.82	31	7.60	9.63	64	7.82	7.18	67	11.97	5.94	81
Purchased Options	10.05	3.28	83	9.74	2.90	85	12.83	3.43	86	15.39	5.72	83	23.97	4.69	92
Exchange Traded	7.57	0.02	99	4.60	0.02	98	4.47	0.05	98	5.13	0.06	98	10.63	0.09	98
Over-the-Counter	2.48	3.12	62	5.14	2.74	75	8.36	3.12	81	10.26	5.07	79	13.34	4.13	84
Swaps	57.90	56.85	36	59.61	49.33	47	58.92	54.55	34	48.87	50.37	35	38.21	48.36	32
Held-for-Trading	47.25	37.43	53	45.24	32.78	55	45.74	36.60	51	93.46	33.56	80	93.69	28.80	83
Interest Rate Contracts	43.65	32.60	58	42.07	28.99	60	43.16	32.27	53	86.07	25.45	87	89.76	21.48	91
Foreign Exchange Contracts	3.59	2.12	81	3.11	2.45	79	2.46	1.65	78	6.72	2.84	82	3.08	3.40	78
Equity, Comm & Oth Contracts	0.00	0.16	85	0.05	0.23	84	0.12	0.35	82	0.67	0.39	84	0.85	0.30	85
Non-Traded	52.75	23.42	46	54.76	25.93	44	54.26	25.80	48	6.54	32.57	19	6.31	35.34	16
Interest Rate Contracts	52.18	26.44	50	54.60	33.48	48	54.26	32.21	52	6.54	35.03	24	6.31	38.64	21
Foreign Exchange Contracts	0.25	0.38	85	0.00	0.42	76	0.00	0.18	77	0.00	0.31	76	0.00	0.43	74
Equity, Comm & Oth Contracts	0.33	0.13	89	0.16	0.26	87	0.00	0.10	86	0.00	0.11	85	0.00	0.09	87
Memo: Marked-to-Market	52.75	23.42	46	54.76	25.93	44	54.26	25.80	48	6.54	32.57	19	6.31	35.34	16
Derivative Contracts (RBC Def)	55.16	80.47	15	61.84	76.84	24	68.12	77.74	25	59.83	80.01	14	58.84	79.59	14
One Year or Less	20.38	21.17	61	20.71	27.80	46	16.94	25.11	46	16.48	24.26	44	16.94	22.72	45
Over 1 Year to 5 Years	19.23	25.09	41	25.55	22.43	53	33.04	30.69	48	26.17	31.13	42	24.86	29.11	43
Over 5 Years	15.55	24.57	41	15.58	17.01	52	18.13	13.89	61	17.17	16.71	55	17.05	18.53	55
Gross Negative Fair Value	1.08	1.17	46	1.85	1.79	50	1.26	1.64	40	0.81	1.04	43	0.49	0.64	47
Gross Positive Fair Value	1.27	1.29	54	2.22	1.55	67	1.33	1.53	41	0.98	1.17	45	0.54	0.75	41
By Tier One Capital:															
Gross Negative Fair Value (x)	0.14	0.02	94	0.23	0.03	93	0.15	0.03	90	0.29	0.03	93	0.18	0.02	93
Gross Positive Fair Value (x)	0.17	0.02	93	0.27	0.03	93	0.16	0.04	89	0.35	0.04	93	0.20	0.02	92
Held-for-Trading (x)	6.29	0.75	93	5.60	0.97	91	5.40	1.09	90	33.27	1.31	94	34.64	1.30	94
Non-Traded (x)	7.02	0.41	98	6.78	0.52	97	6.41	0.55	97	2.33	0.79	84	2.33	1.08	80
Non-Traded Marked-to-Mkt(x)	7.02	0.41	98	6.78	0.52	97	6.41	0.55	97	2.33	0.79	84	2.33	1.08	80
Current Credit Exposure (x)	0.09	0.01	92	0.11	0.02	89	0.09	0.03	86	0.35	0.03	93	0.20	0.02	92
Credit Losses on Derivatives	0.00	0.00	92	0.00	0.00	88	0.10	0.00	93	0.00	0.00	95	0.00	0.00	97
Past Due Derivative Instruments:															
Fair Value Carried as Assets	0.00	0.00	96	0.00	0.00	94	0.00	0.00	93	0.00	0.00	97	0.00	0.00	98
Other Ratios:															
Cur Credit Exposure/Risk WT AST	0.96	0.18	91	1.21	0.30	88	1.01	0.38	86	2.65	0.28	93	1.61	0.19	92
Credit Losses on Derivatives/CR Allow	0.03	0.00	92	0.03	0.01	87	0.47	0.02	94	0.02	0.00	95	0.01	0.01	97
Impact Nontraded Derivatives Contracts:															
Incr(Dec) Interest Inc/Net Inc	N/A	0.00	N/A	N/A	0.00	N/A	N/A	0.00	N/A	N/A	0.00	N/A	N/A	0.00	N/A
Incr(Dec) Interest Exp/Net Inc	N/A	0.00	N/A	N/A	0.00	N/A	N/A	0.00	N/A	N/A	0.00	N/A	N/A	0.00	N/A
Incr(Dec) Nonint ALLOC/Net Inc	N/A	0.00	N/A	N/A	0.00	N/A	N/A	0.00	N/A	N/A	0.00	N/A	N/A	0.00	N/A
Incr(Dec) Net Income/Net Inc	N/A	0.00	N/A	N/A	0.00	N/A	N/A	0.00	N/A	N/A	0.00	N/A	N/A	0.00	N/A

FDIC Certificate # 6384 **FRB District/ID_RSSD 3 / 817824** **PNC BANK, NATIONAL ASSOCIATION; WILMINGTON, DE** **Balance Sheet %**
OCC Charter # 1316 **County: NEW CASTLE** **Balance Sheet Percentage Composition–Page 6**

	12/31/2013			12/31/2012			12/31/2009			12/31/2007			12/31/2006		
Percent of Average Assets	BANK	PG 1	PCT	BANK	PG 1	PCT	BANK	PG 1	PCT	BANK	PG 1	PCT	BANK	PG 1	PCT
Loans Held For Sale	1.04	0.46	81	1.06	0.59	79	0.98	0.53	77	2.83	0.85	86	3.15	0.89	86
Loans Not Held For Sale	63.96	62.36	48	61.84	60.54	46	60.58	65.15	29	52.23	64.18	21	55.07	62.16	26
Less: LN&LS Allowance	1.27	0.96	76	1.45	1.12	70	1.95	1.39	77	0.58	0.76	22	0.65	0.73	34
Net Loans & Leases	63.73	62.47	45	61.45	60.71	45	59.61	64.94	28	54.48	65.46	21	57.56	63.50	26
Interest-Bearing Bank Balances	1.97	4.25	38	0.93	4.95	17	1.61	3.68	42	0.00	0.50	15	0.00	0.48	16
Federal Funds Sold & Resales	0.58	0.32	80	0.67	0.38	82	0.92	0.77	70	2.34	2.06	66	1.70	1.79	60
Trading Account Assets	1.07	0.17	91	0.98	0.26	87	0.92	0.40	82	3.53	0.52	89	2.70	0.29	92
Held-to-Maturity Securities	3.56	2.42	70	3.84	2.08	74	2.01	0.97	80	0.00	1.19	35	0.00	1.57	36
Available-for-Sale Securities	16.29	16.94	54	17.87	18.00	57	19.44	14.99	72	23.36	15.57	79	23.55	17.26	76
Total Earning Assets	87.19	90.35	21	85.74	90.05	12	84.50	89.69	8	83.72	89.51	11	85.53	89.75	18
Nonint Cash & Due From Banks	1.49	1.53	45	1.53	1.55	48	1.65	1.86	43	2.84	2.34	75	3.79	2.49	84
Premises, Fix Assts & Cap Leases	1.52	1.16	68	1.62	1.16	71	1.44	1.09	68	1.29	1.12	63	1.44	1.06	69
Other Real Estate Owned	0.25	0.28	59	0.32	0.38	56	0.23	0.26	50	0.02	0.05	39	0.01	0.03	40
Dir & Indir Inv RE Ventures	0.00	0.02	73	0.00	0.02	75	0.00	0.01	76	0.00	0.01	76	0.00	0.01	75
Inv in Unconsolidated Subs	0.00	0.02	66	0.00	0.03	65	0.00	0.01	67	0.00	0.01	73	0.01	0.01	80
Acceptances & Other Assets	9.55	6.20	81	10.78	6.40	90	12.18	6.53	92	12.13	6.56	88	9.22	6.18	79
Total Non-Earning Assets	12.81	9.59	79	14.26	9.95	87	15.50	10.31	91	16.28	10.49	88	14.47	10.25	81
Total Assets	100.00	100.00	99	100.00	100.00	99	100.00	100.00	99	100.00	100.00	99	100.00	100.00	99
Standby Letters of Credit	4.76	1.11	94	5.05	1.15	94	4.99	1.80	87	5.35	2.21	87	7.30	2.29	90
Liabilities															
Demand Deposits	12.39	7.00	86	11.55	6.60	85	6.12	4.99	66	8.35	4.97	84	9.51	5.52	86
All NOW & ATS Accounts	1.10	2.17	39	1.05	2.11	39	1.37	1.82	47	1.47	1.73	52	1.94	1.73	62
Money Market Deposit Accounts	46.97	33.60	74	45.22	32.33	75	40.83	23.60	87	31.98	24.76	69	37.05	24.07	79
Other Savings Deposits	3.99	12.78	27	3.74	11.70	29	3.11	7.22	38	2.09	7.20	26	2.38	8.24	26
Time Deps At or Below Insurance Limit	6.65	12.72	25	8.48	13.81	31	13.27	15.04	47	10.18	12.97	39	10.83	10.51	53
Less: Fully Insured Brokered Deposits	0.03	3.09	23	0.09	2.99	26	1.48	4.92	44	3.57	2.80	69	4.27	2.65	72
Core Deposits	71.05	68.92	45	69.95	67.16	44	63.22	50.56	74	50.49	51.74	38	57.45	51.02	61
Fully Insured Brokered Deposits	0.03	3.09	23	0.09	2.99	26	1.48	4.92	44	3.57	2.80	69	4.27	2.65	72
Time Deps Above Insurance Limit	0.59	3.14	10	0.69	3.36	12	5.64	10.75	19	4.26	11.83	10	6.15	12.79	19
Deposits in Foreign Offices	1.80	0.44	87	2.41	0.63	88	3.83	1.53	81	5.96	1.77	81	4.18	1.74	79
Total Deposits	73.48	79.05	19	73.15	78.11	25	74.16	73.48	50	64.27	72.44	20	72.05	71.92	48
Federal Funds Purch & Repos	1.21	2.31	42	1.24	2.65	41	1.54	4.50	29	6.14	6.37	57	5.23	6.11	47
Total Fed Home Loan Borrowings	3.10	2.88	62	3.31	2.86	65	4.13	4.83	50	6.11	4.18	68	2.18	4.16	44
Total Other Borrowings	5.27	0.56	93	4.65	0.79	91	2.06	1.99	67	6.10	1.62	85	5.33	1.72	84
Memo: Sht Ter N Core Funding	8.10	11.08	40	9.88	11.85	51	10.31	23.93	5	21.00	23.85	42	17.06	24.06	27
Acceptances & Other Liabilities	1.95	1.22	81	2.40	1.41	84	3.30	1.49	90	3.59	1.58	89	4.06	1.63	90
Total Liabilities (Incl Mortg)	85.00	87.79	18	84.74	87.79	17	85.19	88.67	14	86.21	88.64	20	88.84	89.03	38
Subordinated Notes & Debentures	2.20	0.18	97	1.81	0.24	96	2.59	0.50	92	1.56	0.61	77	2.22	0.58	87
Total Bank Capital & Min Int	12.79	11.84	65	13.45	11.83	72	12.23	10.63	71	12.23	10.57	76	8.94	10.18	42
Total Liabilities & Capital	100.00	100.00	99	100.00	100.00	99	100.00	100.00	99	100.00	100.00	99	100.00	100.00	99
Memo: All Brokered Deposits	0.03	3.51	21	0.09	3.46	23	1.48	5.89	39	3.69	3.55	65	4.27	3.62	65
Insured Brokered Deposits	0.03	3.09	23	0.09	2.99	26	1.48	4.92	44	3.57	2.80	69	4.27	2.65	72
Loans HFS as a % Loans	1.60	0.71	80	1.69	0.93	78	1.58	0.82	79	5.14	1.37	87	5.40	1.44	86

FDIC Certificate # 6384 **FRB District/ID_RSSD 3 / 817824** **PNC BANK, NATIONAL ASSOCIATION; WILMINGTON, DE** **Allowance & Loan Mix-a**
OCC Charter # 1316 **County: NEW CASTLE** **Analysis of Credit Allowance and Loan Mix–Page 7**

	12/31/2013			**12/31/2012**			**12/31/2009**			**12/31/2007**			**12/31/2006**		
Analysis Ratios	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**
Loss Provision to Average Assets	0.22	0.14	72	0.34	0.32	63	1.46	1.72	50	0.21	0.30	47	0.14	0.13	55
Recoveries to Prior Credit Loss	27.07	23.98	63	25.71	17.68	77	75.86	14.18	97	24.58	41.56	33	30.09	37.61	44
Net Loss to Average Total LN&LS	0.56	0.30	84	0.72	0.61	67	1.68	1.86	56	0.29	0.29	57	0.28	0.17	75
Gross Loss to Average Total LN&LS	0.82	0.44	84	1.04	0.77	73	1.96	1.99	60	0.35	0.37	56	0.35	0.24	73
Recoveries to Average Total LN&LS	0.26	0.14	84	0.32	0.15	86	0.28	0.10	89	0.06	0.07	53	0.08	0.08	54
LN&LS Allowance to LN&LS Not HFS	1.84	1.44	77	2.17	1.73	74	3.21	2.53	73	1.14	1.25	37	1.12	1.15	48
LN&LS Allowance to Total LN&LS	1.82	1.43	77	2.13	1.68	74	3.16	2.46	75	1.08	1.22	32	1.06	1.11	42
LN&LS Allowance to Net Losses (X)	3.35	8.83	33	3.13	5.00	46	1.87	1.86	65	3.78	6.97	34	3.86	10.85	24
LN&LS Allowance to Nonaccrual LN&LS (X)	1.01	1.68	27	1.20	1.45	45	0.94	0.90	66	1.72	2.60	54	3.67	4.22	60
Earnings Coverage of Net Losses (X)	5.09	16.75	27	3.55	10.28	38	2.28	3.30	58	9.77	16.15	45	11.51	30.60	34
Net Losses by Type of LN&LS															
Real Estate Loans	0.79	0.26	88	1.05	0.64	74	1.41	1.83	54	0.16	0.14	64	0.08	0.05	70
Loans to Finance Comml Real Estate	0.01	0.02	80	0.22	0.41	80	0.66	1.17	74	0.97	0.07	92	0.07	0.00	93
Construction & Land Development	0.99	0.33	78	1.41	1.40	63	3.51	5.10	46	0.44	0.23	77	0.10	0.03	85
1-4 Family Construction	0.00	0.09	64	2.39	1.00	80	9.57	6.74	66	0.22	0.28	63	N/A	0.00	N/A
Other Construction & Land	1.10	0.27	81	1.25	1.46	61	1.31	4.37	35	0.80	0.15	90	N/A	0.00	N/A
Secured by Farmland	–2.58	0.06	1	0.53	0.22	79	0.89	0.28	86	–0.07	0.01	6	0.86	0.02	95
Single & Multifamily Mortgage	0.93	0.29	90	1.15	0.57	79	0.96	1.11	56	0.14	0.12	67	0.08	0.05	67
Home Equity Loans	1.32	0.40	91	1.38	0.77	80	1.01	1.06	57	0.25	0.16	73	0.09	0.08	62
1-4 Family Non-Revolving	0.72	0.31	84	0.98	0.60	75	0.80	1.03	54	0.10	0.10	61	0.07	0.05	71
Multifamily Loans	–0.01	0.12	17	0.91	0.34	80	2.37	0.85	84	–0.05	0.05	4	0.14	0.02	88
Non-Farm Non-Residential Mtg	0.39	0.20	79	0.72	0.41	75	1.66	0.66	85	0.10	0.05	75	0.06	0.03	74
Owner Occupied Nonfarm Nonresidential	0.58	0.19	87	0.94	0.36	85	1.70	0.45	92	0.02	0.04	62	N/A	0.00	N/A
Other Nonfarm Nonresidential	0.27	0.19	72	0.58	0.46	65	1.64	0.79	79	0.12	0.05	81	N/A	0.00	N/A
RE Loans in Foreign Offices	N/A	0.56	N/A	0.00	0.59	70	0.00	0.13	72	N/A	0.00	N/A	N/A	0.00	N/A
Agricultural Loans	–0.84	0.09	3	–0.06	0.13	8	5.62	0.25	99	0.00	0.06	67	–9.22	0.03	0
Commercial and Industrial Loans	0.25	0.33	51	0.22	0.52	36	2.27	1.98	65	0.51	0.37	70	0.41	0.30	70
Lease Financing	–0.10	0.02	14	–0.22	0.18	8	2.07	0.99	81	0.00	0.24	19	0.38	–0.02	81
Loans to Individuals	1.02	0.97	65	1.26	1.10	64	2.29	2.32	61	0.32	0.86	30	0.27	0.65	30
Credit Card Plans	3.73	2.51	71	4.11	2.37	80	6.73	5.86	55	0.07	2.44	22	–0.06	1.96	10
All Other Loans & Leases	0.11	0.22	67	0.14	0.26	64	0.38	1.06	55	0.54	0.36	75	1.37	0.28	88
Loans to Foreign Governments	0.00	0.00	90	0.00	0.00	94	0.00	–0.07	94	0.00	–0.16	94	0.00	0.00	87
Change: Credit Allowance ($000)															
Beginning Balance	4,035,708			4,346,873			1,293,773			534,585			572,482		
Gross Credit Losses	1,583,428			1,870,555			3,155,109			237,608			176,729		
Memo: Loans HFS Write-down	21,667			52,165			20,113			16,131			4,946		
Recoveries	506,277			581,803			443,605			43,444			38,113		
Net Credit Losses	1,077,151			1,288,752			2,711,504			194,164			138,616		
Provision: Loan & Lease Losses	651,026			977,178			3,969,456			256,273			120,423		
Other Adjustments	–918			409			2,511,942			137,446			–19,704		
LN&LS Allowance	3,608,665			4,035,708			5,063,667			734,140			534,585		
Average Total Loans & Leases	192,826,560			179,591,931			161,223,757			67,047,976			50,231,115		

FDIC Certificate # 6384 **FRB District/ID_RSSD 3 / 817824** **PNC BANK, NATIONAL ASSOCIATION; WILMINGTON, DE** **Allowance & Loan Mix-b**
OCC Charter # 1316 **County: NEW CASTLE** **Analysis of Credit Allowance and Loan Mix–Page 7A**

	12/31/2013			**12/31/2012**			**12/31/2009**			**12/31/2007**			**12/31/2006**		
Loan Mix, % Average Gross LN&LS	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**
Construction & Development	3.63	4.28	51	3.58	4.73	46	5.95	9.38	36	6.54	12.58	32	3.34	9.83	25
1-4 Family Construction	0.35	0.78	43	0.52	0.81	47	1.58	2.14	48	4.09	3.56	62	N/A	0.00	N/A
Other Const & Land Development	3.28	3.19	58	3.06	3.55	52	4.37	6.94	38	2.45	8.57	23	N/A	0.00	N/A
1-4 Family Residential	27.60	24.19	58	29.25	25.60	61	35.21	23.00	80	34.22	23.18	74	39.61	24.79	79
Home Equity Loans	11.68	4.49	93	13.24	4.92	95	15.11	4.75	95	9.59	4.28	81	11.85	4.74	89
Other Real Estate Loans	12.60	30.78	15	13.33	29.57	18	15.17	26.13	25	13.24	23.84	22	7.88	23.19	15
Farmland	0.09	0.69	39	0.10	0.72	38	0.20	0.58	45	0.15	0.52	44	0.02	0.44	33
Multifamily	1.37	3.12	26	1.60	2.77	33	1.74	2.11	49	0.97	1.93	32	0.92	2.01	31
Non-Farm Non-Residential	11.14	25.08	18	11.63	24.72	19	13.23	22.61	25	12.13	20.16	23	6.94	19.34	16
Owner Occupied Non-Farm Non-Residential	4.22	9.69	23	4.49	9.60	26	4.70	8.70	30	2.79	7.74	22	N/A	0.00	N/A
Other Non-Farm Non-Residential	6.92	14.34	20	7.14	13.32	22	8.53	12.12	32	9.33	11.73	40	N/A	0.00	N/A
Total Real Estate	43.84	62.75	18	46.16	63.57	20	56.33	63.56	28	54.00	63.99	26	50.83	62.95	25
Financial Institution Loans	0.07	0.05	81	0.09	0.07	80	0.19	0.16	78	0.14	0.17	75	0.10	0.19	76
Agricultural Loans	0.05	0.41	47	0.05	0.44	47	0.09	0.36	51	0.01	0.35	40	0.00	0.31	33
Commercial & Industrial Loans	28.77	20.14	77	28.45	19.39	79	25.62	19.05	77	30.07	19.63	83	31.50	18.97	84
Loans to Individuals	13.03	5.54	80	13.23	6.11	78	10.73	6.58	72	7.42	6.90	60	7.67	7.47	59
Credit Card Loans	1.93	0.35	90	2.03	0.41	89	1.34	0.40	85	0.00	0.40	48	0.00	0.41	53
Municipal Loans	5.35	1.08	92	3.83	0.99	90	0.96	0.64	71	1.39	0.50	84	1.51	0.45	86
Foreign Office Loans & Leases	1.11	0.24	88	0.95	0.26	87	0.88	0.30	87	1.60	0.45	87	2.58	0.44	88
All Other Loans	4.27	2.19	82	3.78	1.92	84	2.14	1.63	74	3.64	1.53	84	3.56	1.62	83
Lease Financing Receivables	3.51	0.78	88	3.45	0.80	85	3.05	0.90	85	1.71	1.19	70	2.25	1.26	74
Supplemental:															
Loans to Foreign Governments	0.00	0.00	91	0.00	0.00	92	0.01	0.00	92	0.00	0.00	92	0.00	0.00	89
Loans to Finance Comml Real Est	2.91	0.43	94	2.54	0.43	92	1.41	0.56	82	3.19	0.51	94	4.25	0.39	97
Memorandum (% of Avg Tot Loans):															
Loans & Lease Commitments	69.61	33.04	89	69.10	32.27	89	65.59	30.07	88	80.81	41.36	88	92.56	44.21	89
Officer, Shareholder Loans	0.00	0.50	17	0.00	0.53	16	0.01	0.57	18	0.03	0.65	26	0.04	0.65	30
Officer, Shareholder Loans to Assets	0.00	0.31	17	0.00	0.32	17	0.00	0.37	20	0.02	0.43	25	0.02	0.41	29
Other Real Estate Owned % Assets															
Construction & Land Development	0.05	0.11	53	0.09	0.16	54	0.07	0.12	53	0.00	0.01	46	0.00	0.00	66
Farmland	0.00	0.00	81	0.00	0.00	75	0.00	0.00	79	0.01	0.00	98	0.00	0.00	87
1-4 Family	0.05	0.05	67	0.06	0.07	62	0.06	0.06	59	0.01	0.02	52	0.01	0.01	55
Multifamily	0.01	0.00	74	0.01	0.01	65	0.04	0.01	91	0.00	0.00	75	0.00	0.00	80
Non-Farm Non-Residential	0.03	0.08	45	0.05	0.09	47	0.02	0.04	38	0.00	0.01	43	0.00	0.01	53
Foreclosed GNMA	0.11	0.00	96	0.11	0.00	96	0.04	0.00	96	0.00	0.00	91	0.00	0.00	91
Foreign Offices	0.00	0.00	89	0.00	0.00	88	0.00	0.00	93	0.00	0.00	91	0.00	0.00	90
Subtotal	0.25	0.28	59	0.32	0.38	56	0.23	0.26	50	0.02	0.05	39	0.01	0.03	40
Direct and Indirect Inv	0.00	0.02	73	0.00	0.02	75	0.00	0.01	76	0.00	0.01	76	0.00	0.01	75
Total	0.25	0.33	52	0.32	0.43	50	0.23	0.29	46	0.02	0.08	31	0.01	0.05	34
Asset Servicing % Assets															
Mortgage Servicing w/ Recourse	1.05	0.04	94	1.51	0.06	95	3.63	0.05	97	0.00	0.04	73	0.00	0.09	69
Mortgage Servicing w/o Recourse	36.37	7.70	88	39.86	8.13	88	56.90	7.71	93	1.79	6.73	56	1.64	6.58	56
Other Financial Assets	107.55	1.06	99	103.73	1.03	98	119.67	1.39	98	213.33	1.29	99	231.61	1.03	99
Total	144.97	10.04	97	145.10	10.57	97	180.20	11.52	97	215.12	10.09	97	233.25	9.62	97

FDIC Certificate # 6384 FRB District/ID_RSSD 3 / 817824 PNC BANK, NATIONAL ASSOCIATION; WILMINGTON, DE Concentrations of Credit
OCC Charter # 1316 County: NEW CASTLE Analysis of Concentrations of Credit–Page 7B

	12/31/2013			12/31/2012			12/31/2009			12/31/2007			12/31/2006		
Loan & Leases as a % of Total Capital	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**
Construction & Development	20.74	26.63	49	17.81	24.74	42	29.36	61.76	30	41.27	95.63	29	22.20	76.16	24
1-4 Family Construction	1.02	4.96	29	2.53	4.62	45	7.80	12.35	43	25.30	25.97	56	N/A	0.00	N/A
Other Const & Land Development	19.72	19.72	55	15.28	19.63	46	21.56	47.14	31	15.97	63.30	20	N/A	0.00	N/A
1-4 Family Residential	140.79	145.98	50	149.52	155.66	49	173.78	163.01	53	215.82	165.41	67	223.96	170.96	67
Home Equity Loans	57.75	27.50	83	65.95	28.70	85	74.59	34.95	82	61.26	31.90	79	68.88	32.14	79
Other Real Estate Loans	66.04	191.49	14	69.56	177.04	17	74.89	193.69	19	87.63	178.77	22	49.44	164.84	16
Farmland	0.43	4.20	36	0.50	4.23	36	1.00	4.44	43	0.92	3.92	42	0.08	3.15	32
Multifamily	7.09	20.12	25	8.59	17.26	33	8.61	16.42	37	6.76	14.31	34	4.92	13.88	29
Non-Farm Non-Residential	58.51	154.53	15	60.47	146.67	17	65.28	158.09	19	79.95	152.66	22	44.44	131.90	17
Owner Occupied Non-Farm Non-Residential	22.38	59.56	21	23.01	56.71	23	23.20	63.52	24	17.47	59.25	21	N/A	0.00	N/A
Other Non-Farm Non-Residential	36.13	88.97	21	37.47	79.30	23	42.08	92.36	25	62.48	88.38	36	N/A	0.00	N/A
Total Real Estate	227.56	381.98	18	236.89	373.20	20	278.03	443.51	23	344.72	471.06	25	295.61	449.20	21
Financial Institution Loans	0.32	0.29	81	0.47	0.29	84	0.92	0.59	79	1.22	1.14	78	0.72	1.03	76
Agricultural Loans	0.31	2.64	47	0.31	2.64	47	0.44	2.79	50	0.07	2.54	38	0.01	2.25	33
Commercial & Industrial Loans	151.75	121.92	71	151.26	117.52	71	126.46	118.31	60	195.12	138.03	79	192.86	125.82	80
Loans to Individuals	69.88	34.41	77	69.83	36.44	76	52.94	43.94	64	47.29	48.15	62	44.40	50.37	56
Credit Card Loans	10.44	2.11	89	10.69	2.44	87	6.59	2.56	82	0.01	2.87	52	0.01	2.78	54
Municipal Loans	30.59	7.49	89	25.83	6.69	89	4.75	4.82	60	8.73	3.87	78	7.85	3.22	80
Foreign Office Loans & Leases	7.11	1.05	89	4.49	1.05	88	4.36	1.43	88	10.14	2.81	87	15.36	2.35	88
All Other Loans	22.23	12.56	77	21.53	10.23	82	10.58	8.72	64	25.17	10.40	82	17.86	8.88	79
Lease Financing Receivables	17.88	4.55	88	20.03	4.60	88	15.06	5.04	81	10.71	8.05	69	13.52	7.61	74
Supplemental:															
Loans to Foreign Governments	0.00	0.01	91	0.01	0.00	92	0.03	0.00	93	0.02	0.00	92	0.03	0.00	91
Loans to Finance Commercial Real Estate	16.53	2.52	93	14.66	2.48	93	6.97	3.41	76	20.39	3.73	93	22.77	2.73	96
Commercial Real Estate Loans as a % of Total Capital:															
Non-owner OCC Commercial Real Estate	80.49	150.08	25	78.52	137.59	26	87.02	191.75	22	130.89	219.20	25	N/A	0.00	N/A
Total Commercial Real Estate	102.87	218.95	19	101.53	202.91	21	110.22	261.76	21	148.37	283.80	22	94.34	253.26	18
Commercial Real Estate Loans as a % of Total LN&LS:															
Construction & Development	3.93	4.27	55	3.36	4.11	47	5.95	8.53	36	6.42	12.60	31	3.78	10.51	27
Non-owner OCC Commercial Real Estate	15.25	24.33	28	14.80	23.00	28	17.64	27.21	29	20.36	29.16	31	N/A	0.00	N/A
Total Commercial Real Estate	19.50	35.31	22	19.13	33.71	22	22.34	37.84	25	23.08	37.88	26	16.05	35.27	21

FDIC Certificate # 6384 FRB District/ID_RSSD 3 / 817824 PNC BANK, NATIONAL ASSOCIATION; WILMINGTON, DE PD, Nonacc & Rest Loans-a
OCC Charter # 1316 County: NEW CASTLE Analysis of Past Due, Nonaccrual & Restructured–Page 8

	12/31/2013			12/31/2012			12/31/2009			12/31/2007			12/31/2006		
% of Non-Current LN&LS by Loan Type	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**
Real Estate LNS-90+ Days P/D	2.41	0.41	91	4.09	0.66	90	5.62	0.45	97	0.18	0.13	68	0.13	0.09	73
–Nonaccrual	3.84	1.46	92	3.61	2.16	82	4.24	4.79	53	0.76	0.89	48	0.24	0.41	36
–Total	6.25	2.04	92	7.70	3.12	87	9.85	5.61	83	0.94	1.09	51	0.37	0.55	41
–30-89 DAYS P/D	0.95	0.65	76	1.49	0.88	82	2.71	1.32	86	0.63	1.00	33	0.37	0.68	29
LNS Fin Coml RE-90+ Days P/D	0.01	0.00	91	0.00	0.00	90	0.00	0.07	81	0.09	0.00	93	0.01	0.00	90
–Nonaccrual	0.09	0.23	75	0.19	0.23	74	2.38	1.52	73	0.73	0.13	88	0.01	0.03	78
–Total	0.10	0.24	73	0.19	0.28	72	2.38	1.71	73	0.82	0.16	87	0.03	0.06	76
–30-89 DAYS P/D	0.02	0.04	81	0.03	0.08	75	0.94	0.45	81	0.66	0.27	78	0.01	0.17	65
Const & Land Dev-90+ Days P/D	3.49	0.47	92	9.04	1.08	92	14.24	0.43	98	0.36	0.11	86	0.02	0.03	67
–Nonaccrual	2.32	2.37	58	5.05	5.29	57	19.69	15.12	72	4.00	1.83	82	0.39	0.36	63
–Total	5.80	3.45	77	14.08	7.56	80	33.92	16.07	82	4.35	2.02	79	0.41	0.44	60
–30-89 DAYS P/D	0.77	0.35	80	1.41	0.93	75	6.78	1.69	94	1.47	1.45	56	0.01	0.72	19
1-4 Fam Cons & L Dev-90+ Days P/D	9.31	0.50	93	10.91	0.99	92	27.08	0.54	99	0.37	0.15	80	N/A	0.00	N/A
–Nonaccrual	8.39	2.19	86	8.71	4.40	78	29.10	18.69	71	5.47	2.56	83	N/A	0.00	N/A
–Total	17.70	3.56	90	19.62	6.84	84	56.18	20.08	90	5.84	2.86	81	N/A	0.00	N/A
–30-89 DAYS P/D	0.00	0.32	51	0.27	0.72	54	5.02	2.07	81	2.34	1.76	64	N/A	0.00	N/A
Other Const & Land Dev-90+ Days P/D	3.19	0.45	91	8.73	1.09	92	9.60	0.39	97	0.34	0.08	86	N/A	0.00	N/A
–Nonaccrual	2.00	2.35	55	4.44	5.29	52	16.28	12.95	71	1.66	1.28	68	N/A	0.00	N/A
–Total	5.19	3.42	71	13.16	7.70	78	25.88	13.82	80	1.99	1.42	70	N/A	0.00	N/A
–30-89 DAYS P/D	0.81	0.34	82	1.60	0.88	77	7.41	1.57	96	0.09	1.19	28	N/A	0.00	N/A
Single & Multi Mtg-90+ Days P/D	2.88	0.46	91	4.66	0.67	91	5.74	0.53	95	0.21	0.16	68	0.14	0.13	68
–Nonaccrual	4.61	1.43	93	3.53	1.83	82	1.68	2.80	39	0.18	0.63	24	0.19	0.36	39
–Total	7.49	2.09	92	8.19	2.74	91	7.42	3.60	83	0.39	0.91	28	0.33	0.54	38
–30-89 DAYS P/D	1.25	0.87	73	1.78	1.00	81	2.36	1.49	77	0.50	0.95	27	0.34	0.74	30
Non-Farm Non-Res Mtg-90+ Days P/D	0.83	0.19	86	1.15	0.27	88	1.43	0.11	94	0.02	0.04	64	0.12	0.02	90
–Nonaccrual	2.40	1.17	85	3.33	1.65	85	4.39	3.05	70	0.71	0.50	70	0.40	0.43	50
–Total	3.23	1.47	86	4.48	2.27	86	5.82	3.28	78	0.73	0.57	68	0.52	0.47	58
–30-89 DAYS P/D	0.29	0.35	48	0.78	0.48	75	1.89	0.83	85	0.57	0.50	66	0.66	0.40	75
Own Occ Non-Farm Non-Res-90+ Days P/D	0.91	0.19	86	1.45	0.31	88	0.57	0.07	93	0.01	0.04	60	N/A	0.00	N/A
–Nonaccrual	2.23	1.26	79	2.85	1.79	75	3.79	2.34	75	0.91	0.53	72	N/A	0.00	N/A
–Total	3.14	1.59	81	4.30	2.46	83	4.35	2.45	77	0.92	0.59	69	N/A	0.00	N/A
–30-89 DAYS P/D	0.41	0.42	57	0.66	0.54	67	1.42	0.74	79	0.36	0.43	48	N/A	0.00	N/A
Other Non-Farm Non-Res-90+ Days P/D	0.79	0.19	86	0.96	0.33	85	1.90	0.13	94	0.03	0.03	72	N/A	0.00	N/A
–Nonaccrual	2.51	1.11	84	3.63	1.63	85	4.72	3.39	67	0.65	0.47	71	N/A	0.00	N/A
–Total	3.30	1.46	85	4.59	2.19	83	6.62	3.70	77	0.68	0.55	68	N/A	0.00	N/A
–30-89 DAYS P/D	0.22	0.30	52	0.86	0.48	78	2.15	0.87	85	0.63	0.53	68	N/A	0.00	N/A
Non-Current LN&LS ($000)															
90 Days and Over Past Due			2,509,844			3,931,988			5,635,665			108,023			57,584
Total Nonaccrual LN&LS			3,563,833			3,375,508			5,375,446			425,898			145,591
Total Non-Current LN&LS			6,073,677			7,307,496			11,011,111			533,921			203,175
LN&LS 30-89 Days Past Due			1,285,872			1,802,366			3,440,995			395,152			173,243
Gtyd LN&LS 90+ Days P/D			328,121			328,740			77,996			7,647			8,911
Gtyd LN&LS on Nonaccrual			5,046			10,803			18,746			421			312
Gtyd LN&LS 30-89 Days P/D			243,053			296,483			118,808			8,384			16,527
Restructured LN&LS 90+ Days P/D			8,607			9,411			150,163			0			0
Restructured LN&LS Nonaccrual			1,511,223			1,592,215			31,959			0			0
Restructured LN&LS 30-89 Days P/D			43,691			0			193,580			0			0
Current 1-4 Family Restru LN&LS			782,667			781,913			1,185,659			N/A			N/A
Current Other Restructured LN&LS			393,541			480,854			1,569			0			0
Loans Secured 1-4 RE in Foreclosure			1,678,240			2,289,804			2,447,302			N/A			N/A
Other Real Estate Owned			604,503			887,467			596,262			27,361			12,542

FDIC Certificate # 6384 FRB District/ID_RSSD 3 / 817824 PNC BANK, NATIONAL ASSOCIATION; WILMINGTON, DE PD, Nonacc & Rest Loans-b
OCC Charter # 1316 County: NEW CASTLE Analysis of Past Due, Nonaccrual & Restructured–Page 8A

	12/31/2013			12/31/2012			12/31/2009			12/31/2007			12/31/2006		
% of Non-Current LN&LS by Loan Type	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**
Coml & Indust LNS-90+ Days P/D	0.08	0.05	73	0.13	0.10	73	0.81	0.12	94	0.11	0.05	77	0.05	0.05	66
–Nonaccrual	0.36	0.64	39	0.47	0.89	34	3.01	2.49	67	0.67	0.51	67	0.51	0.48	56
–Total	0.43	0.74	38	0.60	1.13	37	3.82	2.68	75	0.78	0.60	69	0.56	0.56	55
–30-89 DAYS P/D	0.09	0.27	28	0.18	0.37	34	1.15	0.82	71	0.54	0.62	51	0.26	0.49	35
Loans to Individuals-90+ Days P/D	1.58	0.14	94	1.68	0.16	95	0.99	0.21	89	0.26	0.11	81	0.30	0.09	88
–Nonaccrual	0.27	0.25	67	0.20	0.29	54	0.20	0.49	46	0.01	0.16	33	0.01	0.11	33
–Total	1.85	0.48	90	1.88	0.56	89	1.19	0.84	70	0.27	0.33	56	0.31	0.23	69
–30-89 DAYS P/D	1.47	0.99	72	1.66	1.09	74	1.69	1.63	52	0.87	1.26	35	0.82	1.15	33
Credit Card Plans-90+ Days P/D	0.87	0.45	73	0.95	0.50	72	2.38	0.91	80	0.99	0.59	66	1.81	0.76	84
–Nonaccrual	0.00	0.10	74	0.00	0.17	73	0.00	0.40	71	0.00	0.24	70	0.00	0.15	72
–Total	0.87	0.68	61	0.95	0.79	61	2.38	1.55	70	0.99	0.97	50	1.81	1.06	78
–30-89 DAYS P/D	1.10	0.98	56	1.35	1.09	64	3.19	1.87	80	8.27	1.51	96	7.56	1.50	95
Lease Financing-90+ Days P/D	0.00	0.01	79	0.03	0.01	87	0.11	0.04	81	0.04	0.03	76	0.00	0.02	70
–Nonaccrual	0.06	0.22	62	0.18	0.50	61	2.18	1.56	76	0.10	0.23	61	0.01	0.21	51
–Total	0.06	0.25	58	0.20	0.52	61	2.29	1.64	75	0.14	0.30	59	0.01	0.27	44
–30-89 DAYS P/D	0.43	0.35	74	0.25	0.29	66	2.23	0.95	83	0.13	0.69	48	0.07	0.47	45
Agricultural LNS-90+ Days P/D	0.00	0.02	82	0.29	0.01	93	0.06	0.01	89	0.00	0.02	79	0.00	0.01	84
–Nonaccrual	0.52	0.28	82	0.08	0.36	55	15.81	0.90	99	0.00	0.31	54	0.00	0.28	54
–Total	0.52	0.58	75	0.36	0.48	69	15.87	0.93	98	0.00	0.36	50	0.00	0.31	53
–30-89 DAYS P/D	0.83	0.16	88	0.06	0.23	61	4.38	0.49	96	0.42	0.23	76	0.00	0.27	52
Other LN&LS-90+ Days P/D	0.09	0.02	89	0.02	0.01	81	0.31	0.02	94	0.10	0.02	87	0.23	0.02	92
–Nonaccrual	0.03	0.17	61	0.02	0.17	50	2.25	0.58	87	0.17	0.10	78	0.02	0.07	63
–Total	0.12	0.23	62	0.03	0.25	45	2.56	0.67	86	0.28	0.16	79	0.25	0.13	80
–30-89 DAYS P/D	0.06	0.15	58	0.08	0.18	60	0.95	0.54	81	0.15	0.29	57	0.20	0.29	60
Total LN&LS-90+ Days Past Due	1.27	0.29	87	2.07	0.47	87	3.52	0.35	96	0.16	0.13	66	0.11	0.09	66
–Nonaccrual	1.80	1.05	82	1.78	1.54	65	3.35	3.77	54	0.62	0.77	47	0.29	0.38	40
–Total	3.06	1.46	88	3.85	2.22	83	6.87	4.33	80	0.78	0.96	47	0.40	0.51	42
–30-89 DAYS P/D	0.65	0.59	62	0.95	0.77	68	2.15	1.32	80	0.58	0.96	27	0.34	0.73	26
Other Pertinent Ratios:															
Non-Cur LN&LS to-LN&LS Allowance	168.31	107.51	78	181.07	133.06	73	217.45	167.33	76	72.73	80.55	51	38.01	45.81	44
–Equity Capital	16.64	8.01	88	20.15	11.69	82	38.62	28.10	76	4.23	6.56	39	3.01	3.41	50
% Total P/D LN&LS-Incl Nonaccrual	3.71	2.08	87	4.80	3.00	80	9.02	5.72	79	1.36	1.96	35	0.75	1.32	28
Non Curr LNS+OREO to LNS+OREO	3.36	1.88	82	4.30	2.79	78	7.22	4.90	78	0.82	1.08	42	0.43	0.57	39
Non-Curr Restruct Debt/Gr LN&LS	0.77	0.34	82	0.84	0.51	77	0.11	0.28	48	0.00	0.01	70	0.00	0.00	77
Curr+Non-Curr Restruct/GR LN&LS	1.36	1.06	70	1.51	1.32	65	0.85	0.71	65	0.00	0.02	54	0.00	0.01	61
Current Restruct LN&LS	0.59	0.64	59	0.67	0.78	56	0.74	0.39	72	0.00	0.01	70	0.00	0.01	68
Loans Sec 1-4 Fam RE in Forclosure as % Total Loans Sec 1-4 Fam RE	3.17	0.79	89	4.28	1.07	88	4.34	1.21	90	N/A	0.00	N/A	N/A	0.00	N/A
Gtyd LN&LS 90+ P/D/LN&LS 90+ P/D	13.07	15.39	69	8.36	14.99	67	1.38	5.96	68	7.08	2.15	86	15.47	2.60	90
Gtyd Nonaccrual LN&LS/Nonaccrual LN&LS	0.14	3.95	39	0.32	3.19	46	0.35	1.73	55	0.10	1.46	41	0.21	2.45	41
Gtyd LN&LS 30-89 P/D/LN&LS 30-89 P/D	18.90	5.84	85	16.45	6.89	79	3.45	3.27	78	2.12	0.92	81	9.54	1.17	93

FDIC Certificate # 6384 FRB District/ID_RSSD 3 / 817824 PNC BANK, NATIONAL ASSOCIATION; WILMINGTON, DE Interest Rate Risk
OCC Charter # 1316 County: NEW CASTLE Interest Rate Risk Analysis as a Percent of Assets–Page 9

	12/31/2013			12/31/2012			12/31/2009			12/31/2007			12/31/2006		
Long Assets Insts w/Options	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**
Mortgage Loans & Pass Thrus	15.58	17.15	49	16.32	17.55	49	13.84	15.72	44	23.89	14.55	82	26.79	15.82	81
Loans & Securities Over 15 Years	7.25	4.62	77	7.94	4.92	76	7.82	4.24	78	5.76	3.53	75	4.85	3.78	72
Loans & Securities 5-15 Years	3.68	5.56	40	3.51	5.32	39	2.33	3.86	40	4.67	3.70	68	3.50	4.13	50
Other Loans and Securities	60.43	60.30	47	60.77	57.46	58	57.02	58.50	42	47.19	62.72	17	47.63	61.83	17
Loans & Securities Over 15 Years	2.52	2.00	64	2.10	1.92	59	2.32	1.67	67	4.09	1.72	82	4.77	1.78	85
Loans & Securities 5-15 Years	9.68	10.29	53	9.02	8.73	56	9.55	6.43	76	7.62	7.18	59	8.01	7.15	62
Total Loans & Securities Over 15 Years	9.77	7.06	72	10.04	7.30	69	10.13	6.25	75	9.85	5.53	78	9.62	5.86	77
CMO'S Total	6.08	4.94	63	6.74	5.29	62	9.97	3.61	86	6.34	3.57	73	5.51	4.11	66
Avg Life Over 3 Years	4.35	3.49	62	4.50	2.30	77	6.37	1.55	92	4.85	2.19	82	4.55	2.46	78
Structured Notes	0.00	0.10	71	0.00	0.11	73	0.00	0.07	70	0.00	0.06	74	0.00	0.06	74
Mortgage Servicing (FV)	0.53	0.08	92	0.37	0.07	89	0.98	0.08	95	0.62	0.09	93	0.61	0.08	93
Total	0.53	0.24	79	0.37	0.22	75	0.98	0.21	88	0.62	0.21	83	0.61	0.20	84
Overall Risk Indicators															
Available for Sale	15.64	15.96	57	17.27	17.50	57	19.44	15.61	70	23.49	14.93	81	24.60	16.55	78
Held to Maturity	3.77	2.82	68	3.51	2.11	71	2.01	0.97	77	0.00	1.07	40	0.00	1.41	38
Off Balance Sheet	53.60	25.31	89	54.24	24.80	88	62.33	26.27	87	69.54	36.83	87	73.41	37.63	86
Unrealized Appreciation/Depreciation	0.03	–0.04	91	0.17	0.07	83	0.12	0.01	92	0.00	0.00	67	0.00	–0.01	74
Unrealized App/Dep % Tier One Cap	0.27	–0.51	92	1.79	0.80	81	1.23	0.13	91	0.00	0.01	65	0.00	–0.13	73
Contractual Mat/Reprice Data															
Loans/Securities Over 3 Year	32.92	42.24	22	32.62	37.54	33	35.06	30.79	61	31.62	30.91	54	30.45	32.79	49
Liabilities Over 3 Year	1.98	2.05	60	1.71	2.21	50	1.62	2.53	46	1.77	2.17	57	2.77	2.29	65
Net Over 3 Year Position	30.94	39.87	22	30.91	35.01	36	33.44	28.17	65	29.85	28.39	56	27.69	29.90	49
Loans/Securities Over 1 Year	37.89	54.70	14	38.09	51.59	17	44.12	45.00	44	37.14	44.37	28	34.72	46.79	17
Liabilities Over 1 Year	5.71	6.45	48	3.61	6.50	37	7.45	8.57	49	6.73	6.51	57	3.94	6.58	38
Net Over 1 Year Position	32.18	47.69	13	34.48	44.69	22	36.67	36.01	46	30.42	37.26	29	30.78	39.31	26
Non-Maturity Deposits	64.27	60.86	53	63.95	58.97	56	51.43	44.28	67	43.19	40.10	60	50.96	42.39	71
Non-Maturity Deps % Long Assets	195.22	153.76	78	196.05	170.86	70	146.71	161.65	52	136.57	146.24	50	167.35	146.53	66
Net Over 3 Year Position	–31.35	–18.23	25	–31.33	–21.00	31	–16.37	–13.04	43	–11.56	–9.07	44	–20.51	–9.64	31
As % Tier 1 Capital															
Structured Notes	0.00	1.04	71	0.00	1.24	73	0.00	0.88	70	0.00	0.76	74	0.00	0.76	74
Mortgage Servicing (FV)	5.71	0.89	92	3.80	0.72	89	10.38	1.06	93	9.89	1.25	93	8.96	1.14	94
Total	5.71	2.57	79	3.80	2.46	75	10.38	2.58	86	9.89	2.95	84	8.96	2.69	86

FDIC Certificate # 6384 FRB District/ID_RSSD 3 / 817824 PNC BANK, NATIONAL ASSOCIATION; WILMINGTON, DE Liquidity & Funding
OCC Charter # 1316 County: NEW CASTLE Liquidity & Funding–Page 10

	12/31/2013			12/31/2012			12/31/2009			12/31/2007			12/31/2006		
Percent of Total Deposits	BANK	PG 1	PCT	BANK	PG 1	PCT	BANK	PG 1	PCT	BANK	PG 1	PCT	BANK	PG 1	PCT
Individ, Partnerships, and Corp.	94.62	91.77	68	93.68	92.16	60	95.43	92.54	67	96.41	92.96	68	96.02	92.95	67
U.S. Govt, States & Political Sub in U.S.	5.17	5.98	43	5.97	5.73	49	3.93	5.12	41	3.28	5.06	40	3.59	4.59	44
Comml Banks & Other Dep Inst. in U.S.	0.20	0.56	56	0.34	0.56	60	0.63	0.60	66	0.30	0.41	64	0.37	0.58	66
Banks in Foreign Countries	0.01	0.05	83	0.01	0.05	84	0.01	0.22	77	0.01	0.16	80	0.02	0.20	78
Foreign Govts and Official Inst.	0.00	0.01	87	0.00	0.01	89	0.00	0.01	85	0.00	0.01	88	0.00	0.02	87
Total deposits	100.00	100.00	99	100.00	100.00	99	100.00	100.00	99	100.00	100.00	99	100.00	100.00	99
Domestic Demand Deposits	17.40	9.16	87	17.13	9.33	88	8.25	7.34	61	13.40	6.86	89	12.68	7.42	86
Domestic Other Transaction Accts	1.63	2.66	43	1.62	2.69	43	1.85	2.74	46	2.45	2.50	56	2.61	2.35	62
Domestic Nontransaction Accts	78.10	85.64	19	79.00	85.43	22	84.74	86.10	33	73.93	86.10	14	78.59	85.65	20
Total Domestic Deposits	97.14	96.64	12	97.74	96.68	13	94.84	93.33	18	89.77	89.74	15	93.87	90.30	21
Deposits in Foreign Offices	2.86	0.55	87	2.26	0.63	86	5.16	1.95	81	10.23	2.82	84	6.13	2.75	78
Total Deposits	100.00	100.00	99	100.00	100.00	99	100.00	100.00	99	100.00	100.00	99	100.00	100.00	99
Liquidity/Funding Ratios															
Net Non Core Fund Dep $250M	9.53	12.89	40	10.60	11.89	49	19.02	30.36	27	36.87	35.94	52	25.99	36.30	33
Net Non Core Fund Dep $100M	11.29	16.46	34	12.65	16.10	39	17.23	29.16	23	32.42	33.98	47	21.15	33.08	27
Core Deposits	70.18	69.41	44	71.13	68.38	44	63.22	53.78	67	49.41	50.70	39	57.94	50.70	63
Short Term Non Core Funding	7.58	10.94	37	8.95	11.26	47	10.31	21.26	12	22.50	25.18	41	16.09	24.04	22
S.T Inv to S.T. Ncore Fund	63.41	81.69	64	23.23	97.90	29	25.49	39.63	50	11.40	24.69	48	13.98	24.72	49
S.T. Asset to S.T. Liabilities	105.98	152.34	52	82.38	167.38	33	73.84	96.62	45	44.37	78.00	21	45.19	78.87	25
Net S.T. Liabilities to Assets	–0.68	–2.30	48	2.40	–3.82	64	4.91	3.87	49	16.53	9.38	67	13.76	8.45	63
Net Loans & Leases to Deposits	86.23	80.33	57	85.68	77.40	61	80.38	84.28	39	85.06	93.33	29	76.08	89.94	22
Net LN&LS to Core Deposits	89.47	92.75	44	88.49	90.49	50	94.29	122.61	23	109.49	140.82	31	95.10	134.19	18
Brkr Dep Mat < 1 Yr to Brkr Deps	0.00	70.02	3	62.83	71.70	29	1.24	72.87	1	6.51	61.77	9	92.00	59.53	60
Brokered Deposits to Deposits	0.00	4.52	18	0.09	4.62	25	1.99	7.53	44	5.80	5.00	66	5.31	5.42	63
Listing Service Dep to Deposits	0.00	0.20	71	0.00	0.13	75	N/A	0.00	N/A	N/A	0.00	N/A	N/A	0.00	N/A
List Service and Brkrd Dep to Deps	0.00	4.99	17	0.09	4.97	23	N/A	0.00	N/A	N/A	0.00	N/A	N/A	0.00	N/A
Sec Bor + sec FFP to Tot Bor + FFP	0.82	5.57	66	0.17	5.92	63	1.07	6.64	61	1.66	3.00	68	7.06	2.81	80
Recip Brkrd Dep to Tot Brkrd Dep	0.00	14.36	44	0.00	12.91	48	0.00	11.27	54	N/A	0.00	N/A	N/A	0.00	N/A
Total Deposits															
Individ, Partnerships, and Corp.	213,604,365			203,050,399			184,218,123			76,515,064			62,683,779		
U.S. Govt, States & Political Sub in U.S.	11,660,896			12,930,246			7,589,902			2,604,668			2,341,503		
Comml Banks & Other Dep Inst. in U.S.	451,721			735,855			1,224,375			235,537			243,624		
Banks in Foreign Countries	20,868			25,871			9,944			11,413			11,000		
Foreign Govts and Official Inst.	1,021			894			797			364			0		
Total Deposits	225,738,871			216,743,265			193,043,141			79,367,046			65,279,906		
Domestic Demand Deposits	39,280,715			37,117,705			15,917,849			10,631,314			8,275,895		
Domestic Other Transaction Accts	3,688,494			3,501,310			3,573,286			1,945,139			1,701,657		
Domestic Nontransaction Accts	176,303,738			171,226,925			163,589,949			58,673,930			51,300,573		
Total Domestic Deposits	219,272,947			211,845,940			183,081,084			71,250,383			61,278,125		
Deposits in Foreign Offices	6,465,924			4,897,325			9,962,057			8,116,663			4,001,781		
Total Deposits	225,738,871			216,743,265			193,043,141			79,367,046			65,279,906		
Other Liquidity/Funding Data															
Non Core Liabilities $250M	39,190,793			32,368,864			47,026,103			38,867,000			20,653,746		
Non Core Liabilities $100M	43,685,952			37,434,680			43,250,104			34,561,219			17,190,029		
Short Term Non Core Funding	23,504,548			26,409,305			26,827,424			28,074,303			14,507,878		
Core Deposits	217,556,482			209,859,330			164,570,179			61,657,625			52,224,180		
Time Deps $250M & Under Mat < 1 Yr	11,720,434			13,868,356			N/A			N/A			N/A		
Time Deps $250M & Under Mat > 1 Yr	6,591,682			7,514,602			N/A			N/A			N/A		
Time Deps over $250M Mat < 1 Yr	1,156,779			1,293,621			N/A			N/A			N/A		
Time Deps over $250M Mat > 1 Yr	559,587			492,002			N/A			N/A			N/A		
Fed Home Loan Bor Mat < 1 Yr	6,092,549			7,960,051			4,230,290			3,634,834			595,584		
Fed Home Loan Bor Mat > 1 Yr	6,819,579			1,476,526			6,531,035			4,751,499			1,561		
Other Borrowing Mat < 1 Year	5,546,515			8,906,811			2,388,397			3,105,607			745,782		
Other Borrowing Mat > 1 Year	11,138,049			6,089,605			2,965,428			4,250,024			4,606,664		
Secured Other Borrowings	218,934			38,037			157,741			301,940			389,281		
Federal Funds Purchased	105,000			107,993			156,887			5,752,252			2,357,194		
Secured Fed Funds Purchased	0			0			0			0			0		
Listing Service Deposits	0			0			N/A			N/A			N/A		
Brokered Deposits	99			200,987			3,840,528			4,605,781			3,463,717		
Reciprocal Brokered Deposits	0			0			0			N/A			N/A		

FDIC Certificate # 6384 FRB District/ID_RSSD 3 / 817824 PNC BANK, NATIONAL ASSOCIATION; WILMINGTON, DE Liquidity & Inv Portfolio
OCC Charter # 1316 County: NEW CASTLE Liquidity & Investment Portfolio–Page 10A

	12/31/2013			**12/31/2012**			**12/31/2009**			**12/31/2007**			**12/31/2006**		
Percent of Total Assets	BANK	PG 1	PCT	BANK	PG 1	PCT	BANK	PG 1	PCT	BANK	PG 1	PCT	BANK	PG 1	PCT
Short Term Investments	4.81	5.56	59	2.08	7.19	28	2.63	7.45	36	2.57	5.47	46	2.25	5.26	37
Marketable Equity Sec (MES)	0.13	0.04	85	0.12	0.04	84	0.14	0.06	82	0.45	0.12	88	0.23	0.09	82
Net LN&LS & SBLC to Assets	67.26	64.63	47	67.92	62.17	58	64.60	65.02	43	59.33	68.34	23	62.14	67.01	30
Pledged Assets	25.97	34.94	32	29.10	33.38	42	16.06	31.68	19	N/A	0.00	N/A	N/A	0.00	N/A
Securities Mix															
% Total Securities															
US Treas & Govt Agencies	7.23	13.73	51	5.44	14.89	44	13.43	17.40	50	0.47	18.34	13	1.37	22.49	13
Municipal Securities	6.10	11.17	41	4.81	10.28	39	2.38	8.64	35	0.64	9.12	21	0.47	8.12	23
Pass-Through Mtg Backed Secs	37.14	29.44	67	39.64	28.32	69	23.13	32.57	42	60.37	29.25	87	67.58	29.11	91
CMO & REMIC Mtg Backed Secs	21.50	21.79	53	22.77	22.45	51	35.36	19.47	76	26.98	21.15	62	22.41	21.37	52
Commercial Mtg Back Secs	12.66	2.96	87	12.65	1.99	91	12.83	0.39	98	N/A	0.00	N/A	N/A	0.00	N/A
Asset Backed Securities	7.24	1.17	87	8.09	1.38	87	7.90	1.08	89	9.41	1.44	90	7.18	1.04	88
Structured Financial Products	4.04	0.51	90	2.54	0.28	91	0.52	0.35	79	N/A	0.00	N/A	N/A	0.00	N/A
Other Domestic Debt Secs	1.52	2.41	60	1.65	2.08	62	1.33	1.89	66	0.21	2.20	47	0.03	2.12	44
Foreign Debt Securities	1.92	0.49	87	1.82	0.47	87	2.48	0.51	89	0.00	0.20	57	0.00	0.14	56
Inv Mut Fnd & Oth Mktbl	0.65	0.27	81	0.59	0.26	80	0.64	0.43	74	1.93	0.97	80	0.95	0.78	72
Total	100.00	100.00	99	100.00	100.00	99	100.00	100.00	99	100.00	100.00	99	100.00	100.00	99
Liquidity/Securities Ratios:															
App (Dep) Hi Risk & Struc/T1 Cap	0.00	–0.03	92	0.00	0.00	80	0.00	0.00	85	0.00	0.00	86	0.00	–0.03	96
App (Dep) in AFS sec to AFS Sec	1.29	–0.80	90	3.25	2.19	77	–4.30	0.69	5	–0.87	–0.33	28	–0.59	–0.96	63
App (Dep) in HTM Sec to HTM Sec	0.66	–0.69	75	4.66	2.80	73	5.44	0.64	94	N/A	0.46	N/A	N/A	0.00	N/A
App (Dep) in HTM Sec to Eqy Cap	0.21	–0.41	92	1.40	0.61	80	1.06	0.12	91	0.00	0.01	65	0.00	–0.11	73
Pledged Securities to Tot Sec	27.71	50.33	22	41.30	50.86	37	41.22	61.80	20	79.65	64.91	62	47.70	61.30	28
Pledged Loans to Total Loans	32.19	35.06	43	31.90	33.22	45	11.73	28.66	27	N/A	0.00	N/A	N/A	0.00	N/A
Loans Held for Sale to Total Loans	1.14	0.42	85	1.95	1.01	80	1.58	0.77	79	5.73	1.12	89	4.71	1.33	85
Short Term Investments	14,903,713			6,134,224			6,837,636			3,201,220			2,028,640		
Short Term Assets	37,331,948			33,077,761			36,060,677			16,450,729			10,225,863		
Debt Securities 90+ Days P/D	9			0			17			130			0		
Total Non-Current Debt Sec	9			0			17			130			0		
Fair Value Structured Notes	0			0			0			0			0		
Pledged Securities	16,674,636			25,319,448			23,016,479			23,340,665			10,576,794		
Pledged Loans & Leases	63,828,903			60,530,477			18,800,829			N/A			N/A		
Loans Held for Sale	2,263,778			3,702,343			2,538,787			3,909,243			2,366,109		

FDIC Certificate # 6384 **FRB District/ID_RSSD 3 / 817824** **PNC BANK, NATIONAL ASSOCIATION; WILMINGTON, DE** **Capital Analysis-a**
OCC Charter # 1316 **County: NEW CASTLE** **Capital Analysis–Page 11**

	12/31/2013			**12/31/2012**			**12/31/2009**			**12/31/2007**			**12/31/2006**		
Capital Ratios	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**	**BANK**	**PG 1**	**PCT**
Percent of Bank Equity:															
Net Loans & Leases (x)	5.33	5.49	47	5.12	5.28	45	5.44	6.17	39	5.35	6.56	28	7.35	6.50	64
Subord Notes & Debentures	19.57	1.40	96	16.52	2.03	94	23.61	4.94	90	16.67	6.53	77	23.67	6.35	85
Long Term Debt	19.57	1.40	96	16.52	2.03	94	23.61	4.94	90	16.67	6.53	77	23.67	6.35	85
Com RE & Related Ventures	100.25	173.58	26	94.07	164.68	24	117.86	227.55	26	119.29	235.00	25	113.15	216.10	27
Percent of Average Bank Equity:															
Net Income	9.68	8.97	60	7.60	9.11	42	5.39	−2.38	61	8.80	9.64	45	13.43	12.97	55
Dividends	7.89	4.06	76	6.85	4.37	66	3.62	2.04	72	7.30	6.75	54	9.19	6.44	68
Retained Earnings	1.79	4.25	27	0.74	3.71	25	1.77	−5.37	60	1.50	2.01	44	4.25	5.63	44
Other Capital Ratios:															
Dividends to Net Operating Income	78.52	44.30	76	89.36	47.10	77	67.33	41.96	70	82.97	66.65	57	68.37	48.47	63
Bank Eq Cap + Min Int to Assets	12.36	11.79	57	13.02	11.81	68	12.23	10.84	69	11.97	10.62	73	9.27	10.34	44
Growth Rates:															
Total Equity Capital	0.65	5.18	34	14.64	8.24	75	178.26	9.37	97	86.76	17.69	90	7.42	17.26	40
Equity Growth Less Asst Growth	−4.43	−0.46	30	2.59	0.15	62	93.35	4.55	97	48.33	3.76	92	−1.35	4.15	28
Intang Assets % Bank Equity															
Mortgage Servicing Rights	4.48	0.64	93	2.95	0.54	89	7.92	0.83	93	5.53	0.84	90	7.05	0.79	94
Goodwill	24.86	13.31	74	25.01	13.10	75	28.89	13.61	79	53.10	19.05	90	33.89	16.40	78
Purch Credit Card Relations	0.00	0.02	80	0.00	0.02	82	0.01	0.01	83	0.00	0.01	83	0.00	0.01	83
All Other Intangibles	1.59	0.90	72	2.00	1.02	77	3.84	1.54	83	2.60	1.65	69	1.79	1.44	61
Total Intangibles	30.93	15.83	76	29.97	15.49	77	40.65	17.48	83	61.22	23.03	90	42.74	19.97	82
Risk-Based Capital															
Tier One RBC to Risk-Wgt Assets	10.96	13.43	13	11.27	13.96	16	10.88	11.99	45	7.57	9.95	8	8.03	10.47	8
Total RBC to Risk-Weight Assets	14.33	14.73	52	14.22	15.43	42	14.43	13.90	66	10.24	11.73	8	11.13	12.11	32
Tier One Leverage Capital	9.78	9.86	52	10.08	9.76	59	9.31	8.68	71	6.84	8.05	22	7.18	8.18	29
Other Capital Ratio:															
Def Tax Asset to T1 Cap	0.00	3.86	19	3.42	2.77	58	13.89	3.35	96	0.00	2.53	32	0.00	2.51	28
Advanced Approaches Institutions Only															
Com Equity Tier 1 Cap Ratio (Col A)	N/A	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Com Equity Tier 1 Cap Ratio (Col B)	N/A	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tier 1 Capital Ratio (Column A)	N/A	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tier 1 Capital Ratio (Column B)	N/A	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Capital Ratio (Column A)	N/A	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Capital Ratio (Column B)	N/A	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tier One Leverage Capital	N/A	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
End of Period Capital ($000)															
Perpetual Preferred			500,000			500,000			500,000			500,000			500,000
+ Common Stock			240,060			240,060			240,060			240,060			240,060
+ Surplus			27,804,668			27,780,678			24,255,689			7,167,033			1,424,829
+ Undivided Profits			7,497,815			6,854,883			5,459,973			4,907,622			4,866,753
+ Accum Other Comp Income			460,059			891,923			−1,947,102			−189,591			−271,444
+ Other Equity Capital Comp			0			0			0			0			0
Total Bank Equity Capital			36,502,602			36,267,544			28,508,620			12,625,124			6,760,198
Minority Interest Cons Subs			1,802,315			2,142,466			3,319,297			2,311,109			1,594,210
Total Bank Capital & Min Int			38,304,917			38,410,010			31,827,917			14,936,233			8,354,408
Subordinated Notes & Debentures			7,142,150			5,990,020			6,729,890			2,104,911			1,599,832
Changes in Bank Equity ($000)															
Balance at Beginning of Period			36,267,544			31,636,420			10,245,444			6,760,198			6,293,197
+ Net Income			3,505,355			2,666,967			1,535,763			1,109,757			878,639
+ Sales or Purchase of Capital			17,317			0			0			0			0
+ Merger & Absorptions			0			3,398,260			15,616,291			5,727,622			0
+ Restate due to Acctg Error&Chg			0			0			110,064			−148,138			0
+ Trans with Parent			0			11,796			161,047			14,582			204,012
− Dividends			2,855,750			2,405,750			1,030,750			920,750			600,750
+ Other Comprehensive Income			−431,864			959,851			1,870,761			81,853			−14,900
Balance at End of Period			36,502,602			36,267,544			28,508,620			12,625,124			6,760,198
Intangible Assets															
Mortgage Servicing Rights			1,636,498			1,070,607			2,257,058			697,855			476,868
+ Purch Credit Card Relations.			0			0			1,415			0			0
+ Other Intangibles			579,976			726,693			1,093,841			328,458			120,887
+ Goodwill			9,074,422			9,071,743			8,236,044			6,703,358			2,291,349
Total Intangibles			11,290,896			10,869,043			11,588,358			7,729,671			2,889,104

FDIC Certificate # 6384 **OCC Charter # 1316**	**FRB District/ID_RSSD** **County: NEW CASTLE**	**PNC BANK, NATIONAL ASSOCIATION WILMINGTON, DE** **Capital Analysis–Page 11A**			**Capital Analysis-b**
	12/31/2013	**12/31/2012**	**12/31/2009**	**12/31/2007**	**12/31/2006**
Risk Based Capital ($000)					
Tier One Capital					
Total Equity Capital Adjusted	38,209,626	37,894,911	33,296,475	14,777,557	8,571,270
– Ineligible Def Tax Assets	0	0	0	0	0
– Ineligible Intangibles	9,478,757	9,543,112	8,805,802	6,926,184	2,412,236
– Cumul Change F.V. Financial Liab	0	0	0	0	N/A
Net Tier One	28,730,869	28,351,799	24,490,673	7,851,373	6,159,034
Tier Two Capital					
+ Qualif Debt and Redeem Pfd	5,559,469	4,246,942	5,145,661	1,760,000	1,178,000
+ Cumulative Preferred Stock	0	0	0	0	0
+ Allowable LN&LS Loss Allow	3,285,126	3,157,447	2,844,721	866,712	653,875
+ Unrl Gain Mktbl Eqy Sec (45%)	0	0	0	763	0
+ Other Tier 2 Capital Comp	0	0	0	137,165	549,604
Net Eligible Tier Two	8,844,595	7,404,389	7,990,382	2,764,640	2,381,479
Total RBC Before Deductions					
Tier One & Tier Two	37,575,464	35,756,188	32,481,055	10,616,013	8,540,513
Tier Three & Fin Sub Adj	N/A	0	0	0	0
– Deductions for Total RBC	0	0	0	0	0
Total Risk-Based-Capital	37,575,464	35,756,188	32,481,055	10,616,013	8,540,513
Risk-Weighted Assets					
On-Balance Sheet					
Category Two – 20%	9,820,764	10,466,854	11,535,190	7,590,533	5,774,306
Category Three – 50%	16,030,064	13,360,861	9,834,404	6,588,063	5,262,022
Category Four – 100%	188,131,978	182,883,441	163,346,842	61,537,790	44,766,871
Total On-Balance Sheet	213,982,806	206,711,156	184,716,436	75,716,386	55,803,199
Memo: Category One – 0%	33,479,315	24,081,814	15,209,275	1,512,641	1,266,620
Off-Balance Sheet					
Category Two – 20%	1,089,903	1,186,488	1,095,801	1,125,467	634,631
Category Three – 50%	2,265,774	2,289,230	2,728,995	1,851,223	583,168
Category Four – 100%	44,916,333	40,441,258	35,383,633	22,315,811	18,011,210
Total Off-Balance Sheet	48,272,010	43,916,976	39,208,429	25,292,501	19,229,009
Memo: Category One – 0%	0	0	6,409,161	8,222,958	7,937,251
Adjustments to Risk-Wgt Assets					
Risk-Weighted Asset Before Ded	262,254,817	250,628,132	223,924,865	101,008,887	75,032,208
– Excess Allowable LN&LS Loss Al	565,060	1,127,958	2,514,554	0	0
– Allocated Transfer Risk Reserve	0	0	0	0	0
+ Mkt Risk Asset & Fin Sub Adj	555,238	1,967,775	3,652,850	2,705,775	1,706,513
Total Risk-Weighted Assets	262,244,996	251,467,949	225,063,162	103,714,663	76,738,722

4

Managing Noninterest Income and Noninterest Expense

Financial services companies differ sharply in the amount of revenue they generate from fees and other noninterest sources. At one extreme are investment banks that charge fees for virtually all products and services offered but hold few interest-earning loans and investments. At the other extreme are small commercial banks that generate fees tied to transactions accounts, but virtually all other revenue comes from interest income. Most managers and analysts believe that over time financial firms will rely less on net interest income and more on noninterest income to improve profitability. In fact, history has shown that the highest-earning institutions have been those that generate an increasing share of operating revenue from noninterest sources. Several provisions of the Dodd–Frank Act of 2010, however, could significantly affect a financial institution's ability to generate fee income in the future. The fundamental issue for managers, then, is how to determine the appropriate customer mix and business mix that will grow profits at high rates (keeping a strong focus on fee-based revenues) while holding earning assets on-balance sheet.

Not all sources of noninterest income, however, are created equal. Some fees are stable and predictable over time, often called re-occurring income, while others are highly volatile because they are derived from cyclical activities. For example, as the market for securities underwriting collapsed in 2008 and 2009, investment banks lost considerable amounts of fee income generated from mergers and acquisitions and other fee-based services as these activities dried up. As customers withdrew funds from stocks and investment management companies, total assets under management declined, thereby reducing fees based on assets under management. The so-called Volcker rule, which is designed to limit a firm's own trading, called proprietary trading, is expected to significantly reduce the fees and other income derived from these activities.

The Durbin Amendment to the Dodd–Frank Act mandated that the Federal Reserve study and issue rules for capping debit interchange fees. On June 29, 2011, the Fed implemented a 21 cents per transaction cap (for banks larger than $10 billion in assets), although banks were allowed to charge 0.05 percent of the purchase for potential fraud losses. A Bloomberg study estimated that this fee cap will likely reduce merchants' cost for larger purchases but is expected to actually increase merchants' cost for transactions under \$20.[1] That is because the fee charge before the Fed ruling was based on a percent of the transaction, and that percentage would have been lower than 21 cents for smaller transactions. Most debit card companies have, however, announced they would charge the maximum fee of 21 cents on all size transactions. As a result Redbox, a DVD rental company, announced a 20 percent increase for its daily rental price—from \$1 to \$1.20— as of October 31, 2011, citing the higher debit fee on smaller transactions as the reason for the increase. Establishing a limit on what a company can charge often hurts most those it intends to help!

The traditional business of accepting deposits, making loans, and producing net interest income is seen by most community banks as the core business of banking. Because they hold the loans they originate on-balance sheet, they carefully attempt to assess the credit risk and liquidity of each loan. If a borrower does not pay as promised, the bank takes the loss. Contrast this with the business of securitization in which the firm that originates a loan works with an investment bank to group similar loans into a package and issue securities using the loans as collateral—thereby moving the loans off-balance sheet. Securitization generates fee income and allows the loan originator to not commit its own funds, and thus not be as sensitive to credit risk, such that investors in the securities absorb loan defaults.

The problems with subprime loans, collateralized debt obligations (CDOs), and related assets in the late 2000s made this originate-to-distribute model of banking less viable as the opportunity to securitize loans dried up. Prior to the financial crisis of 2008, many of the securitizations were moved off-balance sheet using structured investment vehicles (SIVs). Accounting rules allowed financial institutions to move these assets off the books if it was determined that most of the risk and return belonged to another party to the transaction. Unfortunately, as financial institutions' ability to issue new debt to finance the asset pools dried up, the value of the assets plummeted and the subprime crisis forced many of these institutions to place these SIV assets back on-balance sheet.

Before the financial crisis, more than 50 percent of mortgage backed securities were originated and securitized by private third parties, while governmental third parties such as Fannie Mae, Ginnie Mae, FHA and VA originated less than 50 percent. Nongovernmental third party mortgage originations all but disappeared by 2008 and 2009 and amounted to less than 5 percent of all originations. In 2013-2014, over 90 percent of mortgages were originated by Fannie Mae and Freddie Mac,.

Contrary to the originate-to-distribute model, traditional lending requires an almost one-for-one increase in the originating bank's assets and increases the amount of supporting capital (as a percentage of assets) because the lender assumes significant risk of loss. Recall that interest income equals the interest rate charged times the dollar amount of earning assets. Hence, increasing interest income requires either increasing the rate, which is difficult to do in a competitive environment, or increasing the volume of loans. More loans, in turn, generate increased default risk. For most commercial

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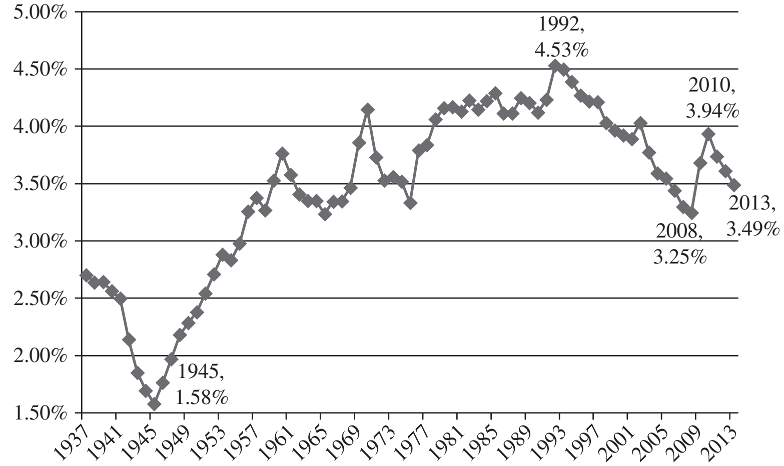
[1] North, Cady and Getter, Lisa, "Business Impact of the Dodd–Frank Debit Fee Cap," Bloomberg Government Study, November 18, 2011.

banks, noninterest income typically equals the price of the product offered times the number of products or services sold. Growing this type of revenue does not always require an increase in assets or risk. Volume is the key to effectively selling products and services, especially those that are based on technology. While all banks would like to generate more fee income and noninterest income from other sources, opportunities to do so depend on the nature of the customers served and the types of products and services provided.

This chapter examines three basic issues related to managing a commercial bank's noninterest income and noninterest expense. First, it describes the strengths and weaknesses of commonly used financial ratios of expense control and noninterest income growth. Second, it discusses why banks should focus on customer profitability and the mix of fee-based businesses when evaluating performance. Finally, it explains how banks utilize different noninterest expense management strategies to enhance performance.

It is widely recognized that the days of record-breaking net interest margins (NIMs) are long gone. Exhibit 4.1, for example, documents the long-term trend in NIMs for commercial banks since 1937. Note the sharp increase in NIMs from 1945 until its modern-day peak of 4.53 percent in 1992, as well as the apparent reversal in this trend since 1992. By 2008, average NIMs had fallen to 3.25 percent. NIMs increase sharply after the beginning of the financial crisis until 2010 due primarily to the Federal Reserve's extraordinarily low interest rate policy. During the recent financial crisis, the Fed lowered the federal funds rate to between zero and 25 basis points where it remained through 2014. Banks successfully lowered their deposit costs in line with the low federal funds rate such that NIMs originally increased. As loans and securities matured and banks replaced them with lower yielding earning assets, NIMS declined. By 2013, the average NIM was just 3.49 percent.

EXHIBIT 4.1 **Net Interest Margins for FDIC-Insured Commercial Banks, 1936–2013**



Source: FDIC Statistics on Depository Institutions, www2.fdic.gov/sdi/main.asp, and Historical Statistics on Banking, www2.fdic.gov/hsob/index.asp.

The natural question is, what factors have led to these long-term trends and will NIMs continue to fall? The answer is obviously complex but can be answered by examining the recent history. Beginning in 1934, the Glass–Steagall Act effectively prohibited depository institutions, securities firms, and insurance companies from venturing into one another's businesses. Obviously, limiting competition for loans and deposits promotes an environment of higher margins. Beyond traditional commercial lending, banks also began moving into other lines of lending such as consumer and subprime lending, both of which pay higher promised yields. During the early part of this period, the stock market still suffered the stigma of the 1929 collapse and most bank customers had few options for investing their funds—either put deposits in a banking institution or the stock market. Regulation Q limited the interest rate that banks could pay for deposits, effectively limiting competition from other banks. This allowed for a long period of relatively stable yet increasing NIMs for the banking community. The sharp, temporary declines in NIMs during the early 1960s and early 1970 generally followed economic declines.

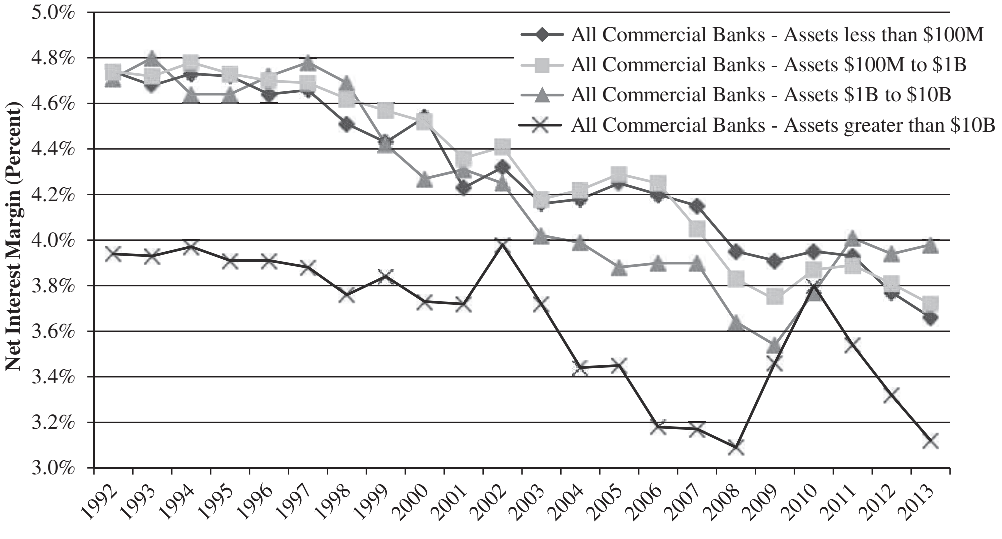
The answer to why NIMs have been steadily decreasing since 1992 most likely lies in a reversal of the very factors that led to the sharp increase. First, where there are profits, competition follows. Glass–Steagall and Regulation Q were designed to limit competition and promote a safer banking system. The restrictions were effective for a long period of time, but commercial banks and other institutions, such as investment and insurance companies, found innovative ways around Glass–Steagall. The financial services industry slowly and methodically eroded the commercial banks' protected marketplace. Financial innovation, for example, led to the creation of the cash management account and money market mutual fund in the mid-1970s. This happened during a time in which depository institutions were restricted from offering competing products due to Regulation Q. In addition, during the latter half of the twentieth century, the United States experienced a general increase in the popularity of mutual funds and the stock market. Many customers moved funds out of FDIC-insured deposits (disintermediation), which started to significantly erode the market share of depository institutions. Commercial banks were further restricted in the types of products (especially securities products, mutual funds, and insurance products) they could offer, while securities firms and insurance companies had significantly greater powers.

The 1990s represented a period of deregulation as well as innovation for nondepository institutions to enter the banking business. The increased supply of commercial bank lending and investment banking products and services put pressure on depository institutions' loan rates and deposit costs. The additional powers and reduced regulatory restrictions of the nonbanks significantly increased competition for the depository institutions' core deposit and lending business, once again eroding NIMs. In 1999, almost all depository institutions gained access to direct borrowings from the Federal Home Loan Bank. This access provided institutions a new form of funding that released them from a reliance on core deposit accounts and allowed many institutions to grow at a much faster pace. The rapid growth of depository institutions after 2000, as well as asset growth fueled by new funding sources, was a source of competition that put additional pressure on NIMs. Finally, commercial banks and customers of savings institutions routinely exercised their implicit "option" to refinance their loans. When interest rates fell, loan customers refinanced at lower rates, which thereby lowered the yields that banks charged.

Depository institutions began the latter half of the twentieth century with a protected market but ended the period with these same protections preventing them from effectively competing with securities firms and insurance companies. This led to a long-term disintermediation of funds from the bank industry. By the late 1990s, however, many of the restrictions of Glass–Steagall had been eroded by court decisions, regulatory rulings, and marketplace practices that increasingly blurred the distinctions between different segments of the financial industry. For example, it is Section 20 of the Glass–Steagall Act that forbids commercial banks from affiliating with a company *principally engaged* in the issue, flotation, underwriting, public sale, distribution at wholesale, distribution at retail, or distribution through syndicate participation of stocks, bonds, debentures, notes, or other securities. In 1988, the U.S. Supreme Court upheld the Federal Reserve Board's definition of *principally engaged* as no more than 5 percent of the affiliate's total revenue. This restriction was increased to 10 percent in 1989 and 25 percent in 1996. Finally, in 1999, Congress passed the Gramm–Leach–Bliley Act, which repealed many sections of Glass–Steagall and allowed commercial banks and savings institutions to enter businesses they were previously forbidden to enter.

The trends and evidence presented above support the fact that NIMs generally increased until 1992 because of restricted competition and are declining as the distinctions between financial firms become blurred—leading to an increased number of competitors, financial sector combinations, and regulatory change. These data, however, may mask some of the differences among financial institutions. Larger commercial banks and financial institutions have generally de-emphasized lending in favor of generating fees from securitizing the loans they make, as well as offering a wide variety of products and services that generate fees. Today, noninterest income comes primarily from fiduciary activities; deposit service charges; trading revenue; venture capital revenue; securitization income; investment banking, advisory, brokerage, and underwriting fees and commissions; insurance commission fees; and fees from servicing real estate mortgages, credit cards, and other financial assets. Smaller banks, by contrast, have continued to be much more dependent on lending and their NIMs. Exhibit 4.2 presents NIMs for different-sized FDIC-insured commercial banks from 1992 through 2013. NIMs are clearly lowest, and have declined the most, for the largest commercial banks with assets greater than $10 billion.

EXHIBIT 4.2 **Net Interest Margins for Commercial Banks (by Asset Size), 1992–2013**



Source: FDIC Statistics on Depository Institutions, www2.fdic.gov/sdi/main.asp.

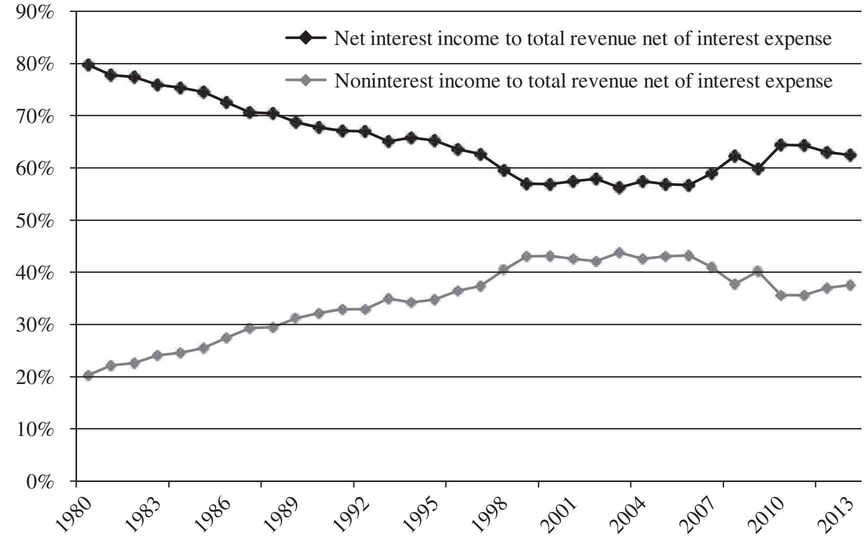
Noninterest Income

For years, depository institutions have tried to increase noninterest income. Exhibit 4.3 documents the dramatic change in the proportion of commercial banks' net interest income and noninterest income sources as a percent of these two sources of income. The percentage of noninterest income to the sum of net interest income and noninterest income equaled just 20.3 percent in 1980 for all FDIC-insured commercial banks but increased sharply to almost 44 percent by 2006 before beginning to decline again. The percentage of noninterest income declined after 2007. Noninterest income as a percent of the sum of net interest income and noninterest income declined from more than 40 percent to less than 40 percent by the end of 2013. There are several contributing factors to this trend. First, the market for securities underwriting collapsed in 2008 and 2009, and investment banks lost considerable amounts of fee income generated from mergers and acquisitions and other fee-based services as these activities dried up. Second, customers withdrew funds from stocks and investment management companies, hence, total assets under management declined, thereby reducing fees based on assets under management. Third, the so-called Volcker rule, designed to limit a firms own propriety trading will also significantly reduce the fees and other income derived from these activities. Finally, the Durbin Amendment to the Dodd–Frank Act mandated the Federal Reserve study and issue rules for capping debit interchange fees which they did in 2011 by placing a 21 cents per transaction cap on these fees (for banks larger than $10 billion in assets).

As discussed in Chapter 3, the Uniform Bank Performance Report (UBPR) lists several sources of noninterest income for financial institutions:

1. **Deposit service charges,** such as checking account fees, generally represent the bulk of noninterest income.
2. **Fiduciary activities** reflect income from an institution's trust department.

EXHIBIT 4.3 **Net Interest Income and Noninterest Income, as a Percentage of Total Revenue Net of Interest Expense for Commercial Banks, 1980–2013**



Source: FDIC Historical Statistics, www2.fdic.gov/hsob/index.asp.

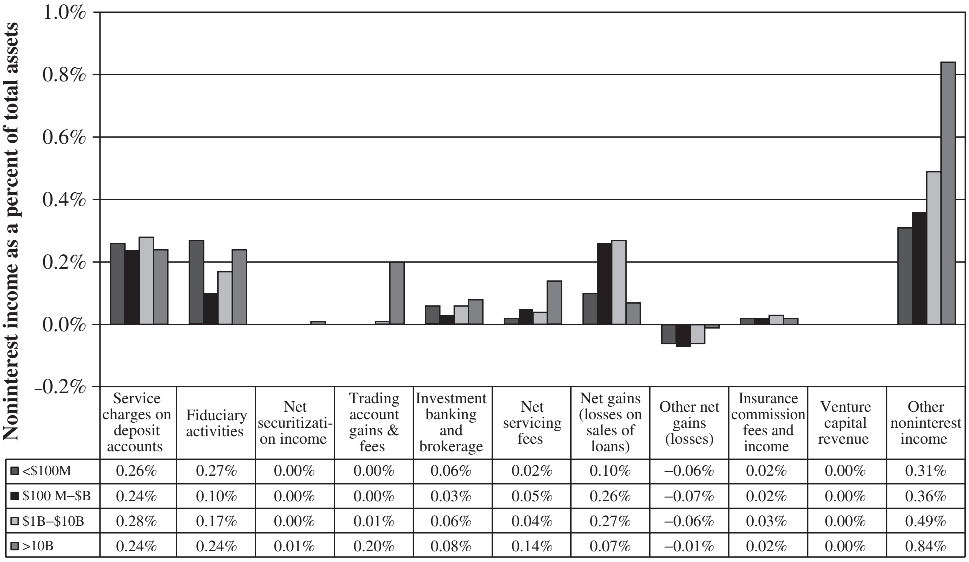
3. **Trading revenue, venture capital revenue, and securitization income** reflect gains (losses) from trading securities (making a market in securities) and off-balance sheet derivative contracts recognized during the period; venture capital activities; and fees from securitization transactions and unrealized losses (recovery of losses) on loans and leases held for sale.
4. **Investment banking, advisory, brokerage, and underwriting fees and commissions** include fees and commissions from underwriting securities, private placements of securities, investment advisory and management services, and merger and acquisition services.
5. **Insurance commission fees and income** are reported income from underwriting insurance, from the sale of insurance, or from reinsurance; this category includes fees, commissions, and service charges.
6. **Net servicing fees** are derived from servicing real estate mortgages, credit cards, and other financial assets held by others.
7. **Net gains (losses) on sales of loans** are net gains (losses) on the sales or other disposal of loans and leases.
8. **Other net gains (losses)** include net gains (losses) on sales of other real estate owned, on the sales or other disposal of other real estate owned, and on sales of other assets (excluding securities) such as premises, fixed assets, and personal property acquired for debts previously contracted (such as automobiles, boats, equipment, and appliances).
9. **Other noninterest income** includes income from safe deposit boxes; sales of bank drafts, money orders, checks, etc.; execution of acceptances and letters of credit; notarizing; advisory services; rentals and other income from real estate owned; credit card fees; loan commitment fees; foreign currency fees; life insurance proceeds; penalties for early withdrawals; data processing fees to others; and a large amount of other miscellaneous income.

The data in Exhibit 4.3, however, mask some of the significant differences in noninterest income that occur because of differences in a bank's size and type of income or business model. Exhibit 4.4 documents the composition of noninterest income, as a percentage of total assets, for all FDIC-insured commercial banks in 2013 (institutions are grouped by asset size). Several observations can be made from these data. First, the biggest contributors to noninterest income are other noninterest income and deposit service charges regardless of size. Both other noninterest income and deposit service charges represent stable sources of revenue for depository institutions, but are difficult to increase sharply over time because they are very visible and not popular with the institutions' customers.

While all depository institutions are focusing on increasing their noninterest income, the largest institutions rely much more on this source of revenue than smaller depository institutions, which still rely more heavily on net interest income. Large institutions not only have greater amounts of noninterest income, they also rely on a wider variety of sources of noninterest income.

With respect to the largest commercial banks, income from investment banking, advisory, brokerage, underwriting fees and commissions, and proprietary trading historically contributed a far greater portion of noninterest income, and these sources of income have increased the most over the past few years. Unfortunately, as mentioned previously, consequences of the credit crisis that began in 2008 meant the largest commercial banks (and old investment banks)—such as Bank of America, Citibank, JPMorgan Chase, Goldman Sachs, and Morgan Stanley—saw these sources of revenue dry up as these activities slowed and assets under management plummeted. The declines demonstrated that nondeposit fees and trading revenue are highly cyclical in nature because they

EXHIBIT 4.4 **Composition of Noninterest Income, as a Percentage of Total Assets, for Commercial Banks and Savings Institutions (by Asset Size): 2013**



	Service charges on deposit accounts	Fiduciary activities	Net securitization income	Trading account gains & fees	Investment banking and brokerage	Net servicing fees	Net gains (losses on sales of loans)	Other net gains (losses)	Insurance commission fees and income	Venture capital revenue	Other noninterest income
■ <$100M	0.26%	0.27%	0.00%	0.00%	0.06%	0.02%	0.10%	–0.06%	0.02%	0.00%	0.31%
■ $100 M–$B	0.24%	0.10%	0.00%	0.00%	0.03%	0.05%	0.26%	–0.07%	0.02%	0.00%	0.36%
□ $1B–$10B	0.28%	0.17%	0.00%	0.01%	0.06%	0.04%	0.27%	–0.06%	0.03%	0.00%	0.49%
■ >10B	0.24%	0.24%	0.01%	0.20%	0.08%	0.14%	0.07%	–0.01%	0.02%	0.00%	0.84%

Source: FDIC Statistics on Depository Institutions, www2.fdic.gov/sdi/main.asp.

depend on capital market activity and the value of the underlying assets. When mergers, acquisitions, trading, and brokerage activities are booming, these large firms with investment banking operations can earn enormous fees that increase with the volume of activity. When these activities decline, fee revenue shrinks accordingly. This was demonstrated most vividly in the fourth quarter of 2007 and through 2008 when commercial banks and savings institutions reported record-high loan loss provisions, record losses in trading activities, and record goodwill impairment expenses. These losses were directly linked to the largest institutions' underwriting, securitization, and trading activities related to the subprime mortgage market. In fact, 25 percent of the institutions with assets greater than $10 billion lost money in the fourth quarter of 2007; 7 large institutions accounted for more than one-half of the industry's total increase in loan loss provisions; 10 institutions accounted for the entire decline in trading profits; 5 institutions accounted for three-quarters of the increase in goodwill and intangible expenses; and 16 institutions accounted for 75 percent of the decline in net income. Note the high levels of other noninterest income at all banks, but especially those with more than $10 billion in assets.

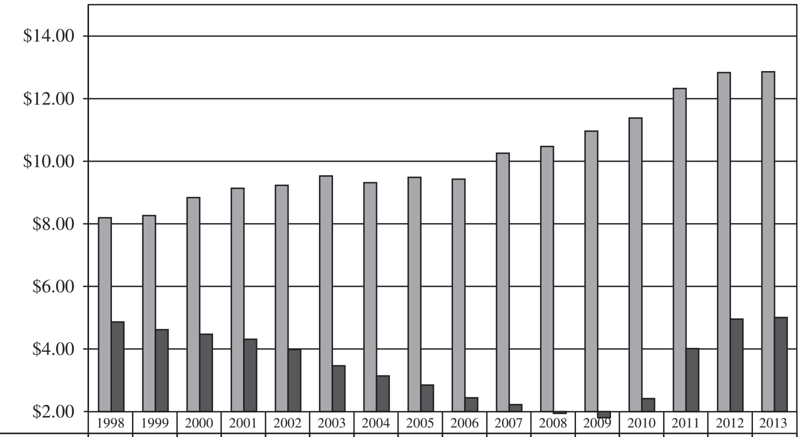
Deposit Service Fees

Fees at financial institutions change over time for many reasons. For example, deregulation encouraged the "unbundling" of products and the charging of fees for individual services rather than offering many "free" services. On the other hand, intense competition through the mid-2000s meant that banks began bundling services and offering "free checking" and no-fee debit and credit cards.

The regulatory burden imposed on bank fees from the Dodd–Frank Act, however, has once again reversed this trend. Banks are again beginning to charge fees for noninterest-bearing checking accounts, presumably to generate additional fee income, which has

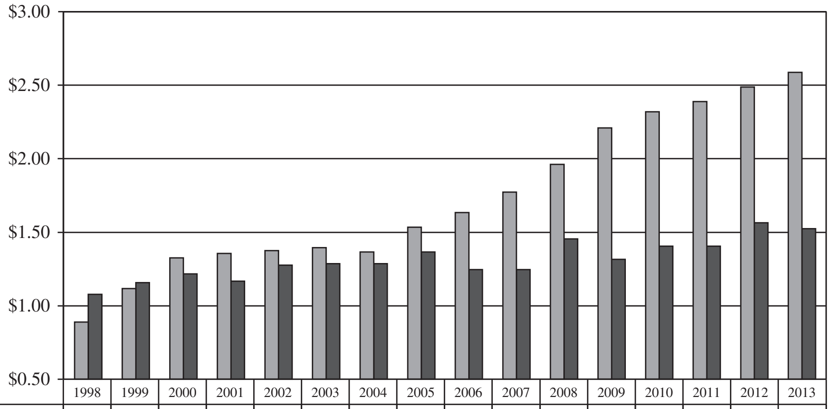
EXHIBIT 4.5 Depository Institution Fee Structures: 1988–2013 (Fall of Each Year)

Average Monthly Service Fees on Checking Accounts



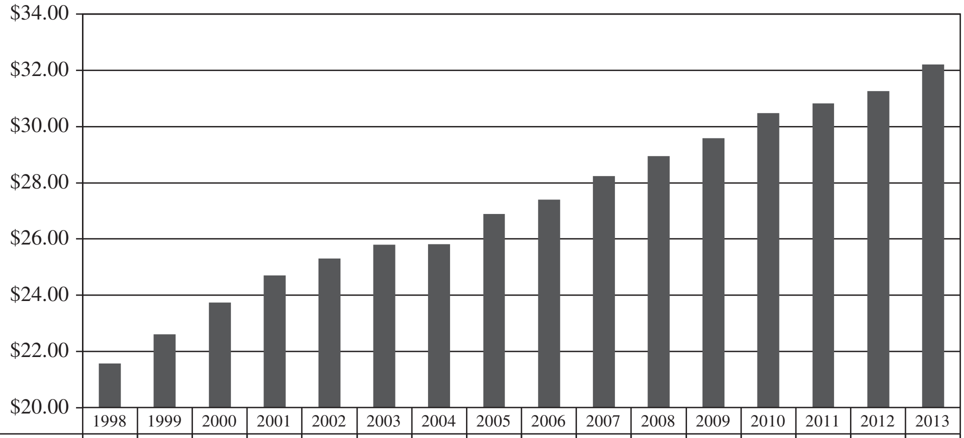
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
▨ Interest checking accounts	$9.29	$9.37	$10.05	$10.40	$10.51	$10.86	$10.61	$10.81	$10.74	$11.72	$11.97	$12.55	$13.04	$14.15	$14.75	$14.78
■ Non-interest checking accounts	$5.37	$5.08	$4.91	$4.72	$4.33	$3.72	$3.34	$3.00	$2.52	$2.26	$1.93	$1.77	$2.49	$4.37	$5.48	$5.54

Average ATM Fee



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
▨ ATM Surcharge	$0.89	$1.12	$1.33	$1.36	$1.38	$1.40	$1.37	$1.54	$1.64	$1.78	$1.97	$2.22	$2.33	$2.40	$2.50	$2.60
■ To Use Other ATM	$1.08	$1.16	$1.22	$1.17	$1.28	$1.29	$1.29	$1.37	$1.25	$1.25	$1.46	$1.32	$1.41	$1.41	$1.57	$1.53

Average Bounced Check Fee



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
■ Bounced Check Fee	$21.57	$22.62	$23.74	$24.70	$25.30	$25.80	$25.81	$26.90	$27.40	$28.23	$28.95	$29.58	$30.47	$30.83	$31.26	$32.20

Source: www.bankrate.com. Special thanks to Greg McBride for providing the data.

been limited recently by the Dodd–Frank Act. This trend can be seen by examining the first graph in Exhibit 4.5, Average Monthly Service Fees on Checking Accounts.

Free checking has been a popular way to attract new business, because bank managers know that customers are largely price insensitive when it comes to some service charges and fees, which means that banks can raise these charges and fees on a regular basis and their total revenues will rise. While competition lowered the basic monthly fees for checking accounts (at least for noninterest-bearing accounts) until the beginning of the financial crisis, NSF and overdraft fees, as well as ATM fees, increased (see Exhibit 4.5). However, since the passage of the Dodd–Frank Act, which limits the amount of fees banks can charge for debit and credit cards transactions, banks have once again had to unbundle their services and charge fees for previously free checking accounts.

The critical decision for management is to determine the appropriate fee-based business mix. Many institutions offer mortgage banking services because of the built-in hedge between loan origination and mortgage servicing. When interest rates are low or falling, firms can earn substantial origination fees from making new loans and mortgage refinancing. When interest rates are high or rising, loan origination fees decline but mortgage-servicing revenue increases because existing mortgages prepay slower and, thus, remain outstanding longer.[2] Mortgage origination can also be somewhat countercyclical to the bank's net interest margin business. For example, in May 2000, the Federal Reserve targeted a 6.5 percent federal funds rate. Two and a half years later, in November 2002, the Federal Reserve was targeting only a 1.25 percent federal funds rate.[3] During this short period, the number of households that refinanced their homes was unprecedented. By early 2004, roughly 75 percent of all 1–4 family mortgages had been put on the books in the prior three years! By the end of 2008, the Federal Reserve once again lower the Federal Funds rate to a historical low of between zero and 25 basis points and mortgage rates fell to their lowest level in history. By 2013, almost every qualified borrower had refinanced his or her home with some having refinanced multiple times? When rates increase, however, the number of new mortgages decreases dramatically. In some cases, mortgage loan originators lay off employees and lose money in the origination side of the business. Coincident with the reduction in origination of new mortgages, however, revenue from mortgage servicing typically increases.

The negative side of the mortgage banking business is that firms benefit from size because, with larger portfolios, there are considerable economies of scale.[4] Unfortunately, it is difficult for many firms to acquire the volume of servicing business needed given the extreme competitive conditions. Hence, many mortgage originators do not service the loans but instead sell the servicing rights. Without the servicing side of the mortgage business, fee income from mortgage origination is highly cyclical with interest rates. As a result, many large banks prefer the huge potential fee income from nonmortgage businesses such as leasing, subprime lending (to high-default-risk customers), factoring, and related activities. Not surprisingly, fees from these activities are also highly volatile because the volume and quality of business changes when economic conditions change.

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[2] A mortgage servicer collects the actual payments from the borrower and transfers the funds, less a servicing fee, to the ultimate holder of the loan. Mortgage-servicing revenue varies directly with the amount of loans serviced. The faster that mortgages prepay, the lower the outstanding mortgage balances are—and servicing revenue falls, ceteris paribus.

[3] The Fed subsequently lowered the targeted federal funds rate to 1 percent in June 2003, then increased it slowly to 5.25 percent in June 2006, only to lower it again to 1 percent by October 2008.

[4] The term *economies of scale* refers to the situation where a firm's average unit costs decrease as output increases.

Noninterest Expense

One source of earnings growth is straightforward—cost cutting. This has been a primary motive for most commercial bank mergers in recent years. In fact, analysts and bank stock investors are constantly trying to identify likely in-market merger partners where cost savings can be substantial. With an *in-market merger*, the two firms have significant duplication of banking offices and services such that any merger leads to the elimination of branches and personnel. Cost savings from eliminating this duplication represent an annuity to the extent that the combined firm can continue to service existing customers. Several studies have suggested that cost savings from mergers are in the form of tax savings, operational synergies, reduced capital spending, and a potential increase in market power by eliminating a competitor.

With respect to overhead or operating expenses, the UBPR reports five components of a bank's noninterest expense:

1. Personnel expense, which includes wages, salaries, and benefits
2. Occupancy expense, which includes rent and depreciation on buildings and equipment
3. Goodwill impairment, which includes any amortization from permanently impaired goodwill
4. Other intangible amortization, which includes amortization expense and impairment losses for other intangible assets
5. Other operating expense, which includes all other noninterest expenses

The sum of these five component expenses is called **overhead** expense. For most banks, personnel expenses are the largest component of overhead, reflecting the heavy dependency on people relative to capital assets.

Key Ratios

Bank managers generally track a variety of financial ratios in an effort to measure and monitor a bank's ability to control expenses and generate noninterest income. The three most common ratios are a bank's burden (net overhead expense), efficiency ratio, and productivity ratios. The following discussion should be viewed in the context that any single institution's ratios would reflect the mix of businesses it represents. Some lines of business require substantial capital investments, while others are more labor intensive or may primarily be off-balance sheet in their impact.

Burden/Net Overhead Expense. As noted in Chapter 3, a bank's burden ratio (BURDEN), or net overhead expense, equals the difference between noninterest expense and noninterest income in dollar terms or as a percentage of total assets:

$$\text{BURDEN} = \frac{\text{Noninterest expense} - \text{Noninterest income}}{\text{Average total assets}} \tag{4.1}$$

Because noninterest expense is higher than noninterest income for most depository institutions, these measures are generally positive and indicate the extent to which a bank generates noninterest income to help cover its noninterest expense. Noninterest expense is generally higher because considerable noninterest expense is incurred as a result of generating interest income and low-cost deposits. For example, expenses related to occupancy costs for buildings and branches, computer systems, and loan officers' salaries are effective in attracting deposits. Hence, the smaller a bank's burden, or net overhead expense, the better a bank has performed on trend and versus peers. When differences appear, managers examine the components of noninterest expense to determine whether personnel, occupancy, or other expense is greater as a fraction of assets. They also compare service charges on deposits and other fee income as a fraction of noninterest income and assets to assess their relative performance related to asset utilization. Importantly, gains or losses on the sale of securities and other nonrecurring income and/or expenses are netted or ignored when making these comparisons.

Efficiency Ratio. A popular ratio used to evaluate performance is the efficiency ratio. Depository institutions frequently report this measure along with ROE, ROA, and NIM as a key driver of profitability and indicator of potential profit growth. Many institutions announce their target ratio at the beginning of each year, and some institutions tie employee bonuses to whether the bank meets its target. Formally, the **efficiency ratio** equals noninterest expense as a fraction of net interest income plus noninterest income. The ratio measures the amount of noninterest expense paid to earn one dollar of total revenue net of interest expense. Thus, a ratio of 0.60 indicates that a bank pays 60 cents in noninterest expense per dollar of total revenue net of interest expense. Institutions that are more efficient are presumably those with the lowest efficiency ratios.

$$\text{Efficiency ratio} = \frac{\text{Noninterest expense}}{\text{Net interest income} + \text{Noninterest income}} \tag{4.2}$$

Exhibit 4.6 provides the components of the efficiency ratio for different-sized commercial banks for 2013. Note that banks with assets greater than $10 billion report the lowest average efficiency ratio at just under 60 percent. Note also that net interest income as a percentage of average assets ratio was the smallest for the largest institutions, while noninterest income, as a percent of average assets, increases with asset size. Banks with more than $10 billion in assets report lower average efficiency ratios than the other banks, because their noninterest income is greater and noninterest expenses smaller, as a percentage of assets.

Exhibit 4.7 reports average efficiency ratios from 1992 through 2013 for U.S. commercial banks with total assets of less than $100 million, $100 million to $1 billion, $1 billion to $10 billion, and more than $10 billion. Approximately 90 institutions with large regional, national, or global operations drive the data for the largest commercial banks. Exhibit 4.7 demonstrates some of the key differences between large and small banks' business models. First, there is a remarkable difference in efficiency ratios by bank size.

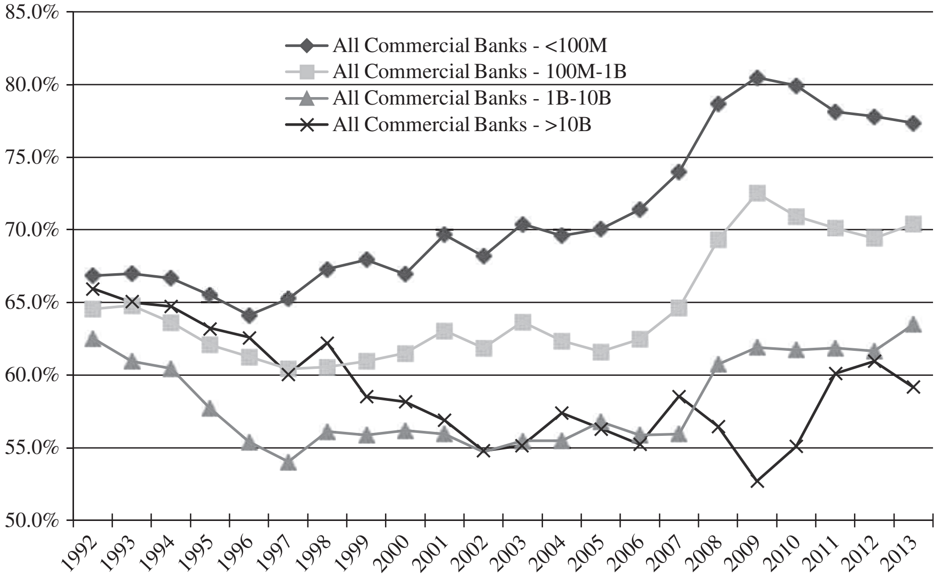
EXHIBIT 4.6 **Components of the Efficiency Ratio at Commercial Banks (by Asset Size), 2013**

Ratio	<$100M	$100M–$1B	$1B–$10B	>$10B
Efficiency ratio	77.33%	70.41%	63.50%	59.13%
Numerator:				
Noninterest expense[1]	3.36%	3.12%	3.17%	2.79%
Denominator:				
Net interest income[1]	3.34%	3.42%	3.61%	2.73%
Noninterest income[1]	0.99%	1.00%	1.28%	1.84%

[1] As a percentage of assets

Source: FDIC's Statistics on Depository Institutions, www2.fdic.gov/sdi/main.asp.

EXHIBIT 4.7 **Efficiency Ratios of U.S. Commercial Banks (by Asset Size), 1992–2013**



Source: FDIC Statistics on Depository Institutions, www2.fdic.gov/sdi/main.asp.

Large commercial banks (with more than $1 billion in total assets) clearly have lower efficiency ratios on average. This generally reflects these large institutions' relative advantage in generating noninterest income by entering businesses such as investment banking, trading, and asset management. In 2013, commercial banks with less than $100 million in assets paid 77.33 cents in overhead for each dollar of total revenue net of interest expense generated; banks with total assets of between $100 million and $1 billion paid 70.41 cents; banks with assets of between $1 billion and $10 billion paid 63.5 cents; and the largest banks with more than $10 billion in assets paid 59.13 cents per dollar of net revenue.

These results clearly reflect the trade-offs between overhead, net interest income, and noninterest income. For the smallest banks, net interest income (as a percentage of total assets) is the largest positive contributing factor to their efficiency ratios. Strong net interest income, and relatively lower overhead (as a percentage of total assets) contribute to the lower efficiency ratios of banks in the "$100 million to $10 billion" asset range. Banks in the "$1 billion to $10 billion" range, however, generate stronger noninterest income (as a percentage of total assets) than do smaller banks, which contributes to their lower efficiency ratios as compared with smaller institutions. The largest banks have much lower net interest income (as a percentage of total assets) but better expense control and generate substantially more noninterest income (as a percentage of total assets), hence their distinction of having the lowest efficiency ratios. This clearly reflects their greater dependence on fees.

Note that the denominator of the efficiency ratios is composed of two parts, net interest income and noninterest income. As shown in Exhibits 4.1 and 4.2, NIMs have systematically declined since 1992, and the rate of decline has increased significantly since 1997. Smaller commercial banks are more dependent on NIMs, and the decline in their NIMs has been larger relative to that of the largest banks. In addition, large banks have been more successful in increasing noninterest income relative to smaller banks. The net result is that the largest banks, with the ability to generate substantial fee income, have been able to improve their efficiency ratios, while smaller banks have not.

A crucial issue is whether low efficiency ratios correspond to higher profitability ratios. Often, when a firm invests into new products, services, or branches, its noninterest expense will increase. This would be reflected in a higher efficiency ratio until revenues from these new ventures could "catch up" to these expenses. Osborne (1995) and Holliday (2000) argue that lower efficiency ratios do not always correspond to higher profitability ratios and that banks that focus on lowering their efficiency ratios may make suboptimal decisions. Using data from 1989 to 1993 for the 50 largest U.S. banks, Osborne demonstrates that banks with the highest ROEs reported a wide range of efficiency ratios. This study points out two essential criticisms of efficiency ratios.

First, the efficiency ratio does not take into account a bank's mix of businesses. It is perfectly logical for banks to invest in businesses where they must incur larger noninterest expense if the marginal revenue obtained from the businesses exceeds the marginal expense. Thus, while the efficiency ratio may increase or exceed that of peers, the investment adds value to shareholders. Second, the efficiency ratio is not directly tied to a bank's target return to shareholders. Holliday similarly argues that banks should focus on growing revenues at the lowest possible cost. If successful, banks will retain customers and increase profitability. Fundamentally, as long as the bank earns more than its marginal cost of capital, the investment is value enhancing. The implication is that managers who evaluate noninterest expense and revenue must carefully measure marginal cost and marginal revenue and compare their bank's performance to similar competitors.

Operating Risk Ratio. Some analysts focus on a bank's operating risk ratio in order to better differentiate performance attributable to cost controls versus fee generation. The lower the operating risk ratio, the better the bank's operating performance because it generates proportionately more of its revenues from noninterest income or fees, which are more stable and thus more valuable. The ratio subtracts noninterest (fee) income from noninterest expense and divides the total by NIM.

$$\text{Operating risk ratio} = \frac{\text{Noninterest expense} - \text{Noninterest income (Fees)}}{\text{Net interest margin}} \tag{4.3}$$

Consider the data for Bay Bank and River Bank in Exhibit 4.8. Both banks report identical ROAs, overhead (noninterest) expense as a percentage of assets, operating revenue as a percentage of assets, and efficiency ratios, but Bay Bank reports a lower operating risk ratio. A closer review of the components of the operating risk ratios for the two banks indicates that Bay Bank generates a higher percentage of its operating revenue from fee income. Hence, it reports a lower operating risk ratio.

Productivity Ratios. Many managers track a variety of productivity ratios to assess whether they are getting the maximum use of employees and capital. Typical ratios included in the UBPR are assets per employee and average personnel expense per employee. In the first case, a higher ratio indicates that fewer employees handle business associated with a larger volume of assets. In a sense, it is an asset efficiency ratio where a high number is good. Of course, the ratio ignores the amount of off-balance sheet activity that a bank conducts. In the second case, the ratio measures the average cost of an employee when salaries and benefits are recognized.

$$\text{Assets per employee} = \frac{\text{Average assets}}{\text{Number of full-time employees}} \tag{4.4}$$

$$\text{Average personnel expense} = \frac{\text{Personnel expense}}{\text{Number of full-time employees}} \tag{4.5}$$

EXHIBIT 4.8 **Operating Risk Ratio Signals the Benefit of Fee Income**

Ratio	Bay Bank	River Bank
Return on assets (ROA)	1.40%	1.40%
Net interest margin (NIM)	4.00%	4.62%
Percentage of average total assets:		
Net interest income	3.20%	3.70%
Noninterest income (fee)	1.40%	0.90%
Operating revenue	4.60%	4.60%
Noninterest expense (overhead)	3.00%	3.00%
Earning assets	80.00%	80.00%
Taxes	0.20%	0.20%
Efficiency ratio:	$65.22\% = 0.03/(0.032 + 0.014)$	$65.22\% = 0.03/(0.037 + 0.009)$
Operating risk ratio:	$40.00\% = (0.03 - 0.014)/0.04$	$45.45\% = (0.03 - 0.009)/0.0462$

There is no widely recognized optimal value for either of these ratios. In fact, many high-performing banks have fewer full-time employees, but pay them better than the average employee at comparable banks. Furthermore, the personnel expense ratio may be biased by large compensation packages for just a handful of bank officers. For example, a community bank with a highly paid CEO will often report a higher ratio, which provides meaningless information about how well the average employee is paid versus peers.

For community banks, two related ratios can provide useful information about productivity. Because loans represent the largest asset holding, it is meaningful to calculate a loans-per-employee ratio as an indicator of loan productivity. Similarly, a ratio of net income per employee generally indicates the productivity and profitability of a bank's workforce. For both of these latter ratios, a higher value indicates greater productivity.

$$\text{Dollar amount of loans per employee} = \frac{\text{Average loans (dollars)}}{\text{Number of full-time employees}} \tag{4.6}$$

$$\text{Net income per employee} = \frac{\text{Net income}}{\text{Number of full-time employees}} \tag{4.7}$$

Productivity ratios for commercial (by size) are presented in Exhibit 4.9. The data in Exhibit 4.9 indicate that productivity, as measured by the ratios presented in Equations 4.4–4.7, improves with bank size. The largest banks operate with approximately twice the dollar amount of assets per employee than smaller banks do, but also pay their employees 50 percent more. They operate with almost twice the dollar amount of loans per employee as well as generate just over twice as much net income per employee.

With declining NIMs, it is essential that managers identify the appropriate mix of products and lines of business because future earnings growth will likely come from fee income. Traditionally, depository institutions have relied on deposit service charges and trust fees for those with trust departments. The key point is that not all fees are created equal and not all customers are profitable. Firms must recognize the risk associated with different sources of fee income and be able to measure whether specific customers generate more revenue than the cost of servicing their accounts.

EXHIBIT 4.9 **Productivity Ratios Improve with Bank Size, 2013 (Thousands of Dollars)**

	<$100M	$100M–$1B	$1B–$10B	>$10B	All Commercial Banks
Assets per employee	$3,639.6	$4,156.0	$5,031.4	$8,044.6	$7,099.9
Average personnel expense	$62.7	$69.1	$74.6	$98.5	$91.2
Loans per employee	$2,007.1	$2,582.0	$3,215.6	$4,013.0	$3,697.7
Net income per employee	$27.4	$37.8	$59.8	$84.8	$74.7

Source: FDIC Statistics on Depository Institutions (SDI), http://www2.fdic.gov/sdi/main.asp.

Which Lines of Business and Customers Are Profitable?

The first step in identifying profitable growth is to determine which lines of business are profitable as well as which of the bank's customers are profitable. Once the returns from these lines of business and customers are identified, banks should allocate resources to the lines of business and customers generating the highest expected returns over time.

Line-of-Business Profitability Analysis

In order to analyze precisely the profitability and risk of various business lines, each line of business must have its own balance sheet and income statement. These statements are difficult to construct because many nontraditional activities, such as trust and mortgage servicing, do not explicitly require any direct equity support. Even traditional activities such as commercial lending and consumer banking complicate the issue because these business units do not have equal amounts of assets and liabilities generated by customers. Furthermore, the critical issue is to determine how much equity capital to assign each unit. This, however, is not a simple task. Alternative capital allocation methods include using regulatory risk-based capital standards; assignment based on the size of assets; benchmarking each unit to "pure-play" peers that are stand-alone, publicly held firms; and measures of each line of business's riskiness. Today, many large banks evaluate line-of-business profitability and risk via RAROC or RORAC systems. **RAROC** refers to risk-adjusted return on capital, while **RORAC** refers to return on risk-adjusted capital. The terms are often used interchangeably, but are formally defined as follows:

$$\text{RAROC} = \frac{\text{Risk-adjusted income}}{\text{Capital}} \tag{4.8}$$

$$\text{RORAC} = \frac{\text{Income}}{\text{Allocated-risk capital}} \tag{4.9}$$

What constitutes risk-adjusted income and allocated-risk capital may vary across institutions, but the concept is to identify some measure of return generated by a line of business and compare that return with the allocated capital. The income or return measure may be adjusted for risk (RAROC), which typically means that expected losses are subtracted from revenues along with other expenses. Alternatively, the capital measure may be adjusted for risk (RORAC), which typically means that it represents a maximum potential loss based on the probability of future returns or an amount necessary to cover loss associated with the volatility of earnings. In addition, some banks subtract a charge for capital from the return measure to estimate "economic returns."

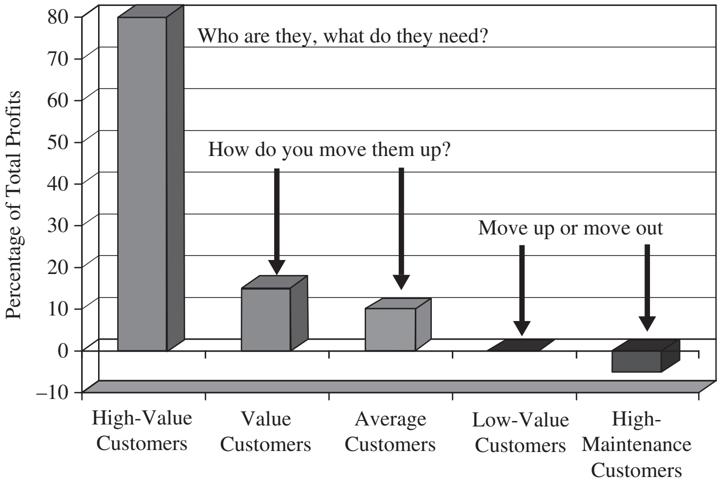
Customer Profitability Analysis

Customer profitability analysis is used to evaluate whether net revenue from an account meets a bank's profit objective. The general customer profitability rule is that 20 percent of a firm's customers contribute about 80 percent of overall profits.[5] The fundamental objective of customer profitability analysis, therefore, is to identify the profitability of individual customers. Firms that are more progressive also use customer profitability analysis to differentiate between the firm's high-value customers and those customers who are marginally profitable in order to move these latter customers to a more profitable position for the company.

Exhibit 4.10 graphically demonstrates that, with respect to the most profitable 20 percent of the business's customers, or high-value customers, the firm's objective is to identify them and determine their needs in order to protect and promote this important source of revenue. Next are the value and average customers, who contribute much less to profits but represent the second biggest strategic opportunity for the firm. The fundamental objective here is to move these customers into a more profitable position by selling them additional products or encouraging them to move additional business to the bank. The final two categories of customers represent the low-value and loss-type or high-maintenance customers. These customers are usually break-even or negative-value relationships. The primary objective with these customers is to determine a way to increase their profitability or encourage them to obtain services from other firms. Management must be extremely careful with these customers, however, in that they tend to be the most vocal and will often do more damage as noncustomers than as customers if they feel they have been treated poorly by the bank. See the Contemporary Issues box: "Strategies for Increasing Noninterest Income."

Customer profitability analysis is most often performed using monthly or quarterly historical data so that pricing can be modified where appropriate. The procedure involves comparing revenues from all services provided to a customer with associated costs and the

EXHIBIT 4.10 Customer Profitability 80–20 Rule



Source: The Authors.

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[5] Although this may be a commonly accepted phrase, many bankers argue that just 5 percent of customers produce around 90 percent of profits.

institution's target profit. Although the analysis applies particularly well to loan customers, it can be easily modified to evaluate noncredit activities. The appropriate comparison is:

$$\text{Account revenues} \overset{\geq}{\underset{<}{=}} \text{Account expenses} + \text{Target profit} \tag{4.10}$$

If revenues exceed the sum of expenses and the target profit, the account generates a return in excess of the minimum return required by the bank. If revenues equal expenses plus the target profit, the account just meets the required return objective. There are two other possible outcomes: If revenues fall short of expenses, the account is clearly unprofitable. When revenues exceed expenses but are less than the sum of expenses and target profit, the account is profitable but does not generate the minimum acceptable return to the bank.

The first step in evaluating customer profitability is to identify the full list of services used by a customer. The list normally includes transactions account activity, extension of credit, security safekeeping, and related items such as wire transfers, safety deposit boxes, and letters of credit. The next step is to assess the cost of providing each service. Unit costs can be determined from cost accounting systems or approximated from private sources. Often, specific figures vary substantially among different types of financial institutions because they allocate fixed costs and overhead differently. There is no best method for allocating fixed costs, so estimating unit expenses is, at best, an approximation. Institutions that do not have formal customer profitability models typically attribute it to the inability to allocate costs due to systems limitations.

Expense Components. Customer expenses consist of a host of various items but are usually categorized into one of three areas: noncredit services, credit services, and business risk expenses. Aggregate cost estimates for **noncredit services** are obtained by multiplying the unit cost of each service by the corresponding activity level. If, for example, it costs $7 to facilitate a wire transfer and the customer authorized eight such transfers, the total periodic wire transfer expense to the depository institution is $56 for that account. In general, check-processing expenses are the major noncredit cost item for commercial customers. If priced separately, service charge income should at least equal this aggregate cost. Estimating the cost of noncredit services, such as deposit accounts, is discussed in more detail in Chapter 10.

CONTEMPORARY ISSUES

Strategies for Increasing Noninterest Income

Increasing noninterest income is the goal of many financial institutions today. The question of *how* is central to that mission. Determining the best method for increasing noninterest income is critical not only to profitability, but to the overall mission of the institution. It would generally not make sense for a community bank with a predominantly retirement-age customer base to begin offering the latest in high-technology gadgets. Still many senior citizens use a good deal of technology today, and the bank must offer technology products catered to their needs. Most experts agree that it usually makes more sense to increase the profitability of existing customers first, before going after new customers.

Former Citigroup co-chair John S. Reed said the banking industry has failed to fully understand and seize the potential of the consumer banking business. "We have a tendency to practice what I call harassment pricing—stick an extra 50 cents on that ATM because you need the revenue," explains Reed. "Most people want access to their money at no cost, and you can understand why." ATM surcharges and NSF (not sufficient funds) fees have been popular methods of increasing noninterest income, although both are coming under more scrutiny by the Consumer Financial Protection Bureau. Even though these fees do increase income, at least in the short run, they might not create value for the institutions if they create more bad will than long-term profit. Therefore, the first step to increasing noninterest income is to *know your customer*. This seems obvious but many businesses do not always have a good handle on who their best customers are and what they need that the bank could provide. When businesses don't know the needs of their best customers, they often find those customers seeking solutions from other providers. These same customers then ask themselves, "Why do we need to do business at the old bank?"

To improve noninterest income, financial firms should profile their best five or six customers and ask why they do business with them. Managers should then determine what type of financial business these customers do with the bank. On the basis of this information, one can then determine how to increase the profitability of these best customers by satisfying their needs. The following list represents the priorities, in order, of a successful strategy for increasing noninterest income:

1. Determine whether all existing products and services are priced appropriately. If not, adjust pricing.
2. Examine exceptions to existing pricing policies to determine whether policy adjustments are needed.
3. Effectively sell, or cross-sell *existing* products and services. Often this requires additional training for employees.
4. Examine and evaluate the bank's market to determine whether the bank is in the right market and offering the right products for that market and its customers. If not, then consider expanding the bank's geographic market and product and service lines:
    - Expand into new markets with existing products by developing new products and services that do the following:
      —Leverage and retain existing customers
      —Attract new customers

The central theme is that offering the latest trendy products is not always the best business strategy. It is most important to determine the appropriateness of existing products first. Are they priced correctly, and is the bank charging the appropriate fees at the appropriate times? Do employees know and understand the existing product line, and are they effectively cross-selling these existing products? Experts agree that the first three strategies often bring the best results in the short run. Expanding the product line or the market in which the bank sells these products is expensive and risky. This is often a good strategy for growth but requires extensive market research.

Cost estimates for **credit services** usually represent the largest expense and are related to the size and type of loan. These costs include the interest cost of financing the loan as well as loan administration expense. The **cost of funds estimate** may be a bank's weighted marginal cost of pooled debt or its weighted marginal cost of capital at the time the loan was made. This calculation follows that described in Chapter 10. **Loan administration expense** is the cost of a loan's credit analysis and execution. It includes personnel and overhead costs as well as direct costs for sending interest bills, processing payments, and maintaining collateral. The charge may be imposed on a per-item basis, determined by the unit cost of handling a loan times the number of notes outstanding, or computed as a fixed percentage of the loan amount.

The final expense, **business risk expense**, is difficult to measure directly and represents actual cash expense (losses) as well as noncash expense, or allocations for potential losses. There are several types of business risk associated with the provision of banking services. With respect to noncredit services, the largest single risk is transaction risk.

Transaction risk is the current and prospective risk inherent in transactions from fraud; theft; error; integrity of computing systems; internal controls; and delays or disruptions in processing, clearing, and settling payment transactions, which could lead to credit and liquidity problems, as well as affect earnings and capital. Each time a customer makes a deposit or withdrawal to his or her account, writes a check, or makes a purchase with a credit card, the bank is at risk. As most of us know, consumers have well-defined limits of liability on their credit cards in the event the card is lost, stolen, or otherwise unauthorized charges appear on the bill. The risk to the bank can be enormous and is determined by the quality of its control systems. The bank must allocate reserve funds for the potential that a customer may lose his or her credit card or checkbook, have an ATM pin number compromised, or that a computer hacker might break into the bank's systems. The majority of transaction risk resides with the bank. More importantly, the extensive use of the Internet and other electronic data sources puts the bank at risk from unauthorized entry into its data systems, illegal transfer of funds, fraud, and embellishment. These expenses are difficult to predict at the individual level but can represent tremendous amounts of money. With effective controls, these transaction risks can be controlled and estimated in the aggregate relatively accurately, but the bank is always at risk for that one-in-a-million chance that a serious breach in controls or security could create liquidity or even solvency problems.

With respect to credit services, **default risk** represents the largest single risk. A formal allocation of risk expense represents one method of handling the impact of potential loan losses. Many banks categorize loans according to their risk characteristics at the time of issue. Low-risk loans, which typically have short-term maturities, are those extended to borrowers with strong financial statements, adequate cash flow and collateral, and sound management. High-risk loans, which generally have longer maturities, are extended to borrowers with weaker financial statements, low cash flow, and collateral that potentially fluctuates widely in value. Management first ranks loans by these characteristics and historical default experience, assigning each loan to a particular risk class. This risk rating system allows different charges for potential loss in the event of default with different likelihoods of default, as well as different magnitudes of loss when in default. The actual risk expense measure equals the historical default percentage for loans in that risk class times the outstanding loan balance.

Revenue Components. Depository institutions generate three types of revenue from customer accounts: investment income from the customer's deposit balances held at the bank, fee income from services, and interest and fee income on loans. Account profitability analysis provides a pricing framework that compares the sum of these revenues with expenses and the target profit.

Every deposit that customers hold generates **investment income from deposit balances** for the bank. In cases involving transactions accounts, banks must set aside legal reserves as a percentage of deposits, but they can invest remaining balances that exceed customer float on the account. Many customers are net depositors as their balances exceed any loans the bank has extended them. Other customers are net borrowers as their outstanding loans are greater than their total deposits. As such, a customer does not borrow his own deposits, but rather all funding comes from all pooled debt and equity. Implicitly, customer deposits are viewed as part of a bank's total available funds. Thus, the cost of financing a loan equals the weighted cost of debt times the full amount of the loan plus the cost of equity, which is the target return to shareholders. Investment income is allocated using an **earnings credit** as an estimate of the interest a bank can earn on the customer's investable balances.

Financial firms increasingly rely on noninterest income **(fee income)** to supplement earnings. Competition among savings banks, credit unions, brokerage houses, insurance companies, and other commercial banks has increased borrowing costs relative to yields available on loans. This pressure on NIMs and growth constraints from capital restrictions make new products and services income the most promising source of earnings growth. Many corporate customers, in turn, are so efficient at minimizing their deposit balances that fees represent a better source of income than interest income from compensating deposit balances. When analyzing a customer's account relationship, fee income from all services rendered is included in total revenue. Fees are frequently charged on a per-item basis, as with Federal Reserve wire transfers, or as a fixed periodic charge for a bundle of services, regardless of usage rates. Fees for servicing mortgage loans supported by pass-through securities and providing letters of credit, financial guarantees, data processing, and cash management have recently risen at banks, which aggressively market these services.

Loan interest represents the primary revenue source in a vast majority of financial institutions, as loans are the dominant asset in their portfolios. The actual interest earned depends on the contractual loan rate and the outstanding principal. Although financial institutions quote many different loan rates to customers, several general features stand out. Most price commercial loans off base rates, which serve as an index of their cost of funds. Common base rate alternatives include the federal funds rate, CD rate, commercial paper rate, the London Interbank Offer Rate (LIBOR), the LIBOR swap curve, Wall Street prime, and a bank's own weighted cost of funds. The contractual loan rate is set at some mark-up over the base rate, so that interest income varies directly with movements in the level of borrowing costs. Such floating-rate loans are popular at financial companies because they increase the rate sensitivity of loans in line with the increased rate sensitivity of liabilities. In addition, the magnitude of the mark-up reflects differences in perceived default and liquidity risk associated with the borrower. The mark-up increases with loans in higher-risk classes and with maturity as there is more time for the borrower's condition to deteriorate.[6] Finally, a substantial portion of commercial loans carry fixed rates. In each case, the contractual rates should reflect the estimated cost of bank funds, perceived default risk, and a term liquidity and interest rate risk premium over the life of the agreement.

Aggregate Profitability Results from Customer Profitability Analysis

Examining aggregate results from customer profitability analyses across different depository institutions reveals several interesting points. First, as indicated above, a small percentage of customers contributes the bulk of bank profits. Second, many customer profitability models show that a significant difference between profitable and unprofitable accounts is that profitable customers maintain multiple relationships with the financial institution, such as substantial loan and investment business. Unprofitable customers, on the other hand, tend to go where they get the best price or do not use multiple products. This should encourage banks to offer product bundles based on the size of the bank's relationships. For example, Wells Fargo offers multiple types of checking accounts that come bundled with free or reduced costs for a variety of services for various tiers of high-combined-balance (total of deposit and loan balances) customers. Finally, banks that want to increase revenues should identify the perceived value of services by customers and price the services accordingly. In 1995, First Chicago imposed a $3 fee each time customers used a live teller in the bank's branches. Not surprisingly, this was a public-relations nightmare once the media got word of it. Other

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[6] When a comprehensive customer profitability analysis is used, the mark-up reflects either default risk or required interest to cover expenses and meet profit targets. Many banks price loans independently from other account activity.

Chicago banks aggressively marketed their no-fee teller services in an attempt to draw business from First Chicago. Still, First Chicago lost less than 1 percent of its customers, cut its branch employees by 30 percent, and saw ATM usage and deposits grow by 100 percent in the first three months. The same cannot be said of Bank of America's planned $5 annual fee for debit cards in 2011 as a response to the Federal Reserve's capping of debit transaction fees at 21 cents. The public and emotional outcry against the fee was so great that Bank of America abandoned the implementation shortly after announcing it!

Although these types of accounts may be public-relations nightmares, they make great business sense. Live teller transactions are the highest-cost type of transactions for a bank. Most banks give these services away free and then charge their customers to use their lower-cost ATM and electronic transactions services. Even though this practice makes poor business sense, it continues because of the customer backlash against imposing fees on transactions that have traditionally been free. Few young people actually visit the bank today; they write few if any checks and do not use the ATM machine for cash. Their primary form of payment is the use of their debit card. Depository institutions tailor accounts to fit their need for low-cost, low-minimum-balance accounts. In the future, successful banks will offer products that meet their customers' needs and price all of their services according to costs, not tradition!

It is important to recognize that just knowing how profitable a customer is does not demonstrate how to use the information. To increase noninterest income, financial firms should attempt to make unprofitable customers profitable by providing them with incentives to buy more services or buy a package of services that meet their wants and needs. This often involves offering price incentives to use ATMs or other low-cost channels for delivering services. For example, many institutions offer a no-minimum-balance, no-service-charge checking account for students. Many institutions pay for their customers' use of other banks' ATMs. Others waive fees and offer attractive interest rates to customers who are highly profitable in order to maintain their relationship with them or encourage them to use the services that are best for the bank.

What is the Appropriate Business Mix?

Some fee income derives from relatively stable services and lines of business, often referred to as reoccurring income, while other fees are highly volatile and reflect changing volumes and pricing. In today's environment, most banks attempt to manage fee income in a portfolio context. Fee income from deposit service charges is quite stable and will likely exhibit modest growth. Still, banks must be aware that they are at great risk from brokerage firms that continue to eat into commercial banks' share of this business. This is particularly true of Internet brokerage firms.

Deposit service charges should be balanced with fees from other lines of business or products with higher growth potential. Exhibit 4.11 shows the composition of various noninterest income components as a percentage of total noninterest income. Investment banking generally refers to the combination of securities underwriting, creation of markets in securities, and fees from investment or merger and acquisitions advice. Trading income derives from operating a trading desk for customers whereby the bank maintains an inventory of securities to buy and sell, and from proprietary trading of securities and derivatives for its own account. Intermediation and/or fee-based operating businesses include activities such as specialized consumer finance operations, specialty leasing, factoring, insurance products, mutual fund sales, and investment management.

The potential of these types of fees is the motivation behind banks' acquiring or merging with insurance companies. Financial companies have always sought out potential synergies between commercial banks, insurance companies, and brokerage companies which could lead to a wide range of products such as credit cards, mortgages, small business loans,

EXHIBIT 4.11 **Percentage of Various Components of Total Noninterest Income, 2013**

Percentage of Total Noninterest Income	<$100M	$100M–$1B	$100M–$1B	>$10B
Service charges on deposit accounts	26.5%	24.2%	21.7%	13.1%
Fiduciary activities	27.6%	10.1%	13.2%	13.1%
Net securitization income	0.0%	0.0%	0.0%	0.5%
Trading account gains and fees	0.0%	0.0%	0.8%	10.9%
Investment banking, advisory, brokerage, and underwriting fees and commissions	6.1%	3.0%	4.7%	4.4%
Net servicing fees	2.0%	5.1%	3.1%	7.7%
Loan and asset sales	10.2%	26.3%	20.9%	3.8%
Insurance commission fees and income	2.0%	2.0%	2.3%	1.1%
Venture capital revenue	0.0%	0.0%	0.0%	0.0%
Other noninterest income	31.6%	36.4%	38.0%	45.9%

Source: FDIC Statistics on Depository Institutions, www2.fdic.gov/sdi/main.asp.

consumer loans, leases, insurance, brokerage services, securities underwriting, and so on, via subsidiaries that specialize in each. Unfortunately, this concept has typically worked better in theory than in practice, as few if any financial institutions have been able to combine all three activities with much success. In fact, in the 1980s, Sears acquired Allstate Savings and Loan, Allstate Insurance, Dean Witter and Coldwell Banker. Sears even created the Discover Card before selling off the product to Citigroup. Sears attempted to put financial services representatives in each of its retail stores but discovered very quickly that the typical consumers did not go "retail" shopping and seek financial advice at the same time! Sears ultimately was forced to divest itself of all of its financial divisions. Citigroup revived the concept in 1997 and acquired Travelers Insurance. Unfortunately, Citigroup discovered, similarly to Sears, that it was difficult to generate the desired synergies and cross-sell opportunities and sold off the Travelers division in the early 2000s.

Community banks, on the other hand, do not have the same opportunities to enter investment banking and specialty intermediation. However, they do have other potential avenues. Many community banks work with bankers' banks in the same geographic area to offer services that they could not offer independently. These **bankers banks** are effectively correspondent banks that are owned by member institutions, such that community banks own the bankers' banks. Bankers banks typically make loans to members, trade federal funds, and offer investment, trust, and data processing services. A relatively new twist finds bankers' banks offering trust services to customers of nonmember institutions.

Many depository institutions offer home equity lines of credit, residential mortgage originations, second mortgages, and adjustable-rate mortgages. Today, a significant number of commercial banks are offering some relatively new products such as remote deposit capture, health savings accounts, and mobile banking. Remote deposit capture allows businesses to deposit paper checks from their offices using a scanner without having to go to the bank. Mobile banking allows consumers to pay bills, transfer money, and deposit checks using their smart phones. Although there are risks involved in remote deposit capture and mobile banking, the cost benefits are significant. As economic conditions change, some businesses will generate increasing fees while others will see fees drop. This same rationale applies in mortgage banking, where loan origination fees vary inversely with mortgage servicing revenue.

An obvious problem is that some managers view these volatile fees as permanent sources of income. In fact, they are not. This point was demonstrated by the reduction in mortgage activity and associated fees when interest rates increased during 2004–2005. The vast majority of home mortgages were created during the early 2000s and as interest rates increase, the rate of refinancing slows dramatically. A dramatic reduction in mortgage fees will undoubtedly occur when interest rates begin to rise after several years of historically low rates following the 2008 financial crisis . The stock market crash of the early 2000s dramatically reduced retail stock trades and the fees associated with them as did the stock market crash of 2008–2009. Even entire companies can be subject to highly volatile income streams. Prior to the financial crisis of 2008, several financial institutions, including Countrywide Financial, built a business model based on fees from subprime and Alt-A (lower risk than subprime but higher risk than prime) mortgage originations. When the liquidity sources that were needed to securitize these assets dried up in 2008, these companies experienced a dramatic reduction in current and future income.

A related problem is that some banks view their fee businesses on a transactions basis; that is, they originate loans to distribute or sell. As such, they cut interest rates on loans and even reduce standards so that they can book additional fee income, and since they intend to sell the loans to an investor, they are less concerned with the true risk of the loan. This was clearly the case with subprime mortgage originations in 2006 and 2007. This creates the perception that the business is winnable only when they are the lowest-price provider—or even worse, the lowest-standards provider. Instead, financial institutions should attempt to build the same type of customer relationships that they have successfully built with many deposit and loan customers. This can be accomplished by focusing on the customers' needs across a broad range of services, rather than on single transactions, and pricing them accordingly.

Strategies for Managing Noninterest Expense

Consider the competitive environment in which financial institutions operate. The basic business of banking has always been accepting deposits and making loans. In today's world, depository institutions are high-cost producers relative to money market funds run by brokerage houses and relative to the commercial paper and bond markets used by corporate borrowers. Comparatively, noninterest expense is too high and earnings are too low. For many depository institution managers, this mandates austere budgets directed at controlling expenses.

Since 1985, noninterest expense at commercial banks has increased each year at a declining rate. This primarily reflects efforts to cut costs and increase profitability that are driven by a fear of being acquired and/or being noncompetitive. Quite simply, senior managers of acquired banks typically find that they are looking for new positions shortly after an acquisition, a fate they most aggressively try to avoid. This begs some obvious questions, however: Are there too many banks, credit unions, and other financial institutions in the United States? Do we need three different competing institutions on every downtown street corner? If banks in the same market combined their operations, they could cut payroll and occupancy expenses, eliminate boards of directors, and use computer technology more efficiently. The cost savings would be recurring and fall right to the bottom line. In fact, potential cost savings has motivated much of the bank merger and acquisition activity.

When they initially consider noninterest expenses, many managers focus on reducing costs. A more comprehensive strategy, however, is to manage costs in line with strategic objectives. Does it not seem sensible, for example, to invest in new technologies if the institution will reduce operating costs long-term, even if the investment adds to noninterest expense in the near term? The basic issue is to determine whether the return on the investment exceeds the weighted marginal cost of capital. If it does, the investment adds value to shareholders.

Cost Management Strategies

What then is cost management? In general, it is a philosophy of allocating resources to the most profitable lines of business to achieve improved performance. There are four basic expense management strategies: expense reduction, operating efficiencies, revenue enhancement, and contribution growth.

Expense Reduction. Many financial firms begin cost management efforts by identifying excessive expenses and eliminating them. Given that noninterest expenses consist primarily of personnel, occupancy, and data processing costs, these are the areas where cuts are initially made. It is not unusual to hear of financial companies announcing widespread employee reductions even absent any merger or acquisition. Citigroup, for example, as a result of significant write-offs in subprime mortgage securitizations, announced 13,000 employee layoffs in early 2008 and another 6,500 from its investment banking division in April of 2008.

Because of the high cost of employee benefits, many firms attempt to use temporary workers who do not receive health insurance coverage and other benefits. Other common areas for cutting include the number of branch offices and employee medical benefits. Many smaller-to-midsized depository institutions have eliminated their data processing department altogether and contracted to buy data processing services from a nonbank vendor such as FiServ, IBM or Jack Henry. In industry jargon, this is referred to as **outsourcing**.

Operating Efficiencies. Another strategy is to increase operating efficiency in providing products and services. This can be achieved in one of three ways:

1. By reducing costs but maintaining the existing level of products and services
2. By increasing the level of output but maintaining the level of current expenses
3. By improving workflow

All of these approaches fall under the label of *increasing productivity* because they involve delivering products at lower unit costs. The first approach typically involves cutting staff and increasing work requirements to maintain output. Fewer people do the same amount or more work. The second addresses economies of scale and economies of scope in banking. **Economies of scale** exist when average costs decrease as output increases. Diseconomies exist when average costs increase with greater output. **Economies of scope** focus on how the joint costs of providing several products change as new products are added or existing product output is enhanced. The argument is that joint costs will grow by less than the costs associated with producing products or providing services independently. For example, if a bank adds a new product line and can provide it and existing products at a lower unit cost than previously, economies of scope exist. Finally, improving workflow involves increasing productivity by accelerating the rate at which a task or function is performed. The intent is to eliminate redundant reviews or tasks and thereby shorten the time to finish a task.

The results of a Booz Allen Hamilton study, summarized by Sanford Rose (1989), identified three myths in bank managers' perceptions about noninterest expense. The first is that banks operate with high fixed costs. Fixed costs create problems because they cannot be reduced (i.e., controlled) by managers. If banks eliminate some products or services, existing fixed costs must then be allocated to any remaining products. According to the study, however, only 10 percent of costs are shared among products and thus are truly fixed. The implication is that banks can eliminate products that are unprofitable or marginally profitable, and the average costs of remaining products will be largely unchanged. The second myth is that banks produce many products at the point of minimum unit costs. In the study, just 3 out of 15 large banks were scale producers. The remaining 12 banks would be better off either merging with other banks or outsourcing products. The third myth is that most reductions in expenses are permanent and have a significant impact on overall profitability.

Revenue Enhancement

Revenue enhancement involves changing the pricing of specific products and services but maintaining a sufficiently high volume of business so that total revenues increase. It is closely linked to the concept of price elasticity. Here, management wants to identify products or services that exhibit price-inelastic demand. An increase in price will lower the quantity demanded of the underlying product, but the proportionate decrease in demand is less than the proportionate increase in price. Revenues thus increase. Alternatively, management can attempt to expand volume while keeping price constant. This can often be achieved by target marketing to enlarge the base of consumers. It also is a by-product of improving product quality. If customers perceive an improvement in quality, they will consume more and/or willingly pay a higher price.

Contribution Growth. With the strategy of contribution growth, management allocates resources to best improve overall long-term profitability. Increases in expenses are acceptable and expected, but must coincide with greater anticipated increases in associated revenues. An example might be investing in new computer systems and technology to provide better customer service at reduced unit costs once volume is sufficiently large. In essence, expenses are cut in the long run but not in the near future.

Obviously, different organizations follow different cost management strategies. This follows from differences in individual organizations' operating environments as determined by business mix, overall corporate strategic objectives, the geographic markets served, and history of cost management behavior. Each strategy can be successfully implemented if pursued with long-term objectives. Rather than use traditional measures of expense control to monitor performance, managers should examine noninterest expense relative to operating revenue as compared with peers that offer the same business mix. Remember that cost management does not necessarily mean that expenses decline in absolute terms.

The net result of cost management is that financial institutions will operate as leaner competitors. This should enhance long-term profitability and survival prospects in the consolidating banking industry. The negative aspects include the painful effects of replacing people with machines, requiring greater on-the-job work effort that potentially increases employee stress, and in many cases reduced support of community activities.

Summary

This chapter examines three issues related to managing a bank's noninterest income and noninterest expense. First, it describes the strengths and weaknesses of commonly used financial ratios that presumably measure a financial institutions' ability to control noninterest expense and grow noninterest income. Second, it discusses why financial firms should focus on customer profitability and the mix of fee-based businesses to improve operating performance. Third, it describes different cost management strategies intended to enhance performance.

The most commonly cited ratio today is the efficiency ratio, which is equal to noninterest expense divided by the sum of net interest income and noninterest income. The lower the ratio, the better a bank's performance—ceteris paribus—because it indicates how much a bank must pay in noninterest expense to generate one dollar of operating revenue. Many depository institutions cite this ratio along with return on equity, return on assets, and net interest margin when describing performance for the entire company. Stock analysts, in turn, cite this ratio when recommending bank stocks. Other key ratios describe a bank's productivity in terms of assets, expense, and net income relative to the number of full-time employees.

A crucial facet of managing noninterest income and expense is knowledge about the profitability of different customer relationships. This information allows management to target products and services and alter pricing strategies to ensure that customers get what they want and that the packages of services or products are profitable. Finally, it is appropriate for banks to follow many different cost management strategies as long as the objective is to enhance shareholder value.

Questions

1. When confronted with runaway noninterest expense, management's first impulse is to cut costs. What are the advantages and disadvantages of this approach? What other approaches are possible?
2. What are the primary sources of noninterest income for both a small community bank and a large bank with many subsidiaries and global operations?
3. What are the components of noninterest expense?
4. Describe why the efficiency ratio is a meaningful measure of cost control. Describe why it may not accurately measure cost control. What are the three primary parts of the efficiency ratio? Are there any trade-offs among these three components? Explain.
5. Which of the following banks evidences better productivity? Both banks have $700 million in assets and conduct the same volume and type of business off-balance sheet.

	Tri-Cities Bank	**Pacific Rail Bank**
Assets per employee	$1,530,000	$1,880,000
Personnel expense per employee	$33,750	$42,600

6. Southwestern Bank reports that just 20 percent of its customers were profitable. Assuming that this applies to individuals' account relationships, make three recommendations to increase the profitability of these accounts.
7. Suppose that your bank imposes the following fees and/or service charges. Explain the bank's rationale and describe how you would respond as a customer.
   a. $1.50 per item for use of an ATM run by an entity other than your own bank
   b. $4 per transaction for using a live teller rather than making an ATM or telephone transaction
   c. Increase in the charge for insufficient funds (where a customer writes a check for an amount greater than the balance available in the account) from $25 per item to $30 per item
   d. A 1 percent origination fee for refinancing a mortgage

8. List the three primary sources of revenue from a commercial customer's account. In today's economic environment, indicate whether each is growing or declining in use and explain why.
9. For each of the following accounts, evaluate the profitability of the customer's account relationship with the bank. Did profits meet expectations? The expense figure includes the cost of debt but not the cost of equity. Figures are in millions of dollars.

	Expenses	Revenue	Target Profit
Class Action Corp.	$11.45	$12.98	$1.50
Zisk Drive	$131.81	$130.27	$4.66
Gonzo Ltd.	$88.35	$93.77	$6.58

10. What impact will online brokerages have on traditional commercial banks? Why?
11. Describe the strengths and weaknesses of expense reduction, revenue enhancement, and contribution growth strategies.
12. Your bank has just calculated the profitability of two small business customers. In both instances, the bank earned a monthly profit of $375 from both Detail Labs and The Right Stuff. Detail Labs had a large loan with the bank and small account balances. Its principals bought no other services from the bank. The Right Stuff had only a small loan, but used the bank for payroll processing and the firm's checking account transactions. The principals also had checking and CD accounts with the bank.
    a. What additional services or products would you suggest that the bank market to each of these customers?
    b. Discuss how the source of profitability will influence the choice of services and products that you recommend.

Activity

Suppose that you operate a large commercial bank, the performance of which is closely followed by a large number of stock analysts. You have just received a summary of five different analysts' reviews of your bank's performance. The essence of each report is that the bank must lower its efficiency ratio from the current 59 percent to less than 52 percent before the analysts will put a strong buy recommendation on the stock. Otherwise, the bank is viewed as a takeover target.

a. Describe several strategies that you might pursue in response to these reports.
b. Discuss the strengths and weaknesses of each strategy. Do stock analysts generally have a reasonable influence on bank managers, or is their influence too great?
c. Discuss whether management should focus on the operating risk ratio and what the likely impact of efforts to reduce this ratio will be.

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5 The Performance of Nontraditional Banking Companies

During 2008 both the U.S. banking system and global banking system changed dramatically. Governments throughout the world propped up many large banks by buying their preferred stock in order to recapitalize institutions that wrote down large amounts of assets. The largest investment banks either failed (Lehman Brothers); were sold to other, more traditional, banks (Bear Stearns and Merrill Lynch); or converted to financial holding companies (Goldman Sachs and Morgan Stanley).[1] Today, there are no pure large U.S. investment banks remaining; they have all converted into financial holding companies, i.e., banks.

The credit crisis revealed important flaws in the operating models of large financial companies that did not have stable sources of funding. Bear Stearns and Lehman Brothers were both highly levered and highly dependent on their ability to roll over their short-term borrowings. As liquidity dried up during the financial crisis, these and other firms found that many lenders with significant concerns on future losses would not lend to them, sometimes even on a fully secured basis. Their inability to roll over their short-term funding and their over-dependence on this funding for liquidity quickly forced each of these companies to face the possibility of bankruptcy. The liquidity problem became so great that even GE began to have difficultly issuing additional commercial paper to fund its operations. GE subsequently changed the way it financed the company and dramatically reduced its use of short-term commercial paper. See Chapters 3, 10, and 11 for a detailed discussion of the various methods of ensuring liquidity and funding sources at financial institutions.

The liquidity crisis was the principal reason some of the largest financial companies converted to financial holding companies and accepted TARP funds. Large nondepository institutions such as American International Group, Goldman Sachs, Morgan Stanley, and American Express converted to financial holding companies to ensure access to borrowings from the Federal Reserve, thereby providing the needed path to a secure liquidity source in which to avert a much larger crisis. The price each of these companies had to pay was coming under the much stricter regulatory authority of the Federal Reserve. Nevertheless, given the magnitude of the developing liquidity crisis, most experts considered

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[1] As indicated in Chapter 3, a financial holding company is regulated as a bank. The "popular press" often refers to companies such as Goldman Sachs and Morgan Stanley as bank holding companies. But a bank holding company and a financial holding company are two different types of entities for regulatory purposes (See Chapter 3).

this a path of lesser evil needed to regain lender confidence and ensure long-term survivability. Thus began the great transformation of the financial services sector in which all large pure investment banks became financial holding companies (commercial banks) under the much stricter regulation of the Federal Reserve.

American International Group, Inc. (AIG), the world's largest insurance company before the financial crisis, was bailed out by the U.S. government three different times; the Treasury eventually committed more than $150 billion to its rescue. MetLife, the world's fourth-largest insurance company in 2014, converted to a financial holding company in 2001, well before the financial crisis. MetLife was ready to accept TARP funds in 2008 but eventually decided against participating in the government program. Although MetLife executives might not have realized the full consequences of not accepting TARP funds at the time, this decision allowed MetLife to deregister as a financial holding company in early 2013, shedding supervision by the Federal Reserve.[2]

Several foreign banks have also attempted to avoid Federal Reserve supervision by restructuring their domestic banking units. Barclays deregistered Barclays Group US as a bank financial holding company, moving the credit card portfolio to a new U.S. company, which is a subsidiary of the British Barclays' parent company. The FDIC, rather than the Federal Reserve, will regulate this company. The move will allow Barclays to avoid adding billions of additional capital, called for by Dodd–Frank, into the banking unit. Similarly, Deutsche Bank AG deregistered its U.S. subsidiary, Taunus Corp., as a financial holding company in February 2012 to avoid new capital requirements of Dodd–Frank as well. It appears that the Dodd–Frank Act has increased the costs and complexity of being designated a financial holding company due to higher capital requirements but has left a loophole for foreign banks.

In this chapter, we analyze the financial performance of several nontraditional banking companies. The purpose is to demonstrate the range of organizations that provide basic banking services and their different business models. Institutions that provide basic banking services are those that accept deposits in the form of transactions accounts and make loans. The three organizations discussed in this chapter are Goldman Sachs, Mutual of Omaha Bank, and BMW Bank. In addition, comparisons will be made with the institutions introduced in Chapter 3, PNC Bank and Community National, USAA, and aggregate peer data.

Prior to 2008, Goldman Sachs had long been the world's premier investment bank. In 2008, however, Goldman and most other pure investment banks converted to financial holding companies in response to the global credit crisis. This has definitely changed the landscape in the investment banking arena. The principal objective motivating the conversion was to ward off a liquidity crisis by gaining access to borrowing from the Federal Reserve in the short-term and the more stable core deposits of traditional banks over the long-term. Mutual of Omaha Bank (MO Bank) is a subsidiary of Mutual of Omaha Insurance Company, a large insurance company that specializes in offering life

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[2] The so called "Hotel California" provision of the Dodd–Frank Act would prevent evasion of Federal Reserve supervision by large financial holding companies that have received TARP funds by simply eliminating their banks. Because MetLife did not receive TARP funds, it would appear they would be able to escape Federal Reserve oversight. However, MetLife and other similar large financial institutions might still be designated as systemically important financial institutions (SIFIs) by U.S. regulators and thereby subject to Federal Reserve oversight even if they are not financial holding companies.

insurance products. MO Bank is atypical in that its parent company, Mutual of Omaha Insurance Company, runs the bank as an independent company, wholly owned by the parent. BMW Bank is an industrial loan corporation (ILC) that is owned by BMW Financial Services, a division of BMW North America, which manufactures automobiles. BMW Bank is chartered by the state of Utah and is also regulated by the FDIC because its deposits are FDIC-insured.

Each of these firms offers a variety of financial services that produces a risk and return profile different from that of a traditional commercial bank. Yet, each is regulated as a bank because it offers FDIC-insured deposits, although the parent company might not be a financial holding company and regulated as such. For example, Goldman Sachs Bank USA is a state-chartered bank and member of the Federal Reserve System. Hence, the Federal Reserve Bank of New York and the New York State Department of Financial Services regulate it. Goldman Sachs Group, Inc., the parent company, is regulated by the Federal Reserve due to its filing as a financial holding company. BMW AG, however, owns BMW Bank as an ILC. Hence BMW Bank is regulated by the FDIC, but the car company, BMW AG, is not regulated by the Federal Reserve, because BMW AG did not register as a financial holding company.

When analyzing nontraditional banks, an obvious question arises: "Why would these firms choose to operate as banks either through subsidiaries or in their overall operations?" For Goldman Sachs, converting to a financial holding company helped prevent a run on the bank associated with market participants' fear that the firm would not have access to sufficient liquidity to maintain its normal operations. By contrast, BMW Bank operates a bank subsidiary as part of a strategy to cross-sell services; i.e., to sell credit card and related financial services to BMW's core customers. MO Bank is unique in that the parent, Mutual of Omaha Insurance, considers the bank a wholly owned bank investment rather than a pure cross-selling institution. Although the MO Bank has cross-selling opportunities in the insurance products area, unlike BMW Bank, it has focused primarily on developing as a commercial bank.[3] Both banks provide access to low-cost deposit funding to finance credit card receivables and other types of loans.

The Disappearance of Large Investment Banks

During the late 1990s, Congress removed most of the restrictions that separated commercial banking from investment banking. Chapter 3 describes the basic features of commercial banks that focus on deposit gathering and lending. Investment banks, by contrast, focused on generating income from capital markets activities rather than relying on the spread between yields on assets held in portfolio and rates paid on funding to generate earnings. In 1999, Congress passed the Financial Services Modernization Act (Gramm–Leach–Bliley Act), which effectively allowed commercial and investment banks to merge. The act encouraged consolidation and expansion into new businesses. Exhibit 5.1 provides a time-line summary of how the largest U.S. investment banks that existed in the late 1980s through the 2000s gradually became commercial banks subject to regulation by the Federal Reserve System. These institutions have been, and continue to be, in transition since their conversion to financial holding companies that led to a restructuring of their businesses.

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[3] Actually, Mutual of Omaha Bank is a Savings Association at the time of this writing. With the elimination of the Office of Thrift Supervision, it is possible Mutual of Omaha Bank will change its charter to a bank charter.

EXHIBIT 5.1 **How U.S. Investment Banks Have Transitioned to Commercial Banks**

Company	When	What
First Boston	1988	Bought by Credit Suisse
Salomon Brothers	1997	Bought by Travelers
Dean Witter Reynolds	1997	Bought by Morgan Stanley
Donaldson, Lufkin & Jenrette	2000	Bought by Credit Suisse
J.P. Morgan	2000	Bought by Chase
PaineWebber	2000	Bought by UBS
A.G. Edwards	2007	Bought by Wachovia
Bear Stearns	2008	Bought by J.P. Morgan Chase
Goldman Sachs	2008	Became financial holding company
Lehman Brothers	2008	Failed, brokerage bought by Barclays
Merrill Lynch	2008	Bought by Bank of America
Morgan Stanley	2008	Became financial holding company

Adapted From: David Enrich, "Walls Come Down, Reviving Fears of a Falling Titan," *The Wall Street Journal*, September 23, 2008, with modifications.

Investment banks generally engage in four broad types of business: securities underwriting, advisory services, market making, and proprietary trading and investing. While they hold some loans and have limited funding from deposits, these firms generate a small portion of their overall net income from net interest income or the spread.

Securities Underwriting

Investment banks assist businesses and governments in raising funds through the issuance of bonds or stocks. When an organization needs funds, it will often contact an investment bank to discuss the amount needed, what type of security (bond or equity) to sell to investors, and what the terms of the offering might be. If the security offering is a first-time placement for the organization, it is called an initial public offering (IPO). If the firm already has securities outstanding that are publicly traded, it is called a secondary offering. The underwriting process consists of helping the organization design the security to meet all legal and regulatory requirements, identify potential buyers, price the security, and sell the security into the marketplace. Investment banks receive payment for flotation costs as well as legal, accounting, and marketing costs, and they earn a fee, labeled the underwriting discount, equal to a percentage of the amount of securities sold. They may also purchase a portion of the securities and hold them in portfolio.

Advisory Services

Investment banks offer numerous fee-based services to businesses and governments that assist them in managing risks and reviewing possible business combinations. The primary services include providing advice concerning mergers and acquisitions and spin-offs of lines of business; managing investable assets for governments, pension funds, and high-net-worth individuals (investment management); and making risk-management decisions involving the uses of foreign currencies, commodities, and derivatives.

Market Making

Investment banks may make a market in certain securities. Consequently, they stand willing to buy securities from participants who want to sell and to sell securities to participants who want to buy. They profit from the bid-ask spread (the difference between the selling price and the purchase price of the security). They may also make a profit from the difference between the yield on the securities owned and the interest paid on debt financing. The investment bank acts as a broker that facilitates the transaction as well as the profits from commissions on the trades, but does not take ownership of the underlying security.

Proprietary Trading and Principal Investing

Proprietary trading occurs when an investment bank commits its own funds to take a risk position in an underlying security, commodity, or asset. An investment bank hopes to profit by later reversing the trade (taking the opposite position) at an attractive price. For example, an insurance company may want an investment bank to help it sell a large number of shares (large block) of stock in Apple, Inc. Anticipating that it will likely be able to sell the stock at a higher price later on, the investment bank will buy the stock directly from the insurance company. It will sell the stock later and realize either the gain if the price rises or loss if the price falls. The key feature is that the bank takes ownership of the underlying asset and thus assumes the risk that the asset's value may fall.

Principal investing and proprietary trading are similar concepts—except that when an investment bank engages in principal investing, it takes a position in a security, derivative, or stock of a company with the expectation that it will hold the position for some time, possibly even years, before trading out of it. In this context, investment banks have operated as *hedge funds* or *private equity funds*. Formally, a hedge fund is an investment fund that is limited to a small number of sophisticated investors. The fund's managers take positions that are of any type and not subject to regulation. Managers generally charge a 2 percent fee applied to the amount of assets under management plus a 20 percent performance fee equal to 20 percent of the profit generated during a year. This 2 + 20 fee structure generates an extraordinary profit for the managers with limited downside risk. Private equity funds accept investments from institutional investors in the form of limited partnership investments. The funds use the proceeds to buy companies and make other investments, but usually have a longer investment horizon than hedge funds when entering transactions. Fund managers earn a management fee plus a percentage (usually 20 percent) of profits in excess of some minimum rate of return. During 2004–2007, hedge funds, private equity funds, and investment banks made substantial profits from investing on their own account using financing from banks and other long-term lenders. They were allowed to operate with especially high levels of financial leverage that ultimately led many funds to have liquidity problems.

Goldman Sachs Group, Inc. and Goldman Sachs Bank USA

Goldman Sachs Group, Inc. (Goldman Group) was a $911.5 billion organization at the end of 2013. Goldman Group separates its operations into four segments: investment banking, institutional client services, investing and lending, and investment management.

Investment banking consists of securities underwriting and advisory services related to mergers, acquisitions, divestitures, spin-offs, and other corporate finance activities. Institutional client services include facilitating client transactions and market making. Investing and lending consists of direct investment in, and origination of, loans, direct and indirect investments in funds that Goldman Group operates, and public and private equity positions. Investment management includes investment advisory, financial planning, prime brokerage and securities lending services to institutional clients, foundations, and high-net-worth individuals. Goldman Sachs Bank USA (Goldman Bank) is a $105.6 billion wholly owned subsidiary of Goldman Group and is supervised by the Federal Reserve Bank of New York and the New York State Department of Financial Services. Because it is also a registered swap dealer, Goldman Bank is also regulated by the Commodity Futures Trading Commission. The bank accepts deposits, lends to individuals and corporations, and transacts in derivatives.

The following discussion focuses on the financial structure and performance of Goldman Group and Goldman Bank during its 2013 fiscal year, which ended in December 2013. During these 12 months, Goldman Group posted profits of $8.04 billion, earnings per share of $15.46 and a return on equity (ROE) of 10.92 percent. This performance is much better than in 2012 but still significantly below the pre-financial crisis (2007) period. During 2013 Goldman Bank posted profits of $1.39 billion and a ROE of 6.99 percent, with similar performance in 2012. It is interesting to note that the return to shareholders is lower, but also less volatile, for Goldman Bank as compared to Goldman Group. This appears to reflect the lower risk position of the Bank as compared to the Holding Company.

Goldman Group and Goldman Bank Income Statements

As noted previously, Goldman Group separates its operations into four segments: investment banking, institutional client services, investing and lending, and investment management. The firm's income statement reflects these different activities. Exhibit 5.2 presents Goldman Group's consolidated earnings for fiscal years 2012 and 2013. Looking first at the bottom line, Goldman Group reported aggregate net income of $8.04 billion in 2013, or earnings per common share of $15.46. Note that revenues are separated by the company's various operating segments, while operating expenses are separated into compensation-based expenses and other, noncompensation expenses. For comparative purposes, these figures are also stated as a percentage of net revenues in Exhibit 5.2. Revenue (net of interest expense) grew to $34.2 billion in 2013, which was virtually the same as in 2012. Net earnings grew by 7.6 percent over the same period. The composition of net revenues, however, changed somewhat over this period. In particular, *Other Principal Transactions* increased to 20.44 percent of net revenues in 2013 up from 17.17 percent the prior year, while net interest income fell to 9.92 percent from 11.36 percent. These changes reflect the improvement in Goldman Group's trading transaction flow as well as soft loan demand and low interest rates at the Goldman Bank subsidiary.

The relatively small contribution of net interest income (interest income minus interest expense) to overall net revenue and thus overall profitability reflects Goldman Group's fundamental business model. Like all investment banks, Goldman Group has never primarily followed the strategy of making loans and/or buying securities and holding them in portfolio for the spread income. Therefore, net interest income contributed less than $4 billion in both 2012-2013. The comparable figure for the largest commercial banks, such as PNC, is around 70 percent. (PNC is discussed at length in Chapter 3.)

Goldman Bank's income statement data are presented in Exhibit 5.3. Goldman Bank generated almost $1.4 billion in net income attributable to the bank. This represented

EXHIBIT 5.2 **Consolidated Statement of Earnings for Goldman Sachs Group Inc. 2012–2013**

Year Ended December ***in thousands, except per share amounts***	**2013**	**% Net Revenues**	**2012**	**% Net Revenues**
Revenues				
Investment banking	$6,004,000	17.55	$4,941,000	14.46
Investment management	5,194,000	15.18	4,968,000	14.54
Commissions and fees	3,255,000	9.52	3,161,000	9.25
Market making	9,368,000	27.39	11,348,000	33.22
Other principal transactions	6,993,000	20.44	5,865,000	17.17
Total non-interest revenues	30,814,000	90.08	30,283,000	88.64
Interest income	10,060,000	29.41	11,381,000	33.31
Interest expense	6,668,000	19.49	7,501,000	21.96
Net interest income	3,392,000	9.92	3,880,000	11.36
Net revenues, including net interest income	34,206,000	100.00	34,163,000	100.00
Provisions for loan and lease losses	**0**	**0.00**	**0**	**0.00**
Operating expenses			0	
Compensation and benefits	12,613,000	36.87	12,944,000	37.89
Brokerage, clearing, exchange and distribution fees	2,341,000	6.84	2,208,000	6.46
Market development	541,000	1.58	509,000	1.49
Communications and technology	776,000	2.27	782,000	2.29
Depreciation and amortization	1,322,000	3.86	1,738,000	5.09
Occupancy	839,000	2.45	875,000	2.56
Professional fees	930,000	2.72	867,000	2.54
Insurance reserves	176,000	0.51	598,000	1.75
Other expenses	2,931,000	8.57	2,435,000	7.13
Total non-compensation expenses	9,856,000	28.81	10,012,000	29.31
Total operating expenses	22,469,000	65.69	22,956,000	67.20
Pre-tax earnings	11,737,000	34.31	11,207,000	32.80
Provision for taxes	3,697,000	10.81	3,732,000	10.92
Net earnings	**8,040,000**	**23.50**	**7,475,000**	**21.88**
			0	
Preferred stock dividends	314,000		183,000	
Net earnings applicable to common shareholders	**$7,726,000**		**$7,292,000**	

Source: Goldman Sachs Group, Inc. Annual Report, 2013.

about 18 percent of net earnings of the holding company, Goldman Group. The majority of net income for the Goldman Bank was derived from noninterest income, which consisted primarily of *Trading Account Gains and Fees*, as well as *Investment Banking, Advisory*, *Brokerage and Underwriting Fees and Commissions*.[4] Again, this is quite

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[4] Detail on Goldman Bank's Income Statement and Balance Sheet can be found on the FDIC's website using the FDIC ID system at: http://www2.fdic.gov/idasp/main.asp.

EXHIBIT 5.3 **Income Statement for Goldman Sachs Bank USA: 2012–2013**

Year Ended December ***in thousands, except per share amounts***	**2013**	**% Net Revenues**	**2012**	**% Net Revenues**
Revenues				
Total non-interest revenues	2,588,000	77.39	2,800,000	86.18
Interest income	1,228,000	36.72	1,077,000	33.15
Interest expense	472,000	14.11	628,000	19.33
Net interest income	756,000	22.61	449,000	13.82
Net revenues, including net interest income	3,344,000	100.00	3,249,000	100.00
Provisions for loan and lease losses	55,000	1.64	14,000	0.43
Operating expenses				
Compensation and benefits	77,000	2.30	95,000	2.92
Occupancy	3,000	0.09	4,000	0.12
Other expenses	867,000	25.93	774,000	23.82
Total noninterest expense	947,000	28.32	873,000	26.87
Pre-tax earnings	2,342,000	70.04	2,362,000	72.70
Provision for taxes	955,000	28.56	906,000	27.89
Net income attributable to noncontrolling interests	3,000	0.09	7,000	0.22
Net income attributable to bank and noncontrolling interests	1,387,000	41.48	1,456,000	44.81

Source: FDIC Institution Directory, www.fdic.gov.

different from other banks such as PNC and the Community Bank (from Chapter 3), which derived around 90 percent of its net revenues (total noninterest revenues plus net interest income) from net interest income.

Goldman Group and Goldman Bank Balance Sheets

The balance sheet reflects what Goldman Group owns as compared with its liabilities and stockholders equity. Given the nature of the firm's business, its assets include cash and securities; receivables from brokers, customers, and counterparties; financial instruments; and securities or financial instruments held under collateralized agreements. As demonstrated in Exhibit 5.4, the firm held just under $912 billion in assets at fiscal year-end 2013. The bulk of these assets consisted of financial instruments owned outright and pledged as collateral and other collateralized agreements. *Financial instruments owned* consist of both cash and derivative securities. *Collateralized agreements* consist of securities that Goldman Group has borrowed and other financial instruments that Goldman has purchased under an agreement to resell at a later date. Goldman Group profits from earning interest on these securities net of the interest paid on their financing. Examine the liability *collateralized financings*, which consists of securities loaned and financial instruments sold under agreement to repurchase. These figures should be netted, as they reflect transactions designed to generate interest income net of financing costs. In 2013, collateralized agreements totaled $326.3 billion, while collateralized financings amounted to $183.53 billion. Thus, the net effect is to add $142.8 billion in net assets that must be financed elsewhere.

EXHIBIT 5.4 **Consolidated Balance Sheet for Goldman Sachs Group, Inc.: 2012–2013 (Thousands of dollars)**

Assets	**2013**	**% Total Assets**	**2012**	**% Total Assets**
Cash and cash equivalents	61,133,000	6.71	72,669,000	7.74
Cash and securities segregated for regulatory and other purposes	49,671,000	5.45	49,671,000	5.29
Collateralized agreements:				
Securities purchased under agreements to resell and federal funds sold	161,732,000	17.74	141,334,000	15.06
Securities borrowed	164,566,000	18.05	136,893,000	14.59
Receivables from brokers, dealers, clearing organizations customers and counterparties	112,775,000	12.37	91,354,000	9.73
Financial instruments owned, at fair value	339,121,000	37.20	407,011,000	43.37
Other assets	22,509,000	2.47	39,623,000	4.22
Total assets	**911,507,000**	**100.00**	**938,555,000**	**100.00**
Liabilities and shareholders equity				
Deposits	70,807,000	7.77	70,124,000	7.47
Collateralized financings:				
Securities sold under agreements to repurchase, at fair value	164,782,000	18.08	171,807,000	18.31
Securities loaned	18,745,000	2.06	13,765,000	1.47
Other secured financings	24,814,000	2.72	32,010,000	3.41
Payables to brokers, dealers and clearing organizations, customers and counterparties	204,765,000	22.46	194,485,000	20.72
Financial instruments sold, but not yet purchased, at fair value	127,426,000	13.98	126,644,000	13.49
Unsecured short-term and long-term borrowings	205,657,000	22.56	211,609,000	22.55
Other liabilities and accrued expenses	16,044,000	1.76	42,395,000	4.52
Total liabilities	**833,040,000**	**91.39**	**862,839,000**	**91.93**
Shareholders equity				
Preferred stock	7,200,000	0.79	6,200,000	0.66
Restricted stock units and employee stock options	3,839,000	0.42	3,298,000	0.35
Common stock	67,428,000	7.40	66,218,000	7.06
Total shareholders equity	**78,467,000**	**8.61**	**75,716,000**	**8.07**
Total liabilities and shareholders equity	**911,507,000**	**100.00**	**938,555,000**	**100.00**

Source: Goldman Sachs Group, Inc. Annual Report, 2013.

The assets labeled *receivables* represent amounts owed to Goldman Group by brokers, the firm's customers, and counterparties to derivative and other contracts. Conceptually, these amounts might be matched with the *payables* owed by Goldman Group to the same groups listed under the liabilities. In 2013, the combined receivables amounted to almost $113 billion, which was significantly less than the $204.8 billion in payables owed to brokers, customers, and counterparties. On a net basis, Goldman Group appears to pay on its payables slower than it collects on its receivables.

In addition to the collateralized financings and payables, Goldman Group's liabilities consist of a small amount of bank deposits from Goldman Bank; financial instruments sold, but not yet purchased; and unsecured short-term and long-term borrowings. These unsecured borrowings totaled almost $333.1 billion—essentially representing "hot money." As hot money, Goldman Group cannot rely on these funds being rolled over in a crisis situation. In fact, these sources of funds represented Goldman Group's greatest liquidity risk during the financial crisis of 2008 and clearly one of the reasons Goldman Group converted to a financial holding company in 2008 by converting its Utah-based industrial loan company (ILC) into a New York State-chartered Federal Reserve member bank At year-end 2013, Goldman Group's stockholders equity amounted to $78.5 billion, up significantly from 2007 (only $42.8 billion). This consisted of a small amount of preferred stock ($7.2 billion), with the remainder being common equity.

As shown in Exhibit 5.5, at year-end 2013, Goldman Bank had total assets of $105.6 billion, or 11.6 percent of Goldman Group's total assets. The majority of the bank's assets are reported as *Cash and Due from Depository Institutions*, which is likely deposits at the holding company, Goldman Group. The next largest is *Net*

EXHIBIT 5.5 **Balance Sheet for Goldman Sachs Bank USA: 2012–2013 (Thousands of dollars)**

Assets	**2013**	**% Total Assets**	**2012**	**% Total Assets**
Cash and due from depository institutions	51,102,000	48.38	59,362,000	50.08
Federal funds sold & reverse repurchase agreements	1,539,000	1.46	1,508,000	1.27
Net loans & leases	22,775,000	21.56	14,722,000	12.42
Trading account assets	21,748,000	20.59	36,894,000	31.12
Bank premises and fixed assets	0	0.00	0	0.00
Goodwill and other intangibles	4,000	0.00	4,000	0.00
All other assets	8,448,000	8.00	6,046,000	5.10
Total assets	**105,616,000**	**100.00**	**118,536,000**	**100.00**
Liabilities and shareholders equity				
Total deposits	64,289,000	60.87	66,185,000	55.84
Federal funds purchased & repurchase agreements	6,983,000	6.61	15,072,000	12.72
Trading liabilities	8,620,000	8.16	9,141,000	7.71
Other borrowed funds	574,000	0.54	507,000	0.43
All other liabilities	5,060,000	4.79	6,923,000	5.84
Total liabilities	**85,526,000**	**80.98**	**97,828,000**	**82.53**
Shareholders equity				
Total bank equity capital	20,051,000	18.98	20,667,000	17.44
Noncontrolling interest in consolidated subsidiaries	39,000	0.04	41,000	0.03
Total shareholders equity	**20,090,000**	**19.02**	**20,708,000**	**17.47**
Total liabilities and shareholders equity	**105,616,000**	**100.00**	**118,536,000**	**100.00**

Source: Goldman Sachs Annual Report, 2013 and FDIC Institution Directory, www.fdic.gov.

Loans & Leases, which comprises 21.6 percent of total assets. Unlike other commercial banks, loans represent only 21.6 percent of assets. While loans as a percent of total assets for PNC Bank and Community Bank (from Chapter 3) represent 62.9 percent and 84.6 percent of assets, respectively.

Goldman Bank's primary funding source is deposits at 60.9 percent of total assets. Total shareholders equity is almost 19 percent, which is much higher than both PNC Bank and Community Bank (from Chapter 3).

Key Performance Ratios for Goldman Sachs Group, Goldman Sachs Bank and Bank of America

Goldman Group's earnings in 2013 are reflected in its aggregate profit ratios, as are the unique features of its business model. According to the income statement and balance sheet data, Goldman Group is essentially a hedge fund. It takes positions in financial assets and companies earning a profit by identifying assets that appreciate in value over time and/or generate considerable cash flow to service its debt. The majority of the firm's revenue goes to pay employees for their services.

Consider the profit and expense ratios in Exhibit 5.6, which compare data and comparable figures for Goldman Group, Goldman Bank, and Bank of America. In 2013, Goldman Group reported a ROE of 10.92 percent, down significantly from 2007 but slightly higher than in 2012. It exceeded Bank of America's ROE by 175 basis points. Generating comparable returns to Goldman Group has proven difficult for most large commercial banking organizations, as well as most smaller community banks. Still, Bank of America, with $1.43 trillion in assets, reported an ROE of 9.18 percent, which was much better than in recent years.

EXHIBIT 5.6 **Goldman Sachs Group, Inc. and Goldman Sachs Bank Usa Key Performance Ratios**

	Goldman Sachs Group, Inc.		Goldman Sachs Bank		Bank of America	
Performance Ratios	**2013**	**2012**	**2013**	**2012**	**2013**	**2012**
Total Assets ($billions)	911.51	938.56	$105.62	$118.54	1,433.7	1,474.1
Total employees	32,900	32,400	191	241	155,163	174,892
Return on Average Equity	10.92%	10.66%	6.99%	7.26%	9.18%	6.93%
Return on Average Assets	0.87%	0.80%	1.23%	1.30%	1.13%	0.85%
Net Interest Income/Total Assets	0.37%	0.41%	0.67%	0.40%	2.28%	2.15%
Noninterest income/Total Assets	3.38%	3.23%	2.30%	2.50%	2.09%	2.12%
Noninterest expense/Total Assets	2.47%	2.45%	0.84%	0.78%	2.71%	2.86%
Net Income to Net Revenue	23.50%	21.88%	41.48%	44.81%	25.91%	19.80%
Net Interest Income to Net Income	42.19%	51.91%	54.51%	30.84%	201.04%	254.57%
Net Income Per Employee ($000)	234.83	230.71	29.05	29.05	70.42	70.42
Assets Per Employee ($000)	27,705	28,794	530,730	491,851	9,240	8,429
Equity capital to total assets	8.16%	8.07%	18.98%	17.44%	12.46%	12.04%

Source: Goldman Sachs Annual Report, 2013 and FDIC Institution Directory, www.fdic.gov.

A key difference in the business models of Goldman Group and Bank of America is indicated by the portion of income that derives from net interest income, or spread management. For Goldman Group, net interest income to assets is about one-fifth the figure for Bank of America and is even smaller for Goldman Bank. Net interest income comprises a very small fraction of net income for Goldman Group and Goldman Bank but is significantly more important at Bank of America.

Goldman Group's earnings were generally higher than almost all other large financial institutions, and the firm paid its employees quite well. The firm's CEO, Lloyd Blankfein, was the highest-paid U.S. bank CEO in 2013 at $21 million. In general, Goldman Group paid over $383,000 in average compensation in 2013, down significantly from 2007 levels of $700,000 in average employee compensation. Contrast this with Bank of America's Brian Moynihan, who received $14 million in total compensation. One of the biggest differences, however, is in average employee compensation at Bank of America, which totaled $106,040 - or roughly 28 percent of that at Goldman Group.

Events in 2008 demonstrated that Goldman Group's business model was not sustainable. During the last three months of its 2008 fiscal year, Goldman Group faced a severe liquidity crisis associated with the collapse of housing values and declines in the values of assets that Goldman Group owned. In September 2008, it sold $5 billion in convertible preferred stock to Berkshire Hathaway, Warren Buffett's investment vehicle, and sold another $5 billion in common stock to the public at $123 per share. Goldman Group also converted to a financial holding company in September of 2008, which meant that it would now be regulated by the Federal Reserve in the same fashion as other traditional banks. In October 2008, Goldman Group accepted $10 billion in preferred stock financing from the U.S. Treasury under the Troubled Asset Relief Program (TARP). Its stock price fell from over $240 per share in 2007 to under $70 in 2008. In its fourth quarter of 2008 (ending November 30), Goldman Group reported its first quarterly loss since it began trading as a public company. Clearly, Goldman Group's management and market participants miscalculated the firm's risks. By 2013, Goldman Group's performance had improved but was still much below its pre-financial crisis performance.

Risks Faced by Goldman Group

Goldman Group has historically generated the majority of its revenues from its capital markets businesses. With the credit crisis of 2008–2009, the money and capital markets stopped functioning in any normal sense. The commercial paper market froze, and large institutions were hesitant to lend to each other. Large banks, investment banks, and insurance companies found themselves undercapitalized and tightened lending standards as they tried to clean up their balance sheets. Goldman Group faced a potential run on the firm, as its lenders were hesitant to roll over their debts, and Goldman Group was unable to sell a sufficient volume of assets to readily access cash. Goldman Group's management thus decided to convert to a financial holding company, which would allow it to access more stable, core deposits for its funding. On the negative side, Goldman Group agreed to be regulated by the Federal Reserve as a bank. The likelihood that it would generate ROE in excess of 30 percent evaporated. The investment banking business model cracked and fell apart.

Goldman Group's Risk Profile

Goldman Group essentially operated as a hedge fund until 2008. It used purchased liabilities that pay market rates to buy speculative assets held for trading and principal investment purposes. The model worked as long as market participants agreed to refinance Goldman Group's debt. In its 2007 Annual Report, Goldman Group lists the following key risks faced by the firm:

- Increasing and/or high rates and widening credit spreads
- Market fluctuations that may adversely affect the value of large trading and investment positions
- Declines in the number and size of securities underwritings and mergers and acquisitions that may lower revenues
- Declines in equity values that may lower asset management fees
- Possible decline in the volume of transactions executed by the firm as a specialist or market maker
- An increase in market volatility that may cause the firm to reduce its proprietary trading

Each of these factors appeared to be to the detriment of Goldman Group in 2008.

As with most banks, Goldman Group carries some credit risk with its customers and counterparties, particularly in derivative (e.g., credit default swap) contracts. Goldman Group also holds in portfolio many different types of securities, some of which are difficult to value. Under FASB 157, Goldman Group is required to classify assets as Level 1, Level 2, or Level 3. ***Level 1*** assets have the most precise values, because valuations are based on actual price quotes in active markets for the same or virtually identical assets. The values are less precise for ***Level 2*** assets, because they are based on matrix pricing. In this context, values are based on the prices of similar assets typically obtained from dealer-pricing services that use survey data. Assets in the final category, ***Level 3***, are extremely difficult to value, because in this category, there are no comparable assets trading—and market quotes are thus not available. Management uses its best judgment (hence the pejorative label that these assets are *marked to myth*) to assign a value using its own assumptions about cash flows. At year-end 2007, Goldman Group reported that it held $53.7 billion of Level 3 assets for which it held economic exposure. At the same time, Goldman Group reported that it had just $34.6 billion in tangible equity. Thus, its ratio of Level 3 assets to tangible equity exceeded 155 percent. The implication was that if the firm's valuation of Level 3 assets was too high and the assets' true economic value was just 64 percent of that assumed, tangible equity would be wiped out.

EXHIBIT 5.7 Accounting for Fair Market Values of Securities under FASB 157

Level 1 Assets: Valuations are based on observable market prices for the identical instrument (asset or liability). Labeled *marking to market*, examples include any publicly traded stock, government bonds, agency bonds, listed options and futures, and mutual funds.

Level 2 Assets: Valuations are based on observable market data for similar assets or liabilities. Labeled *marking to matrix*, price quotes are typically obtained from dealer pricing services using survey information. Examples include corporate and municipal bonds that trade infrequently, many mortgage-backed securities and other asset-backed securities, and derivatives that are not publicly traded.

Level 3 Assets: Valuations are based on management's best judgment of what the underlying asset is worth. Management may use any pricing model and make its own assumptions regarding the model's parameters. Labeled *marking to myth*, price quotes are the least reliable of all valuation techniques. Some assets may be substantially overpriced or underpriced depending on the model analytics.

When Goldman Group became a financial holding company in 2008, it was subject to new, higher capital requirements. Goldman Group reduced its balance sheet in 2008–2009 and increased capital. Capital was $65.5 billion by the end of 2009. Goldman Group also reduced the amount of level 3 assets to about $43.3 billion, or 65.7 percent of equity. Higher levels of capital, and fewer higher-risk profit opportunities, has meant that profitability at Goldman Group post-2009 has not returned, and is not likely to return in the near future, to pre-2008 levels.

Goldman Group, similar to many other financial companies, faced a severe liquidity crisis in September 2008 when management felt the need to sell preferred stock to Warren Buffet and common stock to the public. Goldman Group's 2007 Annual Report was prescient in stating that "most failures of financial institutions have occurred in large part due to insufficient liquidity resulting from adverse circumstances"—as was the case with Bear Stearns, Lehman Brothers, and Wachovia, all of which essentially failed. It further stated that "unsecured debt and some types of secured financing agreements may be unavailable," a pronouncement that mirrored Goldman Group's difficulty in obtaining financing.

With its acceptance of financial holding company status and its TARP financing via preferred stock, Goldman Group agreed to be regulated as a commercial bank. This also meant that its future business model would change to incorporate more regulation. Bank regulators have required Goldman Group to lower its financial leverage. At year-end 2007, Goldman's **leverage ratio**, equal to total assets divided by stockholders equity, was 26.2. At the same time, Bank of America's comparable leverage ratio was 11. By the end of 2013, Goldman's leverage ratio was 12.6 and Bank of America's was 8.1. The degree of leverage in most investment banks increased dramatically from 2004–2007 as they borrowed and invested most of the proceeds in mortgage-backed securities and collateralized debt obligations. Traditional commercial banks generally did not increase their leverage during this time, and their regulatory capital requirements were much greater than requirements for investment banks.

The Dodd–Frank **Volker Rule**, when fully implemented in 2014, is expected to have a significant impact upon companies such as Goldman Sachs. The Volker Rule prohibits proprietary trading— trading on the company's behalf rather than clients—using FDIC-insured funds. It also limits investing in, and the sponsoring of, hedge funds and private equity funds.

The Financial Performance of Mutual of Omaha Bank

MO is an insurance company that offers a wide range of life, disability, long-term care, and medical supplement insurance, along with annuities and mutual funds. In 2007, the company opened Mutual of Omaha Bank (MO Bank) with 13 locations in Nebraska and Colorado through the acquisition and merger of three existing banks. By 2013, MO Bank had 45 offices in Arizona, Colorado, Hawaii, Nebraska, Texas, California, Florida, Missouri, and Nevada. MO Bank's strategic objective is to "acquire community banks in fast-growing cities with a high density of Mutual of Omaha insurance customers."[5] It has a thrift charter granted by the Office of Thrift Supervision, now the Office of the Comptroller of the Currency. At year-end 2007, MO Bank had over $700 million in assets which grew to $6.4 billion by the end of 2013. During 2008, MO Bank acquired two failed banks with primary operations in Nevada and Arizona. It also opened lending operations in Des Moines, Iowa and Dallas, Texas. The bank continues to acquire

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[5] Formally, Mutual of Omaha as a holding company established a subsidiary, Omaha Financial Holdings, Inc., which acquired 100 percent of the stock in three banks. It then named the combined entity Mutual of Omaha Bank. The Management Report in the firm's 2007 Annual Report states the bank's strategic objectives.

other locations in faster-growing states. The second phase of MO Bank's strategy is the creation of a virtual online bank where customers can presumably conduct much of their banking business online from anywhere in the United States.

In 2013, the rating agencies gave MO its highest ratings and A.M Best, the insurance rating company, rated the entire firm A+ (Superior) in terms of its ability to meet obligations to insurance policyholders; Moody's rated it A1, and S&P rated it A+, both strong investment-grade ratings. At year-end 2013, the parent, Mutual of Omaha, reported $32.3 billion in assets, $4.7 billion in equity and net income of $359 million. The firm launched MO Bank to extend its offerings of financial services and to cross-sell insurance and banking services among its customers.

MO Bank's Balance Sheet and Income Statement

MO's business model has been to run the bank as an independent company, wholly owned by the parent. Exhibits 5.8 and 5.9 present MO Bank's balance sheet and income

EXHIBIT 5.8 **Balance Sheet for Mutual of Omaha Bank, 2012–2013 (Thousands of Dollars)**

Assets	2013	% Total Assets	2012	% Total Assets
Cash and due from depository institutions	142,129	2.22	196,524	3.32
Interest-bearing balances	53,790	0.84	92,655	1.56
Securities	938,887	14.69	784,493	13.24
Federal funds sold & reverse repurchase agreements	0	0.00	0	0.00
Net loans & leases	4,978,674	77.88	4,607,270	77.78
Loan loss allowance	59,931	0.94	54,578	0.92
Bank premises and fixed assets	43,394	0.68	33,487	0.57
Other real estate owned	9,568	0.15	19,025	0.32
Goodwill and other intangibles	211,756	3.31	208,539	3.52
All other assets	68,447	1.07	74,054	1.25
Total assets	**6,392,855**	**100.00**	**5,923,392**	**100.00**
Liabilities and Equity				
Deposits held in domestic offices	5,352,459	83.73	4,955,935	83.67
Interest-bearing deposits	4,318,754	67.56	3,999,235	67.52
Federal funds purchased & repurchase agreements	137,671	2.15	205,511	3.47
Other borrowed funds	134,753	2.11	22,874	0.39
All other liabilities	63,994	1.00	56,438	0.95
Total liabilities	**5,688,877**	**88.99**	**5,240,758**	**88.48**
Common stock	100	0.00	100	0.00
Surplus	622,485	9.74	622,485	10.51
Undivided profits	81,393	1.27	60,049	1.01
Total equity capital	**703,978**	**11.01**	**682,634**	**11.52**
Total liabilities and capital	**6,392,855**	**100.00**	**5,923,392**	**100.00**

Source: FDIC, Statistics on Depository Institutions, www2.fdic.gov/sdi/index.asp.

EXHIBIT 5.9 **Income Statement for Mutual of Omaha Bank, 2012–2013 (Thousands of Dollars)**

Revenues	2013	% Net Revenues	2012	% Net Revenues
Total noninterest income	44,132	16.61	47,147	17.12
Total interest income	239,977	90.31	253,155	91.92
Total interest expense	18,388	6.92	24,886	9.04
Net interest income	221,589	83.39	228,269	82.88
Net revenues, including net interest income	265,721	100.00	275,416	100.00
Provision for loan and lease losses	**11,679**	**4.40**	**35,349**	**12.83**
Operating expenses				
Salaries and employee benefits	114,838	43.22	102,425	37.19
Premises and equipment expense	18,067	6.80	17,846	6.48
Additional noninterest expense	58,613	22.06	68,212	24.77
Total noninterest expense	**191,518**	**72.07**	**188,483**	**68.44**
Pre-tax net operating income	62,524	23.53	51,584	18.73
Securities gains (losses)	1	0.00	7,862	2.85
Applicable income taxes	22,482	8.46	21,487	7.80
Net income attributable to bank	**40,043**	**15.07**	**37,959**	**13.78**

Source: FDIC, Statistics on Depository Institutions, www2.fdic.gov/sdi/index.asp.

statement data for 2012–2013. The balance sheet is comparable to that of any bank, with loans representing the dominant asset. Much like a traditional community bank, interest-bearing deposits and demand deposits represent the dominant funding source, contributing approximately 83.7 percent of total funding. In terms of its capital base, MO Bank exhibits low financial leverage, as the bank's equity-to-asset ratio equaled 11 percent in 2013. As demonstrated in Chapter 3, the typical bank's equity-to-asset ratio is 10 percent or less.

MO Bank's income statement largely reflects the operations of the core bank. As with a traditional bank, net interest income contributes the bulk of operating revenue. Exhibit 5.10 shows comparable data for MO Bank and several other banks and average peer groups, similar to that presented in Chapter 3. On an annualized basis, MO Bank's net interest margin equaled 3.86 percent, which is above all others except the community bank. Noninterest income equaled 0.72 percent of average assets. This figure is likely to grow in the future if MO Bank begins to sell banking services to the insurance customers of MO. MO Bank's ROA and ROE (annualized) are relatively low versus competitors, but this largely reflects the newness of the bank as it grows its franchise.

Mutual of Omaha Bank's Risk Profile

MO Bank faces the same types of risk that other commercial banks face. As a bank, its primary exposure is to credit risk. During 2013, the bank charged off 0.13 percent of loans. This figure is in line with other commercial banks of similar size.

EXHIBIT 5.10 **Key Performance Ratios for Selected Banks and All Commercial Banks with Assets Greater Than $10 Billion: 2013 (Thousands of Dollars)**

Performance ratios	Goldman Sachs Bank USA	Mutual of Omaha Bank	BMW Bank of North America	PNC Bank, NA	Community National Bank (Chapter 3)	All Commercial-Banks - Assets more than $10B
Number of employees	**199**	**1117**	**34**	**50,765**	**50**	**1,408,348**
Return on average equity	6.99%	5.77%	13.94%	9.68%	18.61%	9.59%
Return on average assets	1.23%	0.65%	1.58%	1.18%	1.50%	1.06%
Net Loans/Total assets	21.56%	77.88%	74.19%	62.79%	84.63%	49.88%
Investment Securities/Total assets	0.00%	14.69%	25.01%	19.41%	2.88%	19.37%
Yield on earning assets	1.42%	4.18%	4.40%	3.83%	6.48%	3.49%
Cost of funding earning assets	0.55%	0.32%	1.33%	0.28%	0.72%	0.37%
Net interest margin	0.87%	3.86%	3.07%	3.55%	5.76%	3.12%
Noninterest inc. to avg. assets	2.30%	0.72%	0.58%	1.85%	0.53%	1.84%
Noninterest exp. to avg. assets	0.84%	3.11%	0.96%	3.08%	4.17%	2.79%
Burden	-1.46%	2.39%	0.38%	1.23%	3.64%	0.95%
Provisions for loan losses to total assets	0.05%	0.18%	0.14%	0.21%	0.07%	0.21%
Efficiency ratio	28.32%	70.67%	26.60%	61.57%	72.51%	59.13%
Operating exps per empl ($000)	$4,759	$171	$2,757	$181	$114	$221
Assets per employee ($000)	$530,734	$5,723	$292,138	$6,107	$2,803	$8,045
Net charge-offs to loans	0.00%	0.13%	0.29%	0.56%	0.15%	0.77%
Net LN&LS to deposits	35.43%	93.02%	116.13%	86.23%	93.18%	66.66%
Net LN&LS to core deposits	77.12%	105.59%	2166.74%	89.47%	106.27%	89.17%
Equity capital to assets	18.98%	11.01%	10.92%	11.78%	8.21%	11.12%

Source: FDIC Institution Directory, http://www2.fdic.gov/idasp/main.asp.

MO Bank benefits from the strong capital base and low-risk profile of its parent, MO. Were MO Bank to need a capital injection, it can rely on MO to provide additional equity. MO is likely to provide whatever capital is needed to continue MO Bank's aggressive expansion. In turn, MO Bank's market risk, liquidity risk, and reputation risk must be viewed within the context of MO's overall risk exposure. The principal benefit from operating as part of MO is the diversification and access to capital.

The Financial Performance of BMW Financial Services and BMW Bank of North America

Many firms that operate in financial services and the auto industry own industrial loan companies (ILCs). In fact, many of the largest investment banks—for example, Merrill Lynch, Goldman Sachs, and Morgan Stanley—controlled ILCs before these firms each converted to a financial holding company in 2008. ILCs originated in the early 1900s to make loans to borrowers who could not get loans at commercial banks.[6] Over time, ILCs were granted the right to issue deposits that were insured by the FDIC. Passage of the Competitive Equality Banking Act in 1987 clarified what constitutes a bank and whether businesses might own banks. In so doing, the act grandfathered ILCs in certain states, permitting those states to continue chartering ILCs. Today, the majority of ILCs are based in Utah, California, Colorado, and Nevada. The FDIC put a moratorium on extending FDIC insurance to ILC's in 2006, shortly after Wal-Mart applied for an ILC. That moratorium is considered permanent today, and hence no new ILC's have been chartered since.

Historically, most ILCs operated to assist their parent organization in some facet of the firm's core business. Automobile manufacturers, for example, used ILCs to help customers finance the purchase of automobiles. Investment banks used ILCs to attract cheap deposits used in financing financial services to high-net-worth customers. ILCs gained notoriety when Wal-Mart applied for an ILC charter in 2005; Home Depot's application soon followed. Many community banks argued against granting Wal-Mart a charter, because they were concerned that Wal-Mart would offer traditional banking services in all stores and potentially drive them out of business. The primary criticisms against granting commerce companies ILC charters are as follows:

- There should be a separation between commerce and banking to protect customers from potential conflicts of interest (such as those that could occur if loans were made to affiliates or members at below-market rates).
- Firms like Wal-Mart could become so large and powerful that they might dominant business in many communities.
- ILCs are not subject to the same regulation as commercial banks—which may create safety and soundness problems.

BMW Bank of North America is an ILC owned by BMW Financial Services, the financial services arm of BMW North America, which manufactures automobiles. BMW Financial Services offers loans, leases, and credit cards via BMW Bank while it offers insurance services in conjunction with Liberty Mutual Insurance Company. BMW Bank is thus a niche participant that operates as a financing arm for its parent. Although it operates from a single office in Utah, it collects deposits and uses borrowed funds to underwrite loans and leases for the purchase of automobiles at BMW dealers. It offers current and potential customers both savings accounts and credit cards. Given the nature of its automobiles, BMW caters to relatively affluent customers. As such, its banking business operates somewhat like a private bank within a large commercial banking organization. Private banks generally cater to physicians, lawyers, small business owners, and other high-net-worth individuals who may prefer more personalized financial services that extend beyond simple loan services. These services range from investment advice and asset management services to trust and insurance services.

BMW Bank's Balance Sheet and Income Statement

BMW Bank is chartered by the state of Utah and is also regulated by the FDIC because its deposits are FDIC-insured. Exhibits 5.11 and 5.12 present the bank's balance sheet and income statement data, respectively. Note that both statements

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[6] Neely (2007) provides a summary of the history of ILC origination and regulation.

EXHIBIT 5.11 Balance Sheet for BMW Bank of North America: 2012–2013 (Thousands of Dollars)

Assets	2013	% Total Assets	2012	% Total Assets
Cash and due from depository institutions	31,669	0.32	21,333	0.22
Interest-bearing balances	17,002	0.17	3,984	0.04
Securities	2,484,309	25.01	2,410,504	25.32
Federal funds sold & reverse repurchase agreements	465	0.00	494	0.01
Loans				
Multifamily residential real estate	2,373	0.02	0	0.00
Credit card loans	318,453	3.21	325,423	3.42
Automobile loans	7,145,891	71.94	6,864,022	72.10
Less: Loan loss allowance and unearned income	97,914	0.99	154,731	1.63
Net loans & leases	7,368,803		7,034,714	
Bank premises and fixed assets	1	0.00	5	0.00
Goodwill and other intangibles	0	0.00	0	0.00
All other assets	47,452	0.48	53,551	0.56
Total assets	**9,932,699**	**100.00**	**9,520,601**	**100.00**
Liabilities and Equity				
Deposits held in domestic offices	6,345,301	63.88	6,131,347	64.40
Transaction accounts	951	0.01	965	0.01
Money market deposit accounts (MMDAs)	339,136	3.41	350,393	3.68
Total time deposits	6,005,214	60.46	5,779,989	60.71
Core (Retail) deposits	340,087	3.42	351,358	3.69
Brokered deposits	6,005,214	60.46	5,779,989	60.71
Federal funds purchased & repurchase agreements	672,000	6.77	587,500	6.17
Other borrowed funds	1,587,106	15.98	1,500,000	15.76
All other liabilities	243,969	2.46	249,339	2.62
Total liabilities	**8,848,376**	89.08	**8,468,186**	88.95
Common stock	1	0.00	1	0.00
Surplus	373,670	3.76	373,670	3.92
Undivided profits	710,652	7.15	678,744	7.13
Total equity capital	**1,084,323**	**10.92**	**1,052,415**	**11.05**
Total liabilities and capital	**9,932,699**	**100.00**	**9,520,601**	**100.00**

Source: FDIC, Statistics on Depository Institutions, www2.fdic.gov/sdi/index.asp.

follow the same form as that for commercial banks. The balance sheet demonstrates that BMW Bank makes loans to individuals either in the form of credit card loans or loans for automobiles; these loans comprised over 75 percent of assets in 2013, with most of the remaining funds invested in mortgage-backed securities. The bank, in turn, obtains most of it financing in the form of brokered time deposits, federal funds purchased and other borrowed funds. BMW Bank's equity-to-asset ratio

EXHIBIT 5.12 Income Statement for BMW Bank of North America: 2012–2013

Revenues	2013	% Net Revenues	2012	% Net Revenues
Total noninterest income	56,356	15.99	58,361	13.49
Total interest income	424,768	120.51	526,494	121.69
Total interest expense	128,637	36.49	152,187	35.17
Net interest income	296,131	84.01	374,307	86.51
Net revenues, including net interest income	352,487	100.00	432,668	100.00
Provision for loan and lease losses	**13,817**	**3.92**	**19,477**	**4.50**
Operating expenses				
Salaries and employee benefits	4,042	1.15	3,822	0.88
Premises and equipment expense	295	0.08	292	0.07
Additional noninterest expense	89,407	25.36	93,872	21.70
Total noninterest expense	93,744	26.60	97,986	22.65
Pre-tax net operating income	244,926	69.49	315,205	72.85
Securities gains (losses)	2,419	0.69	2,469	0.57
Applicable income taxes	93,513	26.53	124,258	28.72
Net income attributable to bank	**153,832**	**43.64**	**193,416**	**44.70**

Source: FDIC, Statistics on Depository Institutions, www2.fdic.gov/sdi/index.asp.

equaled 10.92 percent at year-end 2013, which is comparable to commercial banks of similar size.

BMW Bank reported net income of $153.8 million in 2013, down from $193.4 million in 2012. Interestingly, the sharp drop in earnings largely reflected a decline in net interest income.

BMW Bank's Risk Profile

Exhibit 5.9 reports key profit and risk ratios for BMW Bank versus various commercial banks and peer averages. It is interesting to note that BMW Bank employs very few people, suggesting the bank is using the resources of the parent car company extensively. BMW Bank reported a higher ROE and ROA—due to holding more loans relative to assets and better controlling noninterest expense. BMW's low noninterest expense suggests that the firm is using credit scoring loan models to evaluate credit risk rather than large numbers of loan officers and obtains its funding primarily by buying deposits in a single office. The bank's charge-offs were small while its net loans to core deposits was exceptionally high. BMW Bank generally earns a higher yield on loans and securities but pays much higher rates on its interest-bearing liabilities. The bank also gets very little funding from demand deposits, which raises its overall cost of funds. Even though the bank generates lower noninterest income, it has much lower noninterest expense. BMW Bank's efficiency ratio, therefore, was about one-third that of other banks 2013 at 26.6 percent. This efficiency ratio suggests that BMW Bank spent just $0.26 in noninterest expense to generate its operating revenue while community banks normally spend around $0.70. Other ratios confirm that BMW Bank operates with far fewer employees than a traditional bank and avoids much of the marketing and administrative expense needed by traditional banks to attract and service customers.

BMW Bank reported lower loan charge-offs and provisions for loan losses than other traditional commercial banks. Thus, its credit risk appears to be lower. In terms of liquidity risk, BMW Bank has few core deposits to loans since it likely buys their deposits by paying higher rates. In a crisis, it would likely see some of these deposits leave, especially any uninsured deposits, and the bank would need to rely on its parent to fund its operations.

Summary

Many different types of firms offer commercial banking services. This chapter examines three financial services companies that pursue different business models to offer traditional loans and deposit products and compares that performance with other traditional commercial banks and aggregate peer data. None of the models dominates the others. They are all, however, reliant on FDIC-insured deposits. The credit crisis of 2008–2009 demonstrated the value of having insured deposits, which are more stable than other sources of funding and carry interest rates that are below those on purchased liabilities.

Goldman Sachs Group Inc., along with other financial companies, was essentially forced to become a financial holding company in order to access funding from the Federal Reserve and ultimately from the banks with which it is affiliated. This chapter discussed the high earnings generated by Goldman Group when it operated as an investment bank with high levels of financial leverage, which are likely gone for the foreseeable future. Goldman Group's ROE has fallen as it changed its business model to more closely reflect that of a commercial bank holding company. Bank regulators will limit the amount of financial leverage it can take and will likely sharply reduce the firm's risk exposure from proprietary trading and principal investing, especially as the Volker Rule is fully implemented. Imagine the difficulties that regulators would have in explaining why they allowed Goldman Group to speculate on investable assets funded by insured deposits!

MO Bank operates as a commercial bank and is charged with growing the banking franchise. MO Bank currently operates as a wholly owned subsidiary of its parent. In the future, one would expect that its insurance company parent, Mutual of Omaha Insurance Company, can expand its financial services offerings to a broader array of customers. Senior management has articulated a strategy that focuses on selling banking services to insurance customers via the Internet.

Finally, BMW Bank of North America operates as an ILC that is owned by BMW of North America, a commercial automobile company. It is chartered in the state of Utah but offers credit card and loan or lease products to BMW customers throughout the United States. It does not offer demand deposits, but finances its loans primarily by issuing time deposits that pay above-average interest rates. Its business model, however, generates strong loan interest and fees from individuals and requires little investment in fixed assets and people. Thus, it has reported aggregate profits in excess of other traditional commercial banks of similar size.

Because of the credit crisis of 2008–2009, competition for FDIC-insured deposits will increase as these three firms and other types of firms enter the banking business. This competition will put increased pressure on traditional banks to fund their activities at low cost. It will also put a premium on having strategies that emphasize either the transactions or relationship emphasis of the bank and on developing niches in which to invest.

Questions

1. Describe the basic business of each of the following types of financial companies. Then explain why the firm in parentheses would want to operate as part of a financial holding company, or as part of a bank.
   a. Insurance company (MO Bank)
   b. Traditional investment bank (Goldman Sachs Group, Inc.)
   c. Commercial bank Goldman Bank
   d. Automobile manufacturer (BMW Bank)
2. List the four types of businesses that investment banks traditionally engage in to sustain their operations. Describe the basic characteristics of each type by noting how the business might generate a profit. Then describe some of the basic risks within that line of business.
3. Explain how Level 1, Level 2, and Level 3 assets differ. Which asset type is the riskiest? Explain why.
4. Explain how financial leverage at investment banks differed from financial leverage at more traditional commercial banks. What is the benefit of this leverage? What are the primary risks associated with financial leverage?
5. What are the principal benefits to MO Bank of becoming aligned with Mutual of Omaha Insurance Company, its parent company? Describe how the bank will take advantage of the parent company's businesses.
6. Why do community banks not want Wal-Mart to be in the banking business? What are the possible benefits to Wal-Mart of such a move? What drawbacks do community bankers anticipate if Wal-Mart is allowed to operate a full-scale bank in the United States?
7. What are the principal benefits to BMW Bank of becoming aligned with BMW North America, its parent company? Describe how the bank will take advantage of the parent company's business activity.
8. Describe key differences in the balance sheets and income statements of each of the following firms versus one of the banks introduced in Chapter 3.
   a. Goldman Sachs Bank versus PNC Bank
   b. MO Bank versus Community Bank
   c. BMW Bank versus Community Bank

Activities

1. Identify how many ILCs exist and what lines of business their parent companies emphasize for their primary activities. Explain why firms in the core businesses would want to own and operate an ILC, or own and operate a bank.
2. Select a firm from the following list and examine the different lines of business that it operates. If available, determine which lines of business are the most profitable by reviewing recent balance sheet and income statement data. Which lines of business are likely the most risky?
   a. Citigroup
   b. Bank of America
   c. The Northern Trust

d. Metropolitan Life
e. American Express
f. Morgan Stanley
g. State Farm Insurance

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6 Pricing Fixed-Income Securities

Just prior to the onset of the recent financial crisis in 2007, both the 10-year Treasury rate and the 2-year Treasury rate exceeded 5 percent. By 2013, these interest rates were sharply lower at 1.7 percent and 0.2 percent, respectively, with the 10-year rate rising another 1 percent in 2014. During the crisis, Ben Bernanke, Federal Reserve chairman, committed to keeping interest rates low "at least through 2015" to help combat the recession's adverse impact on spending and employment. Janet Yellen, who followed Bernanke as the Fed Chair, is following the same policy. Loan demand has still not fully recovered years later and banks have seen their securities portfolios grow. While holders of securities have generally been able to sell bonds at gains, they have replaced them with lower yielding instruments. Most bankers would love to grow their loan portfolios, which will not happen until the U.S. and global economies return to real growth. A common concern among bankers is, "What securities should I buy when rates are expected to rise over time?"

As an investor, do you know what you are earning? As a borrower, do you know what interest you are paying? Suppose that you have $1 million to invest for one year. The interest rate quoted on every one-year fixed-income security you consider is 8 percent. If the security pays simple interest, interest income for the year will equal $80,000. If the security pays interest compounded continuously, interest income will total $83,287, or $3,287 more. If the rate is quoted on a money market basis assuming a 360-day year, interest income will equal $81,111. The point is that quoted interest rates are not necessarily equal. The same percentage quote may produce a different return or cost depending on the frequency of compounding and whether the quote assumes a 360-day or 365-day year.

Interest rates are important to both borrowers and investors. Regulations assist consumer borrowers by requiring banks to quote financing charges as an annual percentage rate (APR) that adjusts for these computational differences, thus enabling a direct comparison of alternative borrowing costs. ***Truth in savings*** regulations similarly enable depositors to compare rates across various deposits. However, securities investors must fend for themselves and decipher how alternative rate quotes affect the true yield.

This chapter examines four basic issues. First, it introduces the mathematics of interest rates for fixed-income securities and demonstrates the impact of compounding. Second, it describes the relationship between the interest rate on a security and the security's market price. The concepts of duration and convexity are used to measure relative price sensitivity to interest rate changes, which can then be compared among securities. This comparative price sensitivity can be used as a measure of risk. Third, it explains how specific interest rates on different money market and capital market instruments are quoted. Particular attention is paid to differences between money market, bond equivalent, and effective interest rate calculations. Finally, it describes how securities are valued when viewing any fixed-income security as a package of zero-coupon cash flows and introduces the concept of total return, used by investors to compare expected realized yields over some predetermined holding period. Subsequent chapters will refer to these concepts and calculations and incorporate them in various applications.

The Mathematics of Interest Rates

Just as there are many different types of securities, interest rates are calculated and reported differently. Depending on the characteristics of the security and pricing conventions of securities traders, interest may be simple or compounded, interest rates may be quoted on a discount basis or interest-bearing basis, and the assumed number of days in a year for reporting purposes may be 360 or 365. Hence, it is virtually impossible to compare quoted rates without a precise understanding of the differences in calculations.

Future Value and Present Value: Single Payment

The mathematics of interest rates is based on the simple recognition that cash in your possession today is worth more than the same amount of cash to be received at some time in the future. For example, are you better off with $50,000 today or a contract to receive $50,000 in six months? Obviously, if you had the cash today, you could invest it for six months and it would grow in value, so $50,000 today is worth more. The difference in value depends on the relevant interest rate that characterizes your opportunity cost or investment opportunities and the length of time until the future cash flow arises. This concept, or more precisely, the concept of future value and present value (PV), provides the framework for interest rate calculations.

Suppose that at the beginning of a year, an individual purchases a security for $1,000. The seller of the security, in turn, promises to pay the individual $1,080 exactly one year later. In this scenario, $1,000 represents the PV of the security, $1,080 represents the future value after one year (FV_1), and $80 is interest. Expressing the $80 relative to the initial investment as a rate of interest (i),

$$i = \$80/\$1{,}000 = 0.08$$

Alternatively,

$$\$1{,}000(1 + i) = \$1{,}080$$

or

$$\begin{aligned} i &= \$1{,}080/\$1{,}000 - 1 \\ &= 0.08 = 8\% \end{aligned}$$

In general, with a single payment after one year (FV_1) that includes interest and the initial investment, the following relationship applies:

$$PV(1 + i) = FV_1 \tag{6.1}$$

where i is a one-year rate, and the subscript 1 for FV refers to the number of periods in the future.

Suppose that the same individual decides to buy another one-year security at the end of the first year and the seller agrees to pay 8 percent on the entire \$1,080 invested. Note that the individual is effectively earning interest on the initial \$1,000 plus the first year's \$80 in interest, so \$1,080 represents the PV at the beginning of the second year. Substituting \$1,080 for PV and 0.08 for i in Equation 6.1 reveals that the future value after the second year (FV_2) equals \$1,166.40.[1]

$$\$1{,}080(1+0.08) = \$1{,}166.40 = FV_2$$

Combining this with Equation 6.1 produces

$$\$1{,}000(1+0.08)(1+0.08) = \$1{,}166.40 = FV_2$$

or

$$PV(1+i)^2 = FV_2 \qquad \textbf{(6.2)}$$

Solving for the Rate of Interest. Alternatively, if the future value and PV are known, we can calculate the fixed annual interest rate from Equation 6.2 as:

$$i = [FV_2/PV]^{1/2} - 1 \qquad \textbf{(6.3)}$$

Using data from the previous example,

$$i = [\$1{,}166.40/\$1{,}000]^{1/2} - 1 = 0.08$$

When an amount is invested for several periods and interest is earned on both the initial investment plus periodic interest (*compound interest*), the following general relationship holds:

$$PV(1+i)^n = FV_n \qquad \textbf{(6.4)}$$

where n represents the number of periods until the future value is determined and i is the periodic rate. Equation 6.4 can be viewed from several vantage points. Because there are four variables, as long as three are known, we can solve for the fourth. Thus, if we know the initial PV the periodic interest rate, and the number of years that interest applies, we can solve for the future value as in Equation 6.4. If we know everything except the interest rate, we can use Equation 6.5 to solve for i.

$$i = [FV_n/PV]^{1/n} - 1 \qquad \textbf{(6.5)}$$

For example, the future value of \$1,000 invested for six years at 8 percent per year with annual compounding (FV_6) is \$1,586.87.

$$FV_6 = \$1{,}000(1.08)^6 = \$1{,}586.87$$

Suppose, instead, that we know that with \$1,000 invested today for six years, the initial investment plus accumulated interest will be worth \$1,700 in six years. What is the annual interest rate? Clearly, the rate must exceed 8 percent because the future value is greater than the \$1,586.87 realized above. Using Equation 6.5, we know that

$$\begin{aligned} i &= [\$1{,}700/\$1{,}000]^{1/6} - 1 \\ &= 0.0925 \end{aligned}$$

Note that in both examples, the interest rate used (annual rate) is matched with the frequency of compounding (annual).

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[1] The subscript in the notation FV_1 and FV_2 refers to the number of periods from the present until the cash flow arises. This example assumes that interest is earned on interest (compounding) and that interest is compounded annually.

Solving for Present Value. In many instances, investors and borrowers want to determine the PV of some future cash payment or receipt. Investors often forecast future cash flows from an asset and want to know the value in today's dollars; that is, how much to pay. Equation 6.4 provides the calculation for the PV of a single future cash flow when we solve for PV and is restated as Equation 6.6.

$$PV = \frac{FVn}{(1+i)^n} \tag{6.6}$$

In this case, the future value is said to be discounted back to a PV equivalent. Suppose that you have a choice between receiving an immediate $30,000 cash payment, or $37,500 in two years. Which would you choose? Assuming you aren't in desperate need of cash today, compare the PV of $37,500 to $30,000. If your opportunity cost of money is 8 percent annually—that is, your investment alternatives yield 8 percent per year—the PV of the $37,500 future cash flow is $32,150.

$$PV = \frac{\$37{,}500}{(1.08)^2} = \$32{,}150$$

Intuitively, you would need to invest $32,150 today at 8 percent to accumulate $37,500 in two years. Alternatively, the future cash flow is worth $2,150 more today than the immediate cash payment, so you would prefer the $37,500.

Future Value and Present Value: Multiple Payments

Future value and PV analysis are slightly more complicated when more than one cash flow is involved. The only difference is that the future or PV of each cash flow is computed separately, with the cumulative value determined as the sum of the computations for each cash flow.

Suppose that an individual makes a $1,000 deposit in a bank, earning 8 percent annually at the beginning of each of the next two years. What is the cumulative future value of both deposits after the second year? The first deposit earns two years of interest, while the second deposit earns just one year of interest. The future value of both deposits after two years is:

$$\begin{aligned} \text{FV of deposit in first year} &= \$1{,}000(1.08)^2 = \$1{,}166.40 \\ \text{FV of deposit in second year} &= \$1{,}000(1.08) \;\;= \$1{,}080.00 \\ \text{Cumulative future value} &= \$2{,}246.40 \end{aligned}$$

In general, setting CF_n equal to the periodic cash flow in period n and assuming that all cash flows are invested *at the beginning* of each year at the fixed rate i, the cumulative future value of a series of cash flows (CFV_n) after n periods can be expressed as:

$$CFV_n = CF_1(1+i)^n + CF_2(1+i)^{n-1} + CF_3(1+i)^{n-2} + \ldots + CF_n(1+i) \tag{6.7}$$

This type of calculation is often used when trying to determine how much needs to be invested periodically to fund a future expenditure, such as payments for a child's college education.

The PV concept is more typically applied to a series of future cash flows. Investors may know the promised payments on a bond, or they may forecast the expected cash flows from buying a business. The PV of a series of cash flows equals the sum of the PVs of the individual cash flows. Assuming the cash flows (CF_n) are received *at the end* of each period, n, the PV of a series of n cash flows received at the end of each period can be expressed as:

$$PV = \frac{CF_1}{(1+i)^1} + \frac{CF_2}{(1+i)^2} + \frac{CF_3}{(1+i)^3} + \ldots + \frac{CF_4}{(1+i)^n} \qquad \textbf{(6.8)}$$

or, using summation notation

$$PV = \sum_{t=1}^{n} \frac{CF_t}{(1+i)^t}$$

Each future cash flow is discounted back to its PV equivalent and the respective PVs are added. Note that Equation 6.8 assumes that the same discount rate (i) applies to each cash flow. We will modify this later when we discuss the valuation of fixed-income securities.

In this context, determine how much you would pay for a security that pays $90 at the end of each of the next three years plus another $1,000 at the end of the third year if the relevant interest rate is 10 percent. Using Equation 6.8,

$$PV = \frac{\$90}{(1.1)^1} + \frac{\$90}{(1.1)^2} + \frac{\$1{,}090}{(1.1)^3} = \$975.13$$

Again, if the PV, future values, and number of periods are known, we can solve Equation 6.8 for i to determine the relevant discount rate. For fixed-income securities, this discount rate is the market rate of interest typically labeled the yield to maturity.[2]

Simple versus Compound Interest

In practice, the amount of interest paid on a security is determined in many different ways. One difference is that interest may be computed as **simple interest** or **compound interest.** Simple interest is interest that is paid only on the initial principal invested. Bank commercial loans, for example, normally quote simple interest payments. In contrast, compound interest is interest paid on outstanding principal plus any interest that has been earned but not paid out. Most bank deposits pay compound interest. Compound interest is also labeled interest-on-interest.

Simple interest equals the outstanding principal amount times the periodic interest rate times the number of periods over which interest is earned. With the previous notation, simple interest equals

$$\text{Simple interest} = PV(i)n \qquad \textbf{(6.9)}$$

In this case, the interest rate i is the periodic rate while n refers to the number of periods. Thus, if n equals one year and i equals 6 percent per year, simple interest on $1,000 equals

$$\text{Simple interest} = \$1{,}000(0.06)1 = \$60$$

Suppose that interest on the above contract is paid monthly. What is the monthly simple interest payment?

$$\text{Monthly simple interest} = \$1{,}000(0.06)(1/12) = \$5$$

The example following Equation 6.5 showed that $1,000 invested for six years at 8 percent with annual interest compounding produced a future value of $1,586.87.

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[2] Another way to view the above calculation is to note that if you deposited $975.13 in an account that earns 10 percent interest per year, you could withdraw $90 at the end of each of the next two years and $1,090 at the end of the third year, which would leave a zero balance.

This assumed that interest was earned annually on the previous years' cumulative interest as well as on the original principal. Suppose, instead, that interest is 8 percent simple interest. What will the future value of principal plus interest equal?

$$\begin{aligned}\text{Simple interest} &= \$1{,}000(0.08)6 = \$480\\ \text{Original principal} &= \$1{,}000\\ \text{Future value} &= \$1{,}480\end{aligned}$$

Obviously, the actual interest varies dramatically depending on whether simple or compound interest applies. As indicated, compound interest assumes that interest is paid on principal and interest. Each of the Equations 6.1 through 6.8 uses annual interest rates and assumes annual compounding. Equation 6.9, however, assumes no compounding.

Compounding Frequency

Interest may be compounded over a variety of intervals. In many cases, it is compounded over periods much less than one year, such as daily or monthly. Fortunately, the same formulas apply, with a small adjustment that consists of converting the annual interest rate to a periodic interest rate that coincides with the compounding interval, and letting the number of periods equal n times the number of compounding periods in a year (m):

$$\mathrm{PV}(1+\mathrm{i}/\mathrm{m})^{\mathrm{nm}} = \mathrm{FV}_{\mathrm{n}} \tag{6.10}$$

and

$$\mathrm{PV} = \frac{\mathrm{FV}_{\mathrm{n}}}{(1+\mathrm{i}/\mathrm{m})^{\mathrm{nm}}} \tag{6.11}$$

Note that i/m equals the periodic interest rate and n × m equals the number of compounding periods.

For example, if compounding occurs daily, m equals 365 and the periodic rate equals the annual rate divided by 365. If compounding occurs monthly, m equals 12 and the periodic rate equals i divided by 12. The product of n × m (nm) is the total number of compounding periods. Exhibit 6.1 demonstrates the impact of different intra-year compounding intervals on future value and PV in line with Equation 6.10 and Equation 6.11 for n = 1. As indicated, the future value after one year is greatest when compounding frequency is the highest, because more frequent compounding means that interest is applied to previous interest more frequently. In a similar vein, the PV of a fixed amount is lowest when compounding frequency is highest as the more interest that can be earned, the lower the initial value required to invest and return the same future value.

Exhibit 6.1 also demonstrates the impact of different effective interest rates. An effective interest rate, in contrast to a nominal or contract rate, incorporates the effect of compounding and thus allows a comparison of yields. Assuming compounding frequency of at least once a year, the effective annual interest rate, i^*, can be calculated from Equation 6.12.[3]

$$\mathrm{i}^* = (1+\mathrm{i}/\mathrm{m})^{\mathrm{m}} - 1 \tag{6.12}$$

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[3] With continuous compounding $\mathrm{i}^* = \mathrm{e}^{\mathrm{i}} - 1$.

EXHIBIT 6.1 The Effect of Compounding on Future Value and Present Value

A. What is the future value after 1 year of $1,000 invested at an 8% annual nominal rate?

Compounding Interval	Number of Compounding Intervals in 1 Year (m)	Future Value (FV1)*	Effective Interest Rate*
Year	1	$1080.00	8.00%
Semiannual	2	1081.60	8.16
Quarter	4	1082.43	8.24
Month	12	1083.00	8.30
Day	365	1083.28	8.33
Continuous	$\infty^{\dagger}$	1083.29	8.33

B. What is the present value of $1,000 received at the end of 1 year with compounding at 8%?

Compounding Interval	Number of Compounding Intervals in 1 Year (m)	Present Value (PV)*	Effective Interest Rate*
Year	1	$925.93	8.00%
Semiannual	2	924.56	8.16
Quarter	4	923.85	8.24
Month	12	923.36	8.30
Day	365	923.12	8.33
Continuous	$\infty^{\dagger}$	923.12	8.33

*Most financial calculators can easily generate the required calculations.

†Continuous compounding assumes that compounding occurs over such short intervals that it is instantaneous, or that m in Equations 6.10 and 6.11 approaches infinity. Mathematically, continuous compounding is based on Euler's **e** such that $\lim_{m \to \infty} \left(1 + \frac{1}{m}\right)^m = e^i$, where $e = 2.71828$. Thus, Equations 6.10 and 6.11 produce $FV_n = PVe^{in}$, and $PV_n = FV_n/e^{in}$.

The Relationship between Interest Rates and Option-Free Bond Prices

As indicated earlier, PV and future value are linked via precise mathematical relationships in Equations 6.4 and 6.8. This suggests that there are systematic relationships between PV, future cash flows, i, and n. In fact, much research has attempted to characterize the exact influence of each variable on the pricing relationships. The following analysis focuses on the relationship between bond prices and their associated market interest rates, and how this relationship changes as the magnitude and timing of future cash flows vary. This discussion can be characterized as the traditional analysis of bond pricing for bonds that do not have options. Specifically, we ignore bonds with embedded call and put options such as callable bonds or mortgage-backed securities subject to prepayments. Exhibit 6.2 summarizes the features of four systematic price relationships. These apply to option-free securities in the traditional framework.

EXHIBIT 6.2 Price and Yield Relationships for Option-Free Bonds That Are Equivalent Except for the Feature Analyzed

Relationship	*Impact*
1. Market interest rates and bond prices vary inversely.	1. Bond prices fall as interest rates rise and rise as interest rates fall.
2. For a specific absolute change in interest rates, the proportionate increase in bond prices when rates fall exceeds the proportionate decrease in bond prices when rates rise. The proportionate difference increases with maturity and is larger the lower a bond's periodic interest payment.	2. For the identical absolute change in interest rates, a bondholder will realize a greater capital gain when rates decline than capital loss when rates increase.
3. Long-term bonds change proportionately more in price than short-term bonds for a given change in interest rates from the same base level.	3. Investors will realize greater capital gains and capital losses on long-term securities than on short-term securities when interest rates change by the same amount.
4. Low-coupon bonds change proportionately more in price than high-coupon bonds for a given change in interest rates from the same base level.	4. Low-coupon bonds exhibit greater relative price volatility than do high-coupon bonds.

Bonds with and without Options

The term "bonds" refers to fixed-income securities with longer-term maturities. some of these securities carry options and some are option-free. in general, there are five types of common bond options, and any single security might have one or more of these "embedded" in its structure.

- Call option: Issuer of the bond can buy it back (redeem it) at a predetermined price at a set time in the future. The buyer (holder) of the bond will receive cash when the issuer calls the bond.
- Put option: Holder of the bond can demand redemption of the bond at a predetermined price at a set time in the future. The issuer of the bond will pay cash when the holder puts the bond to the issuer (buyer demands redemption).
- Conversion option: Holder of the bond can demand that the issuer of the bond convert it into common stock of the issuer at a predetermined price at a set time in the future. No cash changes hands at the time of conversion.
- Extension option: Holder of the bond can extend the maturity of the bond by a set number of periods.
- Exchange option: Holder of the bond can demand that the issuer convert the bond into common stock of a different company at a predetermined price at a set time in the future.

A bond without any options is referred to as option-free and is priced differently than a bond that carries one or more of the above embedded options.

Bond Prices and Interest Rates Vary Inversely

The typical option-free fixed-rate coupon bond has the following features: a par or face value that represents the return of principal at maturity, a final maturity in years, and a coupon payment that is fixed (hence fixed income) over the life of the bond. The other two components are the market price (PV in Equation 6.8) and the market interest rate (i in Equation 6.8). Most fixed-coupon bonds are initially sold in the primary market at prices close to par or face value. The fixed **coupon rate**, defined as the coupon payment divided by the face value, determines the amount of coupon interest that is paid periodically (typically semiannually) until final maturity. After issue, bonds trade in the secondary market, at which time their prices reflect current market conditions. Current market prices will then reflect the size of the bond's fixed coupon payment with the coupon interest paid (determined by the market rate) on a newly issued bond with otherwise similar features

Market interest rates and prices on fixed-income securities vary coincidentally and are inversely related.[4] As such, prices decline when interest rates rise and prices rise when interest rates decline. The inverse relationship reflects the fact that investors in new securities can get more (less) coupon interest on a comparable new security when rates rise (fall) so that the price of the old security falls (rises) to provide an equivalent yield. The sensitivity of the price move relative to the change in interest rates is determined by the size and timing of the cash flows on the underlying security. For coupon bonds, the periodic cash flows consist of interest payments and par value at maturity. The appropriate pricing relationship is characterized by Equation 6.8 where i represents the market yield to maturity.

Consider a bond with a $10,000 face value that makes fixed semiannual interest payments of $470 and matures in exactly three years, at which time the investor receives $10,000 in principal. Note that the semiannual coupon rate is 4.7 percent ($470/$10,000). If the current market interest rate equals 4.7 percent semiannually (9.4 percent per annum), the prevailing price of the bond equals $10,000 as determined below. There are six semiannual compounding periods.

$$\text{Price} = \sum_{t=1}^{6} \frac{470}{1.047^t} + \frac{10{,}000}{1.047^6} = \$10{,}000$$

Thus, at a 9.4 percent yield, this bond sells at a price equal to par or face value.

Now suppose that the corporate issuer of the bond announces unexpectedly poor earnings and forecasts a declining capacity to service its debt in the future. Owners of the bonds subsequently rush to sell their holdings. What should happen to the market interest rate and price of the bond? If the announcement was truly unexpected, then the perceived riskiness of the security has increased. Holders recognize that there is a greater probability that the promised cash flows may not materialize, so they discount the expected cash flows at a higher rate. This essentially means that investors now need a larger default risk premium, reflected by a higher market interest rate, to entice them to buy the bond. If the annual yield to maturity immediately increased to 10 percent (5 percent semiannually), the price of the bond would fall to $9,847.73. With a price below par, this bond becomes a **discount bond**.

$$\text{Price} = \sum_{t=1}^{6} \frac{470}{1.05^t} + \frac{10{,}000}{1.05^6} = \$9{,}847.73$$

Thus, a bond's price and market interest rate vary inversely when market rates rise. If, instead, the annual market interest rate immediately fell to 8.8 percent (4.4 percent semiannually), the bond's price would rise to $10,155.24. In this scenario, the bond becomes a **premium bond** because its price exceeds par.

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[4] The amount of interest paid on securities that carry floating rates or variable rates changes as market rates change. As such, as market rates increase (decrease), the amount of interest rises (falls). Such instruments subsequently trade close to par. The price/yield relationships in Exhibit 6.2 apply only to fixed-coupon securities.

$$\text{Price} = \sum_{t=1}^{6} \frac{470}{1.044^t} + \frac{10{,}000}{1.044^6} = \$10{,}155.24$$

Exhibit 6.3 plots the relationship between the price and market interest rate on this bond. As indicated, higher bond prices are associated with lower market interest rates, and vice versa.

Again, the ratio of the annualized periodic interest payment to a bond's par value is labeled the coupon rate. In the previous example, the coupon rate equaled 9.4 percent ($2 \times \$470/\$10{,}000$). In bond trading circles, if this bond was issued in 2014, it would be labeled the 9.4s of 2017. The following schedule describes the general relationship among yield to maturity, coupon rate, and bond price.

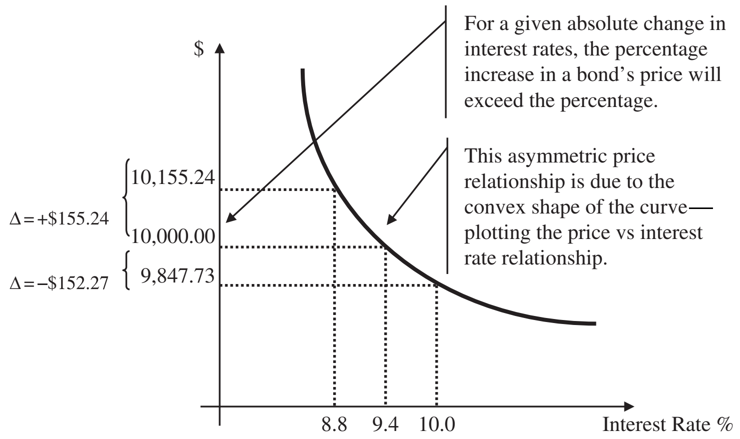
Type of Bond	Yield to Maturity versus Coupon Rate	Price versus Face (Par) Value
Par bond	Yield to maturity = coupon rate	Price = face value
Discount bond	Yield to maturity > coupon rate	Price < face value
Premium bond	Yield to maturity < coupon rate	Price > face value

Bond Prices Change Asymmetrically to Rising and Falling Rates

For a given absolute change in interest rates, the percentage increase in an option-free bond's price will exceed the percentage decrease. Consider the price-to-yield relationship in Exhibit 6.3. When the bond is priced at par, the market rate equals 9.4 percent. If the market yield suddenly increases by 60 basis points to 10 percent, the price falls by \$152.27 or 1.52 percent. If the market yield suddenly decreases by the same 60 basis points to 8.8 percent, the price rises by \$155.24, or 1.55 percent. While the proportionate difference may seem small, it increases with maturity and is larger for bonds with lower periodic interest payments. The dollar difference will also increase with greater par value.

This asymmetric price relationship is due to the convex shape of the curve in Exhibit 6.3, which reflects a difference in bond duration at different interest rate levels. The duration concept and applications are discussed later in this chapter. The primary implication is that for the same change in interest rates, bondholders will realize a greater capital gain when rates fall than capital loss when rates rise for all option-free bonds.

EXHIBIT 6.3 **Relationship between Price and Interest Rate on a Three-Year, \$10,000 Option-Free Par Bond That Pays \$470 in Semiannual Interest**



For a given absolute change in interest rates, the percentage increase in a bond's price will exceed the percentage.

This asymmetric price relationship is due to the convex shape of the curve—plotting the price vs interest rate relationship.

Maturity Influences Bond Price Sensitivity

Short-term and long-term bonds exhibit different price volatility. For bonds that pay the same coupon interest rate, long-term bonds change proportionately more in price than do short-term bonds for a given rate change. Exhibit 6.4 contrasts the price-yield relationship for a 9.4 percent coupon bond with six years to maturity to that of the three-year bond with the same 9.4 percent coupon discussed earlier. Note that the only difference between the two bonds is final maturity and thus the number of interim cash flows (12 versus 6). When both market rates equal 9.4 percent, both bonds are priced at par. The following calculations indicate the price of the six-year bond when the market rate rises to 10 percent and falls to 8.8 percent, respectively.

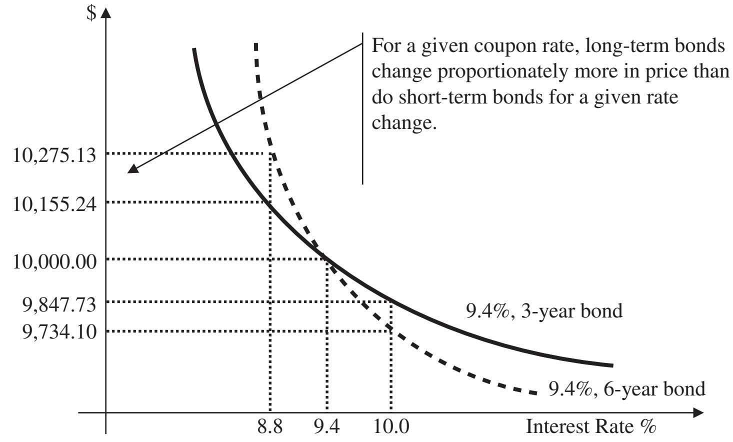
$$\text{Price} = \sum_{t=1}^{12} \frac{470}{1.05^t} + \frac{10{,}000}{1.05^{12}} = \$9{,}734.10$$

$$\text{Price} = \sum_{t=1}^{12} \frac{470}{1.044^t} + \frac{10{,}000}{1.044^{12}} = \$10{,}275.13$$

As indicated in Exhibit 6.4, when rates on both bonds increase by 60 basis points, the price of the six-year bond falls more than the price of the three-year bond. The proportionate price declines are 2.66 percent and 1.52 percent, respectively. When rates decline by 60 basis points, the six-year bond's price increases 2.75 percent while the three-year bond's price increases by 1.55 percent.

The rationale for the different price sensitivity has to do with the basic PV in Equation 6.8. The buyer of a six-year bond contracts to receive fixed-interest payments for twice as many periods as the buyer of a three-year bond. When priced at par, the coupon and market rate are 9.4 percent. If market rates increase, buyers of newly issued par bonds will receive periodic interest at a higher market (and coupon) rate. Holders of "old" discount bonds now receive below-market interest payments. With the six-year bond, these below-market payments will persist for twice as long as with the three-year bond. Thus, the price of the six-year bond declines more than does the price of the three-year bond. The opposite holds when interest rates fall. The holder of a six-year bond receives above-market

EXHIBIT 6.4 **The Effect of Maturity on the Relationship between Price and Interest Rate on Fixed-Income, Option-Free Bonds with 3-Year and 6-Year Maturities**



interest payments, which are locked in for twice as long as for the three-year bond. Thus, the price of a six-year bond will rise above the price of a three-year bond.

Suppose that an investor owns a 9.4 percent coupon bond with nine years to maturity. If the market rate changes from 9.4 percent to 10 percent, its price drops from \$10,000 to \$9,649.31.

$$\text{Price} = \sum_{t=1}^{18} \frac{470}{1.05^t} + \frac{10{,}000}{1.05^{18}} = \$9{,}649.31$$

Not surprisingly, this is well below the price of the six-year bond at 10 percent.

The following schedule compares the percentage price changes for the three-, six-, and nine-year bonds when interest rates rise from 9.4 percent to 10 percent.

	Price Change				
	3-Year		**6-Year**		**9-Year**
Percentage change	–1.52%	V	–2.66%	V	–3.51%
Difference		–1.14%		–0.85%	

Note that the rate of change in the percentage price decline falls from 1.14 percent to 0.85 percent as maturity lengthens. The following general relationship holds: as maturity lengthens, the rate of change in the percentage price change declines. You should verify this for the nine-year bond in the case where its rate falls to 8.8 percent.

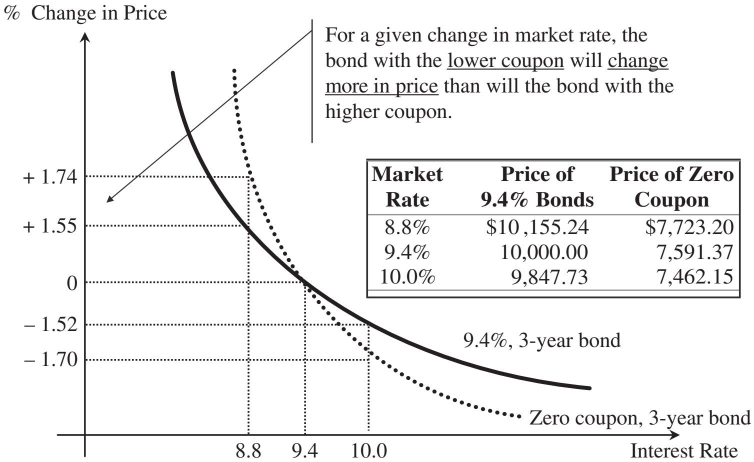
The Size of Coupon Influences Bond Price Sensitivity

High-coupon and low-coupon bonds exhibit different price volatility. Suppose that two bonds are priced to yield the same yield to maturity. For a given change in market rate, the bond with the lower coupon will change more in price than the bond with the higher coupon. This is demonstrated in Exhibit 6.5, which plots the price and yield relationship for two otherwise identical three-year maturity instruments: a zero coupon bond with three years to maturity and one cash flow of \$10,000 paid at maturity, and the 9.4 percent coupon bond introduced earlier. As the market rate falls below 9.4 percent, the price of the zero coupon bond rises by proportionately more than the price of the coupon bond. At 8.8 percent, the price of the zero rises by 1.74 percent while the price of the 9.4 percent coupon bond rises by just 1.55 percent. The zero coupon bond falls proportionately more in price when the market rate rises to 10 percent. Again, this difference increases with maturity and may be quite substantial with large-denomination securities.

Duration and Price Volatility

The previous discussion of bond price volatility focuses on the relationship between a security's market rate of interest, periodic interest payment, and maturity. In fact, the price rules indicate that volatility changes systematically as each of these factors changes. Most financial economists look to duration as a comprehensive measure of these relationships. Simply focusing on interest rate changes ignores the size of interest payment and length of time until each payment is received. Because maturity simply identifies how much time elapses until final payment, it ignores all information about the timing and magnitude of interim payments. The size of coupon, in turn, provides no information about the rate at which interim cash flows can be reinvested or even how many cash flows are promised.

EXHIBIT 6.5 **The Effect of Coupon on the Relationship between Price and Interest Rate on Fixed-Income, Option-Free Bonds**



For a given change in market rate, the bond with the lower coupon will change more in price than will the bond with the higher coupon.

Market Rate	Price of 9.4% Bonds	Price of Zero Coupon
8.8%	$10,155.24	$7,723.20
9.4%	10,000.00	7,591.37
10.0%	9,847.73	7,462.15

Duration as an Elasticity Measure

Duration is a measure of effective maturity that incorporates the timing and size of a security's cash flows. It captures the combined impact of market rate, the size of interim payments, and maturity on a security's price volatility. Conceptually, duration is most easily understood as a measure of price elasticity in determining a security's market value. Thus, if a security's duration is known, an investor can readily estimate the size of a change in value (or price) for different interest rate changes.[5]

There are two important interpretations of duration analysis that apply to valuing most option-free securities and portfolios without embedded options.

1. Duration is a measure of how price sensitive a security (or portfolio) is to a change in interest rates.
2. The greater (shorter) the duration, the greater (lesser) the price sensitivity.

Remember when you were first introduced to the concept of price elasticity? If you knew the price elasticity of demand for a good or service, you could estimate how much the quantity demanded would change when the price changed. In general,

$$\text{price elasticity of demand} = -\frac{\%\ \text{change in quantity demanded}}{\%\ \text{change in price}}$$

Because quantity demanded varies inversely with price changes, the minus sign converts the relative percentage changes to a positive measure. Thus, if a bank raises its charge for usage of some other bank's automatic teller machine (ATM) from $2 to $3 per transaction, and the number of monthly ATM transactions drops from 100,000 to 70,000, the price elasticity of demand is estimated at 0.6.

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[5] The following discussion uses Macaulay's measure of duration, which is introduced formally later in the chapter.

$$\text{price elasticity of demand} = -\frac{-30{,}000/100{,}000}{\$1/\$2} = 0.6$$

This elasticity measure indicates that a proportionate change in price coincides with a smaller proportionate change in quantity demanded. If the elasticity remained constant at higher prices, the bank could estimate that a further price increase to \$4 per item (+33 percent) would lower usage to approximately 56,000 (−20 percent = −0.33 × 0.6) items monthly.

A security's duration can similarly be interpreted as an elasticity measure. However, instead of the relationship between quantity demanded and price, duration provides information about the change in market value as a result of interest rate changes. Letting P equal the price of a security and i equal the security's prevailing market interest rate, duration (DUR) can be approximated by the following expression:

$$\text{DUR} \cong -\left[\frac{\frac{\Delta P}{P}}{\frac{\Delta i}{(1+i)}}\right] \cong -\frac{\%\Delta P}{\%\Delta i} \tag{6.13}$$

The numerator represents the percentage change in price, while the denominator represents the approximate percentage change in interest rates.

Consider information for the three-year zero-coupon bond from Exhibit 6.5 that pays \$10,000 at maturity. At an annual market rate of 9.4 percent, this bond's price equals \$7,591.37 assuming semiannual compounding. As demonstrated later, this zero-coupon bond has a duration of exactly three years, or six semiannual periods. An analyst can use Equation 6.13 to estimate the change in price of this bond when its market rate changes. Restating the expression,

$$\Delta P \cong -\text{Duration}[\Delta i/(1+i)]P \tag{6.14}$$

Suppose the market rate rises immediately from 4.7 percent to 5 percent semiannually. Using semiannual data, the estimated change in price equals −\$130.51, or 1.72 percent of the price.

$$\Delta P \cong -6[0.003/1.047]\$7{,}591.37 \cong -\$130.51$$

This overstates the true price decline by \$1.30, as Exhibit 6.5 demonstrates that the actual price change equals −\$129.21.

Measuring Duration

For option-free bonds, duration is measured in units of time and represents a security's effective maturity. More precisely, it equals a weighted average of the time until expected cash flows from a security will be received, and where the respective weights are the PV of the cash flow as a fraction of the current price of the security. Early cash flows thus carry a greater weight than later cash flows, and the greater the size of the cash flow, the greater the weight and contribution to the duration estimate.

The following examples use Macaulay's duration, which was first introduced in 1938. While this duration measure has been modified to improve its applicability, it serves as a useful first approximation.

Using general notation, Macaulay's duration (D) appears as:

$$D = \frac{\sum_{t=1}^{K} \frac{CF_t(t)}{(1+i)^t}}{\sum_{t=1}^{k} \frac{CF_t}{(1+i)^t}} = \frac{\sum_{t=1}^{n} \frac{CF_t(t)}{(1+i)^t}}{\text{PV of the security}} \tag{6.15}$$

where

CF_t = dollar value of the cash flow at time t,

t = the number of periods of time until the cash flow payment,

i = the periodic yield to maturity of the security generating the cash flow, and

k = the number of cash flows.

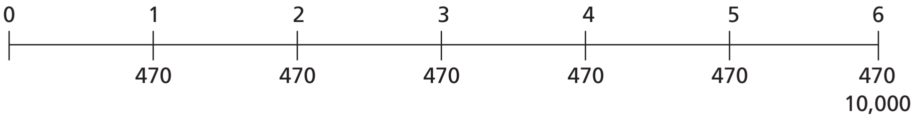
Duration is thus a weighted average of the time until the cash flows arise. As described earlier, the numerator equals the PV of each cash flow times the number of periods until the cash flow arises. The denominator is simply the price of the instrument. The weight for each cash flow equals the PV from the numerator divided by the current price (the entire denominator). The weighted average is therefore measured in some unit of time, such as days, months, and so on, but is usually discussed in terms of years.

Consider the 9.4 percent, three-year coupon bond with a face value of \$10,000. The duration of this security—assuming that it is currently priced at par, does not have either a call option or put option, and all interest and principal payments are made as scheduled—is 5.37 semiannual periods. The calculation is demonstrated in Exhibit 6.6. Note that each cash flow is converted to its PV by discounting at the prevailing market rate of 4.7 percent. Each PV is then divided by the prevailing price (\$10,000) and multiplied by the units of time until the cash flow arises. Because the largest cash flow is the principal payment received at maturity, its weight in the duration calculation is greatest at 79 percent, and the duration of 5.37 semiannual periods is close to final maturity (6 semiannual periods).

Duration of a Zero Coupon Bond. Now contrast duration of the coupon bond with duration of the zero coupon bond described in Exhibit 6.5. With the zero coupon security there are no interim cash flows. The only payment is \$10,000 after three years. Using

EXHIBIT 6.6 A Sample Duration Calculation

A. Time Line Characterizing Cash Flows



B. Estimated Macaulay's Duration

$$\text{Duration} = \frac{\frac{470(1)}{1.047^1} + \frac{470(2)}{1.047^2} + \frac{470(3)}{1.047^3} + \frac{470(4)}{1.047^4} + \frac{470(5)}{1.047^5} + \frac{470(6)}{1.047^6}}{10{,}000}$$

$$= \frac{448.9(1) + 428.8(2) + 409.5(3) + 391.1(4) + 375.6(5) + 7{,}948.2(6)}{10{,}000}$$

$$= 5.37 \text{ semiannual periods (or 2.68 years)}$$

Equation 6.15, the bond's estimated duration (D) is six semiannual periods. There is only one cash flow such that an investor receives 100 percent (weight is one) of the expected cash flows back at maturity.

$$D = \frac{[\$10{,}000/(1.047)^6]6}{\$10{,}000/(1.047)^6} = 6$$

The three-year coupon bond's duration is shorter at 5.37 semiannual periods because there are interim cash flows and an investor receives some of the cash payments prior to final maturity. In general, Macaulay's duration of a zero coupon security equals its final maturity. The duration of any security with interim cash flows will be less than maturity.

A basic contribution of duration is that it accounts for differences in time until interim cash flows are received between securities. Large, near-term cash flows receive the greatest weight and thus shorten estimated duration. Large cash flows arising near maturity lengthen duration. In both of these examples, the majority of cash flows are received near maturity, so duration was relatively long.

Comparative Price Sensitivity

The duration concept is useful because it enables market participants to estimate the relative price volatility of different securities. Remember the second rule for interpreting duration: the greater the duration, the greater the price sensitivity. This is reflected in Equation 6.14 and the following extension.

$$\Delta P/P \cong -[\text{Duration}/(1+i)]\Delta i \tag{6.16}$$

Equation 6.16 characterizes the formal elasticity relationship between interest rates and bond prices and is the same as Equation 6.14 except that the percentage change in price is on the left-hand side of the equality and Macaulay's duration is divided by one plus the market interest rate. This latter ratio *(in brackets)* is labeled **modified duration** and is widely used by bond market participants:

$$\text{Modified duration} = \text{Macaulay's duration}/(1+i)$$

such that the percentage price change of a security or portfolio approximately equals modified duration times the change in market rate. For example, a bond with a modified duration of five years will change by +/−5 percent in price for each 1 percent rate move.

These relationships are quite intuitive because they demonstrate that the greater the duration or modified duration, the greater the percentage change and/or actual change in price for a given change in interest rates. For example, consider the two par bonds from Exhibit 6.4 that are priced at par when market rates equal 9.4 percent. According to the above formulas, the bond with the longest duration will exhibit the greatest price volatility.

This relationship is demonstrated in Exhibit 6.7 for these two coupon bonds and two zero coupon bonds. All of the bonds are assumed to carry an annual yield of 9.4 percent, but they have different prices and durations, depending on maturity and whether interim interest payments are made. Thus, the two zero coupon bonds have Macaulay durations of six and 12 semiannual periods equal to maturity, respectively, and trade at discount prices well below their $10,000 face values. As implied above, the Macaulay durations of the coupon bonds are slightly less than maturity and the modified durations for all bonds are slightly less than the corresponding Macaulay durations.

The bottom part of the exhibit demonstrates how to interpret duration data. Suppose that market yields on all four bonds suddenly increase to 10 percent, or 5 percent semiannually. The comparative absolute change in price, percentage change in price, and

EXHIBIT 6.7 **Comparative Price Sensitivity Indicated by Duration**

	Type of Bond			
	3-yr. Zero	**6-yr. Zero**	**3-yr. Coupon**	**6-yr. Coupon**
Initial market rate (annual)	9.40%	9.40%	9.40%	9.40%
Initial market rate (semiannual)	4.70%	4.70%	4.70%	4.70%
Maturity value	\$10,000	\$10,000	\$10,000	\$10,000
Initial price	\$7,591.37	\$5,762.88	\$10,000	\$10,000
Duration: semiannual periods	6.00	12.00	5.37	9.44
Modified duration	5.73	11.46	5.12	9.02
Rate Increases to 10% (5% Semiannually)				
Estimated ΔP	–\$130.51	–\$198.15	–\$153.74	–\$270.45
Estimated ΔP/P	–1.72%	–3.44%	–1.54%	–2.70%
Initial elasticity	0.2693	0.5387	0.2406	0.4242

Formulas

$\Delta P = -\text{Duration}\,[\Delta i/(1+i)]\,P$

$\Delta P/P = -[\text{Duration}/(1+i)]\,\Delta i$

where Duration equals Macaulay's duration.

initial elasticities are provided at the bottom of the exhibit. Consider the three-year and six-year zero coupon bonds. Using Equation 6.14, the estimated change in price is –\$131 and –\$198, respectively. Using Equation 6.16, the estimated percentage change in price is –1.72 percent and –3.44 percent, respectively. Thus, with the same absolute and percentage change in market rates, the longer-duration six-year bond exhibits the greater price decline both in absolute and percentage terms. This is consistent with its greater duration and interest rate elasticity of 0.5387 versus 0.2693. Consider now the two coupon bonds. Not surprisingly, the same relative price sensitivity appears. With the rate increase, the price of the bond with a duration of 9.44 semiannual periods falls by almost \$271 from the same \$10,000 base compared with the \$154 price decline with the shorter-duration bond. This is again consistent with its higher duration and interest rate elasticity.

The key implication of Exhibit 6.7 is that duration and relative price sensitivity vary directly. The greater is the duration, the greater is a security's percentage change in price and interest rate elasticity when securities carry the same initial yields. When securities carry different yields, they can similarly be ranked by relative elasticities.

Recent Innovations in the Valuation of Fixed-Income Securities and Total Return Analysis

The traditional way of valuing fixed-income securities and analyzing yields is too simplistic given the complexities of today's marketplace. There are many reasons for this. First, many investors do not hold securities until maturity so that yield to maturity is of limited interest. Second, the PV calculation in Equation 6.8 that applies to bonds assumes that all coupon payments are reinvested at the calculated yield to maturity, which is generally not the case. Many investors want to know how changes in reinvestment rates affect the actual realized yield. Third, many securities carry embedded options, such as a call or put option, which complicates valuation because it is difficult to know whether the option will be exercised and thus what cash flows an investor will actually receive.

As an example, consider a bond that has a three-year maturity and carries a fixed coupon rate but can be called anytime after one year. The **call feature** means that the issuer of the security (the borrower) can repay the outstanding principal to the owner of the bond at its discretion after one year. How long will an investor receive interest payments before the bond is repaid? It may be called after one year—or not at all. To know how to value a security with options, the investor must estimate when the options will be exercised and what value they will have. Finally, it is relatively easy for anyone who owns a security to separate, or strip, the coupon payments from each other and from the principal payment on a traditional bond. The holder can buy a security, strip the promised cash flows and sell them as distinct zero coupon securities. Alternatively, someone can buy zero coupon securities and construct a traditional coupon bond. The implications are that (1) any fixed-income security should be priced as a package of cash flows, and (2) each cash flow should be discounted at the appropriate zero coupon rate.

Total Return Analysis

Many market participants attempt to estimate the actual realized yield on a bond by calculating an estimated total return.[6] This yield measure allows the investor to vary assumptions about how long he or she will hold the bond (the holding period), the rate at which interim cash flows will be reinvested (the reinvestment rate), and the value of the bond at the end of the holding period (sale value or maturity value). The calculated total return can then be compared across securities to assess whether the return sufficiently compensates for the risks assumed.

Total return analysis applied to option-free bonds recognizes that there are three different sources of return from owning a bond: coupon interest, reinvestment income —labeled interest-on-interest—and any capital gain or loss realized at maturity or sale if the bond is sold before maturity.[7] The mathematics requires that one specify a holding period, reinvestment rate or rates, and the market price of the bond at maturity or sale. Having done this, the analysis involves estimating the total future value of coupon interest, interest-on-interest, and sale/maturity value; comparing this to the initial purchase price; and calculating a zero coupon yield.

Consider the three-year, 9.4 percent coupon bond trading at par of $10,000 shown in Exhibit 6.3. You buy the bond expecting to hold it until it matures. Coupon interest of $470 is paid every six months so that total interest will be $2,820 (6 × $470). You believe that you can invest each of the coupon payments at a 3 percent semiannual rate through maturity. Equation 6.17 provides the formula for calculating the future value of coupon interest plus interest-on-interest with a constant reinvestment rate (r).

$$\text{future value of coupon interest} + \text{interest-on-interest} = C\frac{(1+r)^n - 1}{r} \qquad \textbf{(6.17)}$$

where C is the periodic coupon interest payment and n is the number of periods until the end of the holding period. In this case, the total future value is

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[6] This discussion follows that from *Fixed Income Mathematics* by Frank Fabozzi.

[7] This discussion assumes that bonds have no options. Total return analysis for securities with options is discussed in Chapter 16.

$$\$470[(1.03)^6 - 1]/0.03 = \$3{,}040.15$$

With \$2,820 in coupon interest (C × n), interest-on-interest equals \$220.15. Finally, if held to maturity, you will receive \$10,000 return of principal after three years. The total future value of the three components of return is thus:

$$\begin{aligned} \text{Coupon interest} &= \$2,820.00 \\ \text{Interest-on-interest} &= \$220.15 \\ \text{Principal at maturity} &= \$10,000.00 \\ \text{Total future value} &= \$13,040.15 \end{aligned}$$

The total return as a yield measure is obtained by comparing this total future value with the initial investment of \$10,000 and calculating the equivalent zero coupon yield. In general,

$$\text{Total return} = [\text{Total future value}/\text{Purchase price}]^{1/n} - 1 \qquad \textbf{(6.18)}$$

For this investment, the total return is

$$[\$13,040.15/\$10,000]^{1/6} - 1 = 1.04523 - 1 = 0.04523$$

or 9.05 percent annually.

Note that this is less than the 9.4 percent yield to maturity of the bond because you assumed a 3 percent semiannual reinvestment rate. Remember that the yield-to-maturity calculation assumes that all interim cash flows can be reinvested at the yield to maturity. If we use a 4.7 percent reinvestment rate assumption in this example, the interest-on-interest component increases to \$352.86. As expected, the total return increases to 4.7 percent semiannually:

$$[(\$13,172.86/\$10,000)^{1/6} - 1] = 0.047$$

Exhibit 6.8 provides a similar application for a nine-year bond that pays a 7.3 percent coupon and currently sells for \$99.62 per \$100 par value. In this example, the holding period is exactly five years and the investor assumes a reinvestment rate of 6 percent annually. After five years, it is believed that a comparable bond with four years remaining until maturity will be priced to yield 7 percent to maturity. Thus, the calculation assumes a holding period far shorter than maturity and requires an estimate of the bond's sale price. Note that in this example, the bond is assumed to sell at a premium after five years (\$101.03 for a gain of \$1.41), which raises the total return to 7.34 percent.

Total return is especially applicable when securities have embedded options, such as a call option or put option, or with mortgages and mortgage-backed securities where the principal can be prepaid. It allows an investor to identify how much of the yield can be attributed to reinvestment income and potential capital gains and losses. It also is important when the investor's holding period differs from maturity.

Valuing Bonds as a Package of Cash Flows

Consider the same three-year maturity, 9.4 percent coupon bond from Exhibit 6.3, which has six remaining coupon payments of \$470 and one remaining principal payment of \$10,000 at maturity. This bond should be viewed as a package of seven separate cash flows as the owner could separate each interest payment and the principal payment and sell them as distinct securities. Formally, if stripped and sold separately, each of the coupon interest payments is labeled an interest-only security (IO) while the principal payment is a principal-only (PO) security. Because the payments can be stripped, an

EXHIBIT 6.8 **Calculation of Total Return for a Nine-Year Bond Purchased at \$99.62 per \$100 Par Value That Pays a 7.3 Percent (3.65 Percent Semiannual) Coupon and Is Held for Five Years**

Assume: semiannual reinvestment rate = 3% after five years; a comparable 4-year maturity bond will be priced to yield 7% (3.5% semiannually) to maturity

Coupon interest:	$10 \times \$3.65 = \$36.50$
Interest-on-interest:	$\$3.65\,[(1.03)^{10} - 1]\,/0.03 - \$36.50 = \$5.34$
Sale price after five years:	$\sum_{t=1}^{8} \frac{\$3.65}{(1.035)^t} + \frac{\$100}{(1.035)^8} = \$101.03$
Total future value:	$\$36.50 + \$5.34 + \$101.03 = \$142.87$
Total return:	$[\$142.87/\$99.62]^{1/10} - 1 = 0.0367$ semiannually or 7.34% annually

arbitrageur who believes the bond is currently undervalued can buy the entire bond, strip the coupons and principal payment, and sell each as a distinct zero coupon (single cash flow) bond for a profit.[8]

The implication is that the bond will be priced as a package of zero coupon instruments. Thus, a different discount rate will apply to each periodic interest payment and the principal payment. The first coupon will be discounted at the six-month zero coupon rate, the second coupon at the one-year zero coupon rate, and so forth.

Suppose that at the time you are considering buying this bond, the following zero coupon rates apply to comparable risk securities.

Maturity	Zero Coupon (Semiannual) Rate
6 months	3.90%
1 year	4.00%
18 months	4.20%
2 years	4.40%
30 months	4.60%
3 years	4.70%

The bond could be bought, stripped, and sold for \$10,021.48.

Value of package of cash flows:

$$\frac{470}{1.039^1} + \frac{470}{1.040^2} + \frac{470}{1.042^3} + \frac{470}{1.044^4} + \frac{470}{1.046^5} + \frac{470}{1.047^6} + \frac{10,000}{1.047^6} = \$10{,}021.48$$

Thus, an arbitrageur could make a riskless profit of \$21.48 per \$10,000 of par bonds if the whole bond could be bought for \$10,000.

Bond valuation is thus more complex than that described under the traditional analysis. It requires the use of zero coupon rates as discount rates and different discount rates at cash flows of varying maturity.

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[8] If the bond is overpriced, an arbitrageur will sell the bond (short it) and buy each of the coupons and principal payment as zero coupon instruments to reconstruct the bond and profit on the difference.

Money Market Yields

While the general pricing relationships introduced above are straightforward, practical applications are complicated by the fact that interest rates on different securities are measured and quoted in different terms. This is particularly true of yields on money market instruments such as Treasury bills, federal funds, CDs, repurchase agreements, eurodollars, bankers acceptances, and commercial paper, which have initial maturities under one year. Some of these instruments trade on a discount basis, while others bear interest. Some yields are quoted assuming a 360-day year, while others assume a 365-day year. The following discussion extends the analysis of interest rate mathematics to money market instruments and provides procedures that allow a comparison of effective annual yields.

Interest-Bearing Loans with Maturities of One Year or Less

Many short-term consumer and commercial loans have maturities of less than one year. The borrower makes periodic interest payments and repays the principal at maturity. The effective annual rate of interest depends on the term of the loan and the compounding frequency. If the loan has exactly one year to maturity, Equation 6.12 characterizes the effective annual yield. Thus, a one-year loan that requires monthly interest payments at 12 percent annually (1 percent monthly) carries an effective yield to the investor of 12.68 percent.

$$i^* = (1.01)^{12} - 1 = 0.1268$$

Suppose that the same loan was made for just 90 days at an annualized stated rate of 12 percent. There is now more than one compounding period in one year. The modified form of Equation 6.12 assumes a 365-day year and calculates the number of compounding periods as 365 divided by the number of days in the contract holding period (h), which is 90 in this example. In general,

$$i^* = \left[1 + \frac{i}{365/h}\right]^{365/h} - 1 \tag{6.19}$$

This 90-day loan thus has 365/90 compounding periods in a year, and the effective annual yield is 12.55 percent.

$$i^* = \left[1 + \frac{0.12}{365/90}\right]^{365/90} - 1 = 0.1255$$

360-Day versus 365-Day Yields

A security's effective annual yield must reflect the true yield to an investor who holds the underlying instrument for a full year (365 days in all but leap years). Some money market rates are, in fact, reported on the basis of an assumed 360-day year. While interest is actually earned for all 365 days in a year, the full amount of interest implied by the reported rate is earned in just 360 days. Thus, $1,000 invested for one year at 8 percent under the 360-day method pays $80 in interest after 360 days, not $80 after 365 days. Because the investor gets the same interest five days earlier, the principal and interest can be invested for five additional days, and the investor earns a higher effective rate of interest.

It is easy to convert a 360-day rate to a 365-day rate, and vice versa. This is done according to the following formula:

$$i_{365} = i_{360}(365/360)$$

where i_{365} = 365-day rate, and

$$i_{360} = \text{360-day rate}$$

The 360-day rate is simply multiplied by a factor of 365/360. In turn, the effective annual yields must reflect both 365 days of interest and compounding frequency. Converting a 360-day yield to an effective annual yield involves two steps. First, the yield is converted to a 365-day yield. Second, the 365-day yield is used for i in Equations 6.12 and 6.19.

For example, a one-year investment that carries an 8 percent nominal rate quoted on a 360-day basis generates a 365-day yield of 8.11 percent.

$$\begin{aligned} i_{365} &= 0.08(365/360) \\ &= 0.0811 \end{aligned}$$

This rate would be used in all formulas to compute effective yields.

Discount Yields

Some money market instruments, such as Treasury bills, repurchase agreements, commercial paper, and bankers acceptances, are pure discount instruments. This means that the purchase price is always less than the par value at maturity. The difference between the purchase price and par value equals the periodic interest. Yields on discount instruments are calculated and quoted on a discount basis assuming a 360-day year and thus are not directly comparable to yields on interest-bearing instruments.

The pricing equation for discount instruments used by professional traders is:

$$i_{dr} = \left[\frac{P_f - P_o}{P_f}\right]\left[\frac{360}{h}\right] \tag{6.20}$$

where

i_{dr} = discount rate,

P_o = initial price of the instrument,

P_f = final price of the instrument at maturity or sale, and

h = number of days in holding period

The discount rate has several peculiar features. First, the amount of interest earned is divided by the final price or maturity value, not by the initial amount invested, to obtain a percentage return. Second, as noted above, it assumes a 360-day year. The discount rate thus understates the effective annual rate. In order to obtain an effective yield, the formula must be modified to reflect a 365-day year and to account for the fact that returns are normally computed by dividing interest received by the amount invested. These problems can be addressed by calculating a **bond equivalent rate** (i_{be}) according to Equation 6.21.

$$i_{be} = \frac{P_f - P_o}{Po}\,\frac{365}{h} \tag{6.21}$$

Consider, for example, a \$1 million par value Treasury bill with exactly 182 days to maturity, priced at \$964,500. The discount rate on the bill is 7.02 percent.

$$\begin{aligned} i_{dr} &= [(1{,}000{,}000 - 964{,}500)/1{,}000{,}000](360/182) \\ &= 0.0702 \end{aligned}$$

The bond equivalent rate equals 7.38 percent.

$$\begin{aligned} i_{be} &= [(1{,}000{,}000 - 964{,}500)/964{,}500](365/182) \\ &= 0.0738 \end{aligned}$$

To obtain an effective annual rate, incorporate compounding by applying Equation 6.19. Implicitly, an investor is assumed to reinvest the proceeds at the same periodic rate for the remainder of the 365 days in a year. Here the effective annual rate equals 7.52 percent.

$$\begin{aligned} i^* &= [1 + 0.0738/(365/182)]^{(365/182)} - 1 \\ &= 0.0752 \end{aligned}$$

Yields on repurchase agreements, commercial paper, and bankers acceptances are also quoted on a discount basis. For comparative purposes with non-discount instruments, their yields must be converted in the same manner as Treasury bills, in a two-step process. The 360-day yield is converted to a 365-day bond equivalent yield; then compounding is taken into account via Equation 6.19.

Yields on Single-Payment, Interest-Bearing Securities

Some money market instruments, such as large, negotiable certificates of deposit (CDs), eurodollars, and federal funds, pay interest calculated against the par value of the security and make a single payment of both interest and principal at maturity. The nominal interest rate is quoted as a percent of par and assumes a 360-day year. The nominal rate again understates the effective annual rate.

Consider a 182-day CD with a par value of $1,000,000 and quoted yield of 7.02 percent, the same quote as the Treasury bill. The actual amount of interest paid after 182 days equals

$$0.0702(182/360)\$1{,}000{,}000 = \$35{,}490$$

The 365-day yield is

$$i_{365} = 0.0702(365/360) = 0.0712$$

Finally, the effective annual rate is

$$i^* = \{1 + [0.0712/(365/182)]\}^{(365/182)} - 1 = 0.0724$$

A careful reader will note that both the 365-day yield and effective annual rate on the CD are below the corresponding bond equivalent yield and effective annual rate on the aforementioned Treasury bill. This demonstrates the difference between discount and interest-bearing instruments. In particular, the discount rate is calculated as a return on par value, not initial investment, as with interest-bearing instruments. Thus, a discount rate understates both the 365-day rate and effective rate by a greater percentage.

Exhibit 6.9 summarizes the conventions for interest rate quotations in the money market and identifies specific instruments priced under each convention. Market participants must be aware of how yields are quoted and calculated before they compare percentages.

EXHIBIT 6.9 Summary of Money Market Yield Quotations and Calculations

A. Simple interest i_s:

$$i_{be} = \frac{P_f - P_o}{P_o}$$

B. Discount rate i_{dr}:

$$i_{dr} = \frac{P_f - P_o}{P_f}\frac{360}{h}$$

C. Money market 360-day rate, i_{360}:

$$i_{be} = \frac{P_f - P_o}{P_o}\frac{360}{h}$$

D. Bond equivalent 365-day rate, i_{365} or i_{be}:

$$i_{be} = \frac{P_f - P_o}{P_o}\frac{365}{h}$$

E. Effective annual interest rate:

$$i^* = \left[1 + \frac{i}{365/h}\right]^{365/h} - 1$$

Summary

Interest rates play an important role in facilitating the flow of funds between lenders and borrowers. Borrowers prefer low rates that lower interest expense while lenders prefer high rates that increase interest income. This chapter provides an overview of the mathematics of interest rates to assist in comparing quoted rates between securities, and presents concepts that are useful in valuing fixed-income securities and evaluating their price sensitivity.

There are several key conclusions. An analyst should understand the basic mathematics supporting these results and the implications for valuation.

1. Fixed-income securities are priced according to the mathematics of PV and future value. The effective price and yield depend on the frequency of compounding—the greater the compounding frequency, the greater the amount of interest.
2. Prices and yields on fixed-income securities without options exhibit well-defined relationships. When interest rates change, prices move inversely. The proportionate price move is relatively greater when rates fall than when rates rise. Similarly, the proportionate magnitude of the price move increases with maturity and decreases with the size of the coupon payment. This relationship is largely revealed by a security's duration, because the greater the duration, the greater the proportionate price change for a given change in interest rates. Thus, longer-duration securities exhibit greater price volatility.
3. Many investors use total return analysis when deciding which securities to buy. Total return analysis allows an investor to vary the assumed holding period, select different reinvestment rates, and incorporate the expected impact of selling the security prior to final maturity. All of these considerations are not permitted by the yield-to-maturity calculation.
4. Option-free securities are valued as a package of cash flows. Each cash flow is valued separately as a zero coupon security.

5. Rates on specific money market securities differ because some are quoted on a 360-day versus 365-day basis and some are discount rates versus bond-equivalent rates. The primary point is that borrowers and lenders must carefully examine the contract terms of specific securities to understand the effective cost or yield.

Questions

1. If you invest $1,000 today in a security paying 8 percent compounded quarterly, how much will the investment be worth seven years from today?
2. If you invest $20,000 in a security today, how much will it be worth in six years? The security pays 6 percent compounded monthly.
3. What is the effective interest rate of 10 percent compounded quarterly, versus 10 percent compounded monthly?
4. Consider a $15,000 loan with interest at 12 percent compounded monthly and 24 monthly payments. How much will the loan payment be? Set up an amortization schedule for the first four months, indicating the amount and timing of principal and interest payments.
5. How much would you be willing to pay today for an investment that will return $6,800 to you eight years from today if your required rate of return is 12 percent?
6. Six years ago you placed $250 in a savings account which is now worth $1,040.28. When you put the funds into the account, you were told it would pay 24 percent interest. You expected to find the account worth $908.80. What compounding did you think this account used, and what did it actually use?
7. If you invest $9,000 today at 8 percent compounded annually, but after three years the interest rate increases to 10 percent compounded semiannually, what is the investment worth seven years from today?
8. Suppose a customer's house increased in value over five years from $150,000 to $250,000. What was the annual growth rate of the property value during this five-year interval? Three local banks pay different interest rates on time deposits with one-year maturities. Rank the three banks from highest to lowest in terms of the depositor's return.

   Bank 1—4.5 percent per year compounded annually
   Bank 2—4.3 percent per year compounded quarterly
   Bank 3—4.1 percent per year compounded daily
9. You want to buy a new car, but you know that the most you can afford for payments is $375 per month. You want 48-month financing, and you can arrange such a loan at 6 percent compounded monthly. You have nothing to trade and no down payment. The most expensive car you can purchase is (1) an old junker for $4,000, (2) a Honda Civic for $10,000, (3) a Ford Escort for $14,000, (4) a Toyota Camry for $17,000, or (5) an Infiniti G35 for $24,000.
10. Consider a 4 percent coupon U.S. Treasury note that has a $10,000 face value and matures 10 years from today. This note pays interest semiannually. The current market interest rate on this bond is 3 percent. Would you expect the bond to be a discount, premium, or par bond? Calculate the actual price of the bond using the PV formula.
11. A Treasury security carries a fixed 3 percent annual coupon rate and matures in exactly two years. The Treasury is currently priced at $10,000 par value to yield 3 percent

to maturity. Assume that you can buy the bond and strip the coupons and final principal payment and sell each of them as a zero coupon security. Given the following zero coupon rates, what price would you get for this purchase and subsequent sales?

Maturity	6-month	1-year	18-month	2-year
Zero coupon yield	2.2%	2.6%	2.9%	3.6%

12. Lamar Baily purchased a 7 percent coupon corporate bond that matured in 10 years and paid interest semiannually. He paid $2,800 and six months later, immediately following an interest payment, he sold the bond. At the time of sale, the market interest rate on bonds of this type was 6 percent. What was Baily's selling price? What was Baily's rate of return for the six months? What is this return on an annual basis?
13. What is the duration of a bond with a par value of $10,000 that has a coupon rate of 3.5 percent annually and a final maturity of two years? Assume that the required rate of return is 4 percent compounded semiannually. What is the duration of a two-year zero coupon bond that pays $10,000 at maturity and is priced to yield 4 percent with semiannual compounding? Why do the durations differ?
14. Guess the duration of the following investment. Is it less than two years, two to three years, three to four years, or greater than four years? After your guess, use a discount rate of 6 percent and calculate the PV of the cash flows and then duration.

Years from now	1	2	3	4
Cash flow	$0	$1,000	$5,000	$2,000

15. In each of the following financial situations, fill in the blank with the terms *high duration, low duration,* or *zero duration,* as appropriate.
    a. If you were considering buying a bond and you expected interest rates to increase, you would prefer a bond with a ______.
    b. Relative to a bond with a high coupon rate, a bond with a low coupon rate would have a ______.
    c. A bond with a short maturity generally has a ______ compared with a bond with a long maturity.
    d. A 1-year corporate bond with a 5 percent coupon rate has a ______ relative to a one-year T-bill.
16. One author says that duration is the weighted average life of a financial instrument. A different one says that duration is a measure of elasticity. Which of the authors is correct? Or, are they both correct?
17. Suppose that a zero coupon bond selling at $1,000 par has a duration of four years. If interest rates increase from 6 percent to 7 percent annually, the value of the bond will fall by what amount using Equation 6.14? Use semiannual compounding. Then, use the PV formula to determine the actual price of the bond at 7 percent. What is the difference? Why is there a difference?
18. If interest rates fall from 6 percent to 5 percent, the price of the bond in the above problem will increase. Will the change in price (regardless of sign) be smaller or larger than in the above problem? Show how much by using the PV formula,

Equation 6.8, and Equation 6.14. How does this conclusion relate to the interpretation of duration as an approximate elasticity measure?

19. Which money market instruments are typically quoted on a discount basis?
20. What is the bond equivalent yield of a 180-day, $1 million face value Treasury bill with a discount rate of 4.5 percent?
21. For which money market instruments are rates calculated on the basis of par value rather than purchase price?
22. You would like to purchase a T-bill that has a $10,000 face value and 270 days to maturity. The current price of the T-bill is $9,860. What is the discount rate on this security? What is its bond equivalent yield?
23. You have just purchased a five-year maturity bond for $10,000 par value that pays $610 in coupon interest annually ($305 every six months). You expect to hold the bond until maturity. Calculate your expected total return if you can reinvest all coupon payments at 5 percent (2.5 percent semiannually). Suppose, instead, that you plan to sell the bond after two years when you expect that a similar-risk three-year bond will be priced to yield 5.2 percent to maturity. Calculate the expected sale price of the bond and your expected total return using the same reinvestment rates. Explain why the two calculated total returns differ.
24. You are planning to buy a corporate bond with a seven-year maturity that pays 7 percent coupon interest. The bond is priced at $108,500 per $100,000 par value. You expect to sell the bond in two years when a similar-risk five-year bond is priced to yield 7.2 percent annually to maturity. Assuming that you can reinvest all cash flows at an 8 percent annual rate (4 percent semiannually), calculate your expected total return over the two-year holding period.
25. You buy 100 shares in Bondex Corporation for $25 a share. Each share pays $1 in dividends every three months. You have a five-year holding period and expect to invest all dividends received in the first two years at 6 percent, and all dividends received the next three years at 9 percent. Calculate your expected total return (as a percentage yield) if you can sell the shares at $30 each after five years.

Activities

1. Rates for the most popular financial instruments can be found in the *Wall Street Journal*. Collect the rates for the following securities. This information can be found at the journal's website under Market Data and Rates.

   3-month T-bill
   Federal funds
   DJ 20 Bond Index
   10-year Treasury
   3-month LIBOR
   4-year CD
   10-year municipal
   30-year fixed-rate mortgage

   Rank the rates from highest to lowest. Why do the rates differ?

2. Locate the first General Electric corporate bond maturing after the year 2015 as reported on the web at www.finance.yahoo.com/bonds. What is its coupon rate, maturity, and stream of coupon and principal payments? What price would you be willing to pay for this bond if you required a 5% yield to maturity? If you were going to buy a bond, what factors would you consider in selecting a bond for your portfolio?

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7

Managing Interest Rate Risk: GAP and Earnings Sensitivity

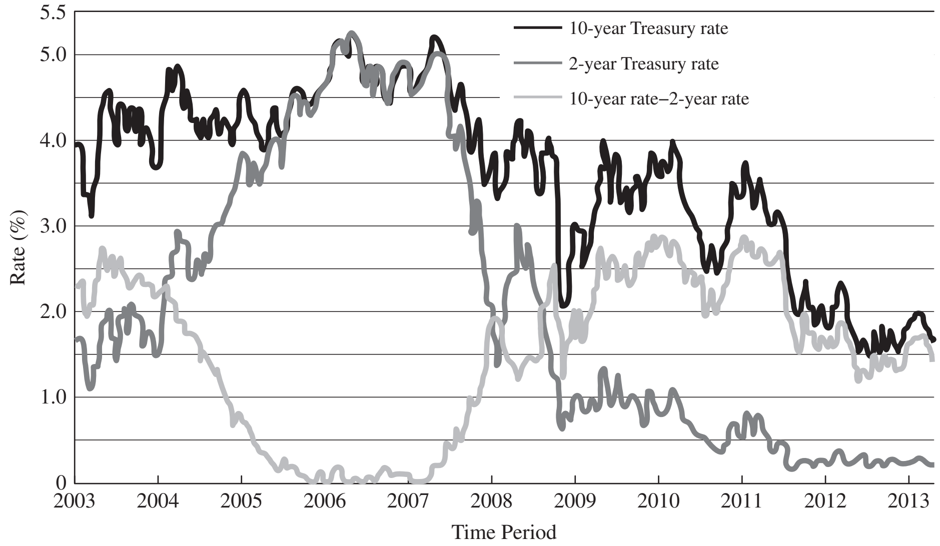
How do interest rates today compare with rates over the past several years? Consider the data below which document trends in the 10-year and 2-year rates on U.S. Treasuries along with the difference, or spread, in these rates from April 2003 to April 2014. From 2003 through much of 2007 (pre-crisis), the 10-year rate was relatively stable and averaged around 4.5 percent. The 2-year rate, in contrast, was as low as 1 percent and increased systematically to over 5 percent. Thus the spread between the two started around 2.5 percent, then fell sharply to zero. Since the onset of the recent financial crisis, both rates fell sharply to where the 2-year rate is just above zero and the 10-year rate is still below 3 percent as of 2014. These rates reflect the weak domestic and global economies and the Federal Reserve's publicized commitment to keep interest rates low.

What opportunities and risks does this environment present to banks? On the positive side, banks, hedge funds, private equity funds, etc. that want to play the leverage game can borrow short-term and buy longer-term securities thereby earning a positive spread (carry), with limited risk that the Federal Reserve will push interest rates higher. They are assuming interest rate risk to make a profit. On the negative side, banks must invest funds obtained from loans and securities that mature over time in lower yielding instruments such that their interest income continues to decline. Most banks have sharply lowered their deposit rates but they cannot (or will not) lower them below zero. Think about what you are currently earning on your interest-bearing checking accounts. Thus, net interest margins are falling and banks are under great pressure to identify earning assets that produce reasonable risk-adjusted yields.

Most market participants recognize that the next major move in rates will be for them to rise. Bank regulators have thus offered substantive "guidance" to banks, advising them to be cautious in extending bond maturities and warning of potential hits to capital once rates do rise.

This chapter examines how banks measure and manage interest rate risk when they focus on earnings. It examines the factors that can potentially cause NIM to change over time, how to measure how much risk a bank has taken, and strategies to alter a bank's interest rate risk profile over time. As part of the analysis, it examines the difficulty in measuring risk associated with the many options embedded in bank assets and liabilities. It also describes how management might attempt to hedge, or reduce, interest rate risk. After reading the material in this chapter, you will be able to assess a financial institution's aggregate interest rate risk profile based on earnings projections.

Comparison of Rates on Different Maturity Treasury Securities: April 2003 – April 2013



Sensitivity to market risk (S) is one of the basic components of a bank's CAMELS rating. For most financial institutions, interest rate risk is the primary contributor to market risk because they don't actively buy and sell securities, commodities, and other assets in trading accounts. As such, they hold loans and securities primarily to earn interest income and meet liquidity requirements and not to speculate on price movements. Interest rate risk refers to the potential for a bank's earnings and economic value of equity to change when interest rates change. Given the recent drop in interest rates and the likelihood that the next major move in rates will be to increase, bank managers and regulators pay considerable attention to measuring and monitoring how rate changes and particularly rising rates might affect performance.

Bank managers consistently ask two questions:

1. What interest rate "bet" is the bank making?
2. How much risk is the bank taking, that is, how big is the bet?

The first question essentially addresses whether the bank is positioned to benefit or lose when interest rates change. In terms of earnings, if interest rates rise, will the bank's net interest income (NII) rise or fall? If interest rates fall, will the bank's NII rise or fall? The second question addresses how much of a change the bank will likely experience. The interpretation of the estimated outcome is closely tied to the bank's interest rate risk policy set by the board of directors. For example, a bank's board determines policy limits for allowable changes in earnings from interest rate shocks. Thus, if NII is expected to fall when rates rise, the drop will be viewed as large if it exceeds policy limits. The drop will be viewed as acceptable if it is within policy limits and small if earnings change little when rates change.

So, what is interest rate risk in general? Consider a traditional community bank whose primary business is accepting deposits and making loans. Interest rate risk arises largely from liabilities and assets that do not reprice coincidentally. As such, the interest yield and market value of the loans can vary over time much differently than the interest cost and market value of liabilities. The result is a change in NII and economic value of stockholders equity. For the largest institutions with more complex operations, possible volatility in NII associated with loans, securities and deposits represents just a portion of overall market risk. Such institutions buy and sell assets and businesses for profit and maintain trading accounts in which the underlying assets are marked to market. When market values of the holdings rise (fall), banks must report the aggregate gains (losses) in their quarterly earnings statements. During the early stages of the financial crisis in 2007–2009, declines in the values of holdings of subprime loans, leveraged loans, collateralized debt obligations, and related instruments produced substantial losses at many of the largest banks, investment banks, and insurance companies. Such value changes can sharply alter a large bank's profitability in a short period of time as witnessed by JPMorgan Chase's 'London Whale' trading losses in 2012.

CONTEMPORARY ISSUES

JPMorgan Chase's London Whale Trading Losses

Early in 2012, rumors circulated that a JPMorgan (JPM) trader, ultimately revealed to be Bruno Iksil, was taking large positions in credit derivatives. The trades were so large that the trader was given the name the "London Whale." Hedge funds and other market participants were widely believed to be betting against the Whale's trades. In an April 2012 call with stock analysts, Jamie Dimon, JPM's CEO, largely dismissed the market rumors as a "tempest in a teapot." The next month JPM announced that it would take a $1.2 billion loss from its hedge position.

Analysts quickly made two broad criticisms. First, JPM's Chief Investment Office (CIO), located in London, was presumably responsible for making conservative investments to balance risks taken elsewhere in the organization. How could hedge positions lose so much? Second, why did management not limit the trading positions in order to limit the potential losses? Ultimately, the Whale's trading was deemed to be speculative and the aggregate losses exceeded $6 billion. In addition, the Whale never revealed the true size of the losses and effectively doubled his bets after the initial large losses. There were no effective position limits in place to detect and prevent the Whale's speculative trading.

A subsequent internal task force concluded the following:[1]

- The trading strategies were poorly conceived; Bruno Iksil and his fellow traders did not fully understand or monitor their trades. The positions ultimately grew so large that the firm could not unwind them at low cost; some traders did not reveal the full extent of losses in their portfolios.
- Ina Drew, who managed the CIO, did not adequately monitor the group's trading or the complexity and potential risk of the trades; she failed to obtain 'robust, detailed reporting' and her reports to JPM's senior management were misleading. Risk controls were inadequate ("not sufficiently granular") and risk limits were "too vague and broad."
- In January 2012, the CIO exceeded its risk limit set by the board. The risk limit was increased temporarily, and the firm subsequently changed its value-at-risk (VaR) model used to measure risk. The model had a simple math error, which had the benefit of lowering the estimated risk.
- JPM's firm-wide risk oversight and controls were inadequate for the complexity of the trading activities.

According to Jamie Dimon, "This is one huge embarrassing mistake … ". Dimon's pay was cut and his reputation damaged. Prior to the event, JPM was viewed as the best managed large financial institution across the globe. The firm's failure reenergized efforts to break up the "Too Big to Fail" institutions.

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[1] See the Report of JP Morgan Chase & Co. Management Task Force Regarding 2012 CIO Losses, 2013.

Banks use two basic models to assess interest rate risk. The first, GAP and earnings sensitivity analysis, emphasizes income statement effects by focusing on how changes in interest rates and the bank's balance sheet affect NII and net income. The second, duration gap and economic value of equity analysis, emphasizes the market value of stockholders equity by focusing on how these same types of changes affect the market value of assets versus the market value of liabilities. This chapter examines the first model. Chapter 8 extends the analysis by relating interest rate risk to the volatility in a bank's economic (market) value of stockholders equity (EVE) and to risk measures associated with the difference in average durations of a bank's assets and liabilities.

Measure of Risk	Measurement Tools
I. GAP & Earnings Sensitivity Analysis	
%Change in Net Interest Income	GAP Analysis
	Rate Shock Analysis
II. EVE Analysis	
%Change in Economic Value of Equity (EVE)	Duration Analysis
	Rate Shock Analysis

The analysis initially introduces traditional measures of interest rate risk associated with static GAP models. These models focus on GAP as a static measure of risk and NII as the target measure of bank performance. Sensitivity analysis extends GAP analysis to focus on the variation in bank earnings across different interest rate environments. This NII simulation, or "What if?" forecasting, provides information regarding how much NII potentially changes when rates are alternatively assumed to rise and fall by various amounts. It takes into account shifts in asset and liability composition, lags in the timing of rate changes on assets versus liabilities, and the exercise of embedded options in a bank's assets, liabilities, and off-balance sheet activities. It provides a better understanding of potential changes in earnings than do simple static models. As such, it is labeled **earnings sensitivity analysis**. Throughout the chapter, we provide numerous examples that clarify how changes in interest rates and other factors affect potential earnings.

Interest rate risk management is extremely important because no one can consistently forecast interest rates accurately. A bank's asset and liability management committee (ALCO), or alternatively its risk management committee, is responsible for measuring and monitoring interest rate risk. It also evaluates pricing, investment, funding, and marketing strategies to achieve the desired trade-off between risk and expected return.

Bank managers generally have greater expertise in managing credit risk than interest rate risk, especially at smaller institutions. This reflects the perception that earnings problems and possible bank failures result primarily from bad loans and not mismatches in the pricing of assets and liabilities. Some managers rely on bond brokers to recommend specific investment securities for purchase and sale and outsource interest rate risk analytics to consulting companies. This behavior is no longer acceptable under current regulatory requirements. Today, senior bank managers and the board must understand how much interest rate risk a bank is taking and whether portfolio and pricing decisions adversely affect aggregate risk exposures. The basic questions are "Do managers understand the nature of the bank's interest rate bet?" and "Do managers understand how big the bet is?"

Measuring Interest Rate Risk with GAP

Why will a bank's NII change from one period to the next? In general, three factors potentially cause a bank's NII to rise or fall. These are:

- unexpected changes in interest rates
- changes in the mix, or composition, of assets and/or liabilities, and
- changes in the volume of earning assets and the volume of interest-bearing liabilities.

These factors are referred to as **rate**, **composition (mix)**, and **volume effects**, respectively.

GAP and earnings sensitivity analysis represent measures of risk. The basic performance target is NII (or net income). Both measures presumably signal whether a bank is positioned to benefit or lose from rising versus falling rates and how big a change in earnings is possible. Importantly, interest rate changes may either raise or lower NII depending on the characteristics of a bank's assets and liabilities and the existence of embedded options.

Consider a bank that makes $10 million in three-year, fixed-rate commercial loans with quarterly principal and interest payments financed with $10 million of small time deposits that reprice monthly. Why might management choose this portfolio? The bank receives interest and principal payments on the loans every three months (quarterly) and pays monthly interest on deposits. With an upward-sloping yield curve, the fixed loan rate will exceed the short-term time deposit rate. For example, if the loan rate is 5 percent and the deposit rate is 1 percent, the initial spread is 4 percent. This initial spread should be large enough to cover the cost of doing business (a portion of overhead), the cost of default and potential losses from the expected change in rates over the investment horizon, plus provide for a reasonable profit.

Asset	Liability
3-year commercial loans @ 5%	1-month time deposit @ 1%
$10 million	$10 million

What happens if interest rates change during the next year? Because the commercial loans have an initial three-year maturity, the 5 percent rate is fixed and only the deposit rates will change during the year. For example, suppose that the one-month deposit rate rises to 1.4 percent. Because the loan rate is fixed at 5 percent, the spread would fall to 3.6 percent. The opposite would occur if the one-month deposit rate fell to 0.75 percent as the spread would then increase to 4.25 percent. Given this bank's portfolio, if the deposit rate rises, the spread will fall below 4 percent. Similarly, if the deposit rate falls, the spread will rise above 4 percent. The bank's choice of longer-term, fixed-rate assets financed by shorter-term deposits evidences a specific interest rate bet. Rising rates lower NII, while falling rates increase NII.

Of course, it is never quite that simple. The previous example describes the **rate effect** but ignores other effects. For one, the balance sheet is dynamic and thus changing constantly over time. Rate changes are only one factor that affects earnings because a bank will change the mix of assets it owns and the mix of liabilities that fund assets. Growing the bank by adding assets and liabilities similarly layers other spreads over the initial ones. Similarly, an upward sloping yield curve indicates a consensus view that short-term rates are going to increase over time. For a bank to take the position described, management is essentially betting that rates will not rise above expectations. Finally, there are embedded options in the loans that will likely alter the cash flows and eventual interest payments and receipts if rates change. For example, in the case of falling rates, some of the bank's commercial borrowers will refinance and the bank will lose interest income because it must reinvest the proceeds at lower rates.

Efforts at managing interest rate risk force a bank's ALCO to establish specific targets for NII, measure overall risk exposure, and formulate strategies to attain the targets. Specific targets and strategies presumably reflect management's view of actions that will lead to maximizing the value of the bank.

The following sections describe the traditional static GAP model and explain its shortcomings, then describe how earnings sensitivity analysis provides a meaningful extension. Exhibit 7.1 summarizes important terminology.

Traditional Static Gap Analysis

Traditional static GAP models attempt to measure how much interest rate risk a bank evidences at a fixed point in time by comparing the rate sensitivity of assets with the rate sensitivity of liabilities. Static GAP focuses on managing NII in the short run. The objective is typically to measure expected NII and then identify strategies to stabilize or improve it. Interest rate risk is measured by calculating GAPs over different time intervals based on aggregate balance sheet data at a fixed point in time—hence, the term *static GAP*. The balance sheet is assumed not to change so that only rate changes affect earnings. GAP values are then examined to infer how much NII will change if rates change.

There are several basic steps to static GAP analysis.

1. Develop an interest rate forecast.
2. Select a series of sequential time intervals for determining what amount of assets and liabilities are rate sensitive within each time interval.
3. Group assets and liabilities into these time intervals, or "buckets," according to the time until the first repricing. The principal portion of the asset or liability that management expects to reprice in each specific time interval is classified as rate sensitive within that interval. The effects of any off-balance sheet positions, such as those associated with interest rate swaps and futures, are also added to the balance sheet position according to whether the item effectively represents a rate sensitive asset (RSA) or rate sensitive liability (RSL).
4. Calculate GAP. A bank's static GAP equals the dollar amount of RSAs minus the dollar amount of RSLs for each time interval.
5. Forecast NII given the assumed interest rate environment and assumed repricing characteristics of the underlying instruments.

GAP measures balance sheet values. It represents the relative *principal amounts* of assets or liabilities that management expects to reprice within the relevant time interval. Expected interest income and interest expense components of cash flows are ignored in the GAP measure. When appropriate, the notional amounts of off-balance sheet items are included as either RSAs or RSLs. Formally,

$$\text{GAP} = \text{RSAs} - \text{RSLs}$$

where RSAs and RSLs are those identified within each time bucket. As such, there is a periodic GAP and a cumulative GAP for each time bucket. The *periodic GAP* compares RSAs with RSLs within each single time bucket. The *cumulative GAP* compares RSAs with RSLs over all time buckets from the present through the last day in each successive

EXHIBIT 7.1 Important Interest Rate Risk Terminology

ALCO: Acronym for asset and liability management committee.

ALM: Acronym for **asset and liability management**.

Base rate: Any interest rate used as an index to price loans or deposits; quoted interest rates are typically set at some markup, such as 0.25 percent or 1 percent, over the base rate and thus change whenever the base rate changes. Sample base rates include the *Wall Street Journal* prime rate, London Interbank Offer Rate (LIBOR) and a bank's own prime rate.

Cost of funds: Interest expense divided by the dollar volume of interest-bearing liabilities.

Duration: A measure of the approximate price sensitivity of an asset or portfolio to a change in interest rates.

Earnings change ratio (ECR): A percentage measure that indicates how much of each type of a bank's assets or liabilities will reprice when some index rate changes. An earnings change ratio of 1 indicates that the underlying asset or liability changes in yield or cost 1-to-1 with changes in the index rate.

Earning asset ratio: The dollar volume of a bank's earning assets divided by the dollar volume of total assets.

Earnings sensitivity analysis: Conducting "what if" analysis by varying factors that affect interest income and expense to determine how changes in key factors affect a bank's net interest income and net interest margin. The output indicates how much net interest income will change in dollars and in percentage terms under different interest rate scenarios.

Effective GAP: The "true" measure of GAP that takes into account a specific interest rate forecast and when embedded options will either be exercised or will affect the actual repricing of an asset or liability.

Embedded option: A specific feature of a bank's asset, liability, or off-balance sheet contract that potentially changes the cash flows of the item when interest rates vary. Examples include early prepayment of principal on loans, issuers calling outstanding bonds, and depositors withdrawing funds prior to maturity.

Floating rate: Assets or liabilities that carry rates tied to the prime rate or other base rates such that the instrument reprices (the effective rate rises or falls) whenever the base rate changes.

GAP: The dollar volume of rate sensitive assets minus the dollar volume of rate sensitive liabilities.

GAP ratio: The dollar volume of rate sensitive assets divided by the dollar volume of rate sensitive liabilities.

Gradual rate shock: An assumed change in interest rates that occurs over time; a 1 percent annual increase in rates may translate into a monthly increase of 8.3 basis points for 12 months.

Hedge: To take a position or implement a transaction with the objective to reduce overall risk associated with an existing position.

Instantaneous rate shock: An immediate increase or decrease in all interest rates by the same amount; a parallel shift in the yield curve.

Net interest margin (NIM): Tax-equivalent net interest income divided by earning assets.

Net overhead (burden): Noninterest expense minus noninterest income.

Nonrate GAP Ratio: Noninterest-bearing liabilities plus equity minus nonearning assets as a ratio of earning assets.

Rate sensitive assets (RSAs): The dollar value of assets that either mature or are expected to reprice within a selected time period, such as 90 days.

Rate sensitive liabilities (RSLs): The dollar value of liabilities that either mature or are expected to reprice within a selected time period, such as 90 days.

Risk management committee: Central committee charged with enterprise-wide risk management, measurement, monitoring, and policies. Members typically set strategy regarding market risk within the organization.

Simulation: An analysis of possible outcomes for net interest margin resulting from selecting hypothetical values for key variables that influence the repricing of assets, liabilities, and off-balance sheet items' and conducting forecasts to determine the effects of changes in these variables on a bank's net interest income.

Speculation: Taking a position or implementing a transaction that increases risk in hopes of earning above-average returns. The party that speculates is labeled a speculator.

Spread: The interest yield on earning assets minus the interest cost of interest-bearing funds.

Variable rate: Assets or liabilities that automatically reprice at regular intervals such that the effective rate potentially varies at specific intervals.

time bucket. For example, the cumulative GAP through 90 days (0–90 days) equals the sum of the periodic GAPs for the two time buckets, 0–30 days and 31–90 days.

Managers use this information to identify a bank's interest rate risk and to develop strategies for managing this risk. Consider the earlier example with three-year fixed-rate loans financed with small time deposits. Following the steps outlined in GAP analysis, assume that rates will rise over the next year and use one year as the relevant time frame. In this case, the loans are not rate sensitive, whereas the small time deposits are. Thus, the bank's one-year GAP equals –$10 million. The sign of GAP indicates whether the bank is positioned to benefit or lose when rates increase or decrease. In this example, the negative sign indicates that the bank has more RSLs than RSAs. The magnitude of the GAP provides information regarding how much NII may change when rates change. In this example, the amount of risk the bank takes may be indicated by comparing the –$10 million to the bank's asset base. A bank with $50 million in assets and a –$10 million one-year GAP has much greater risk, ceteris paribus, than a bank with $500 million in assets and a –$10 million one-year GAP.

Management can alter the size of the GAP to either hedge NII against changing interest rates or speculatively try to increase NII. Hedging involves reducing the volatility of NII either by directly adjusting the dollar amounts of RSAs and liabilities, or by taking an off-balance sheet position such as with forwards, futures, option contracts, and interest rate swaps, to change the effective GAP.[2] Changing the size of GAP to increase expected profits by taking advantage of perceived rate changes is speculative because it assumes that management can forecast interest rates better than the market.

What Determines Rate Sensitivity?

The first three steps in GAP analysis require the identification and classification of the principal portions of specific assets and liabilities that are rate sensitive within specific time intervals. Other balance sheet items either carry fixed rates or do not earn or pay interest. Interest payments are not included directly because GAP is a balance sheet (plus off-balance sheet) measure of risk. Management typically selects a variety of time buckets that provide useful information, as outlined later in Exhibit 7.5. The initial issue is to determine what features make an asset or liability rate sensitive.

Expected Repricing versus Actual Repricing. Although the actual contractual repricing schedule of assets and liabilities is important, using expected repricing can often lead to more accurate estimates of an institution's interest rate risk. Consider a 0–90 day time interval. The key issue is to identify what assets and liabilities listed on a bank's balance sheet *will be repriced* within 90 days given the specific interest forecast. The steps in the analysis require that the person who classifies a principal amount as rate sensitive must forecast when the principal will be repriced. The question typically arises as to whether the contractual date or expected date of repricing is the correct one. The answer depends on the purpose of the analysis. If the purpose is simply to help a reader know when items contractually reprice, using contractual data is helpful. For example, knowing how many loans are priced off of the bank's prime rate, such as loans priced at the current prime rate plus 1 percent, is good information. When assessing risk, however, it is generally more valuable to assess the impact of differences in realized asset and liability repricings on earnings. Thus, the impact of having loans priced off of prime will vary if

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[2] The use of interest rate swaps, caps, floors, collars, forwards, futures, and options is explained and demonstrated in Chapter 9.

the prime rate changes in three months versus nine months. The analysis can help estimate the different impacts only if prime-based loans are categorized according to when prime is expected to change. In practice, analysts use expected repricing dates under the relevant interest rate scenario to assess risk.

In general, an asset or liability is normally classified as rate sensitive within a time interval if:

1. It matures.
2. It represents an interim or partial principal payment.
3. The interest rate applied to the outstanding principal balance changes contractually during the interval.
4. The interest rate applied to the outstanding principal balance changes when some base rate or index changes and management expects the base rate/index to change during the time interval.

Maturity. If any asset or liability matures within a time interval, the principal amount will be repriced. If an asset matures, the bank must reinvest the proceeds. If a liability matures, the bank must replace the liability with new funding. Both hold true regardless of whether interest rates change or not. The question is what principal amount is ***expected*** to reprice. Step two in GAP analysis determines the *time frame* for which proceeds will be reinvested or liabilities refinanced.[3] In the case of a 0–90 day time interval, for any investment security, loan, deposit, or purchased liability that matures within 90 days, the principal amount is rate sensitive.

Interim or Partial Principal Payment. More generally, any principal payment on a loan is rate sensitive if management expects to receive it within the time interval. This includes final principal payments as well as interim principal payments. Consider a bank that makes a one-year $100,000 loan with principal payments of $25,000 due every three months (every 90 days). When making the initial assessment of rate sensitivity at the time the bank books the loan, $25,000 would be classified as a RSA within 90 days because the bank expects to receive and reinvest this portion of the total principal on the loan on the last day of the time interval. The second $25,000 payment would be classified as rate sensitive in 91–180 days, etc. Thus, banks that make car loans and residential mortgages, which typically include monthly fixed-dollar payments that include both principal and interest, record the principal component of each regular monthly payment on the loans as RSAs. The same holds for partial principal payments on a bank's liabilities. Note that any interest received or paid is not included in the GAP calculation.

Contractual Change in Rate. Some assets and deposit liabilities earn or pay rates that vary contractually with some index. These instruments are repriced whenever the index changes. If management knows that the index will contractually change within 90 days, the underlying asset or liability is rate sensitive within 0–90 days.

Consider an adjustable rate mortgage with a 15-year maturity and principal balance of $250,000. The rate equals the prevailing 10-year Treasury rate plus 1 percent and adjusts annually on the anniversary date of when the loan originated. When the loan is first booked, the monthly principal payments expected during the first 90 days are rate

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[3] In this context, an instrument will still be repriced if rates do not change because new contract terms will be determined. As discussed later in the chapter, this is important because not all rates change by the same amount at the same time.

sensitive in the 0–90 day window because the bank can reinvest them as they are received. The remaining principal is not rate sensitive because it will not reprice until the 10-year Treasury rate changes, probably nine months later. After nine months, management knows that the entire outstanding principal will reprice in three more months because the loan rate will automatically adjust to a new value equal to the 10-year Treasury rate prevailing at the end of the year plus 1 percent. For example, if the 10-year Treasury rate equals 2.7 percent at origination, the contractual mortgage rate equals 3.7 percent for the first year. If the Treasury rate rises to 3.4 percent after one year, the contractual mortgage rate rises to 4.4 percent. Thus, the full outstanding principal balance is classified as rate sensitive once the known repricing (reset date for the 10-year Treasury rate) is within 90 days.

Change in Base Rate or Index. Some loans and deposits carry interest rates tied to indexes where the bank has no control or definite knowledge of when the index will change. For example, a commercial loan priced at 1 percent over the *Wall Street Journal* prime rate carries a floating rate, but the rate may not change with any known frequency. Such prime rate loans typically state that the bank can contractually change the base rate daily. The loan is rate sensitive in the sense that its yield can change at any time. However, the loan's effective rate sensitivity depends on how frequently the prime rate actually changes. For the GAP figures to be most meaningful, management must forecast when the *Wall Street Journal* prime rate will change. The full amount of principal should be allocated to the time interval that coincides with when the index or base rate is expected to change. The GAP and effect on NII will vary accordingly. This is why the first step, having an interest rate forecast, is important. *The classification of how much principal is rate sensitive will differ across different economic environments.*

Many asset and liability management (ALM) models used by depository institutions classify prime-based loans and other floating-rate instruments as immediately repriceable. Although this is true, assuming that the indexes and base rates can contractually change at any time, the resulting GAP figure is not very meaningful because such rates do not change that frequently. For example, although the *Wall Street Journal* prime changed more than 50 times in 1980, there are years when it never changed. In 2003, the prime rate fell by 25 basis points one time from 4.25 percent to 4 percent, rising to 5.25 percent by the end of 2004. In 2005, the prime rate increased eight times by 25 basis points each time, ending at 7.25 percent. In sharp contrast, from September 2007 through December 2008, the prime rate fell from 8.25 percent to 3.25 percent, where it remained through 2014. How a bank classifies loans and deposit accounts that are tied to the prime rate and other base rates—for example, NOWs and MMDAs—can dramatically alter reported GAP measures.

Factors Affecting Net Interest Income

Although GAP presumably provides information about a bank's interest rate risk exposure, many factors affect NII. In addition to changes in the *level* of interest rates, changes in the *composition* (or mix) of assets and liabilities, changes in the *volume* of assets and liabilities outstanding, and changes in the *relationship* between the yields on earning assets and rates paid on interest-bearing liabilities will alter NII from that expected. Some factors are at least partially controllable, while others are not. ALM examines the impact of all factors on NII. The following analysis documents circumstances when NII increases and decreases by comparing it at a hypothetical bank before and after each influence.

Rate, Composition (Mix), and Volume Effects. Consider a bank with the general balance sheet accounts listed in Exhibit 7.2. For ease of example, the RSAs and RSLs represent principal amounts that are expected to be repriced within a one-year time interval when interest rates are assumed to remain constant at current levels. Thus, the RSAs and RSLs either mature within one year, represent partial principal payments made during the next year, are variable-rate contracts that are automatically repriced within one year, or carry floating-rate yields that management forecasts will change during the year. The RSAs include short-term securities, federal funds sold, expected principal payments on loans, and the outstanding principal on all repriced variable-rate and floating-rate loans. The RSLs include small time deposits and jumbo CDs maturing within one year, federal funds purchased, some interest-bearing transactions accounts, and money market deposit accounts.

The crucial feature is that cash flows associated with rate sensitive contracts vary with changes in interest rates. Fixed-rate assets and liabilities carry rates that are constant throughout the one-year time interval. Cash flows do not change unless there is a default, early withdrawal, or prepayment that is not forecasted accurately. Nonearning assets generate no explicit income and nonpaying liabilities pay no interest. Both of these are classified as fixed-rate (at zero) in this static analysis. Note that all embedded options are ignored.

Expected average earning asset yield rates and interest costs for the year appear beside each account and represent expected values. If these balance sheet and interest rate figures reflect average performance during the year, the bank's tax-equivalent NII is expected to equal \$40.70 per \$850 in earning assets for a net interest margin (NIM) of 4.79 percent. These figures represent benchmark estimates. During the year, the level of interest rates normally changes from that initially projected, as do the composition and volume of assets and liabilities. This bank's one-year cumulative GAP equals −\$100. The sign and magnitude of GAP presumably provide information regarding interest rate risk.

Changes in the Level of Interest Rates. The sign of GAP (positive or negative) indicates the nature of the bank's interest rate bet. The GAP measure compares the dollar value of a bank's assets that reprice within an interval to the dollar value of liabilities that reprice within the same time frame. A negative GAP, such as that shown in Exhibit 7.2, indicates that the bank has more RSLs than RSAs. When interest rates rise during the time interval, the bank pays higher rates on all repriceable liabilities and earns higher yields on all repriceable assets. If all rates rise by equal amounts at the same time, both interest income and interest expense rise, but interest expense rises more because more liabilities are repriced. NII thus declines, as does the bank's NIM. When interest rates fall during the interval, more liabilities than assets are repriced at the lower rates such that interest expense falls more than interest income falls. In this case, both NII and NIM increase. The sign of a bank's GAP thus indicates whether interest income or interest expense will likely change more when interest rates change. A bank with a negative GAP is said to be **liability sensitive** because more liabilities are expected to reprice versus assets, and interest expense is expected to change more than interest income.

A positive GAP indicates that a bank has more RSAs than RSLs across some time interval. When rates rise, interest income increases more than interest expense because more assets are repriced such that NII similarly increases. Rate decreases have the opposite effect. Because interest income falls more than interest expense, NII falls. Such a

EXHIBIT 7.2 **Expected Balance Sheet Composition and Average Interest Rates for a Hypothetical Bank: What Do Expected Net Interest Income and Net Interest Margin (NIM) Equal?**

	Assets	Yield Rates	Liabilities	Interest Costs
Rate sensitive	$500	6%	$600	2%
Fixed-rate	350	9	220	4
Nonearning/Nonpaying	150	0	100	0
Total			$920	
			Equity	
			$80	
Total	$1,000		$1,000	

$$\begin{aligned}\text{Net interest income} &= 0.06(\$500) + 0.09(\$350) - 0.02(\$600) - 0.04(\$220)\\ &= \$61.50 - \$20.80\\ &= \$40.70\\ \text{Net interest margin} &= \$40.70/\$850 = 4.79\%\end{aligned}$$

$$\text{GAP} = \text{RSAs} - \text{RSLs} = \$500 - \$600 = -\$100$$

Note: RSAs are rate sensitive assets; RSLs are rate sensitive liabilities. The assumed time frame for classifying RSAs and RSLs is one year. Yield rates are computed on a tax-equivalent basis. All rates are expected to remain constant at current levels.

bank is labeled as **asset sensitive**. More assets than liabilities are expected to reprice, and interest income changes more than interest expense.

If a bank has a zero GAP, RSAs equal RSLs, and equal interest rate changes do not alter NII because changes in interest income equal changes in interest expense. *It is virtually impossible for a bank to have a zero GAP given the complexity and size of bank balance sheets.* These relationships are summarized as follows:

GAP Summary

GAP	Change in Interest Rates	Change in Interest Income	Change in Interest Expense	Change in Net Interest Income
Positive	Increase	Increase	> Increase	Increase
Positive	Decrease	Decrease	> Decrease	Decrease
Negative	Increase	Increase	< Increase	Decrease
Negative	Decrease	Decrease	< Decrease	Increase
Zero	Increase	Increase	= Increase	None
Zero	Decrease	Decrease	= Decrease	None

Section A of Exhibit 7.3 shows the relationship between an increase in the level of rates and a negative GAP for the hypothetical bank in Exhibit 7.2. All market rates are assumed to increase by an average of 1 percent during the year, with the bank's portfolio composition and size unchanged.[4] The assumption that all rates change by the same amount, in the same direction, and at the same time is characterized as assuming ***a parallel shift in the yield curve*** by plus 1 percent. With these assumptions, the only items that change are the yield rates and interest costs on RSAs and RSLs. Interest income increases by \$5 to \$66.50, but interest expense increases by \$6 to \$26.80, such that NII declines by \$1 relative to that initially projected in Exhibit 7.2.

Using the previous data,

$$\begin{aligned} \Delta \text{ Interest Income} &= +0.01[\$500] = +\$5 \\ \Delta \text{ Interest Expense} &= +0.01[\$600] = +\$6 \\ \Delta \text{ Net Interest Income} &= -\$1 \end{aligned}$$

NIM subsequently falls by 12 basis points to 4.67 percent.

Suppose instead that rates decrease by 1 percent relative to the base case. The average yield earned on RSAs declines to 5 percent, while the interest cost of RSLs declines to 1 percent. By assumption, fixed rates do not change. Interest income falls by \$5, while interest expense falls by \$6 such that NII increases by \$1. This occurs because the bank now pays lower rates on a greater amount of liabilities (\$600) than assets (\$500) that are now earning lower yields:

$$\begin{aligned} \Delta \text{ Interest Income} &= -0.01[\$500] = -\$5 \\ \Delta \text{ Interest Income} &= -0.01[\$500] = -\$6 \\ \Delta \text{ Net Interest Income} &= +\$1 \end{aligned}$$

NIM subsequently widens.

The change in NII arises because the amount of RSAs differs from the amount of RSLs, and all market rates are assumed to change by the same amount in the same direction. The larger is the GAP difference, the greater is the impact. If RSAs equaled RSLs, the change in interest income would be matched by the change in interest expense regardless of whether rates rise or fall, so that NII would be unchanged. In this framework, whether NIM rises or falls depends on whether the GAP is positive or negative and how much the level of interest rates changes. The following relationship summarizes this framework:

$$\Delta \text{ NII}_{\text{exp}} = \text{GAP} \times \Delta \text{i}_{\text{exp}} \tag{7.1}$$

where

$\Delta\text{NII}_{\text{exp}}$ = the expected change in NII over a period of time from some base amount

GAP = cumulative GAP over the interval through the end of the period of time

$\Delta\text{i}_{\text{exp}}$ = the expected permanent change in the level of interest rates

Again, this applies only in the case of a parallel shift in the yield curve, which rarely occurs. Specifically, if the one-year GAP is any positive value, NII increases when rates are assumed to rise and decreases when rates fall. Suppose, for example, that the above bank's initial position consists of \$650 in RSAs and \$200 in fixed-rate assets with all other factors the same. The one-year GAP equals \$50. At the rates listed, interest income is expected to equal \$58 while interest expense is still \$20.80, producing \$38.80 in NII. If rates rise by 1 percent, interest income rises by \$6.50, while interest

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[4] Earnings sensitivity analysis recognizes that the amounts of RSAs and RSLs change when interest rates change, and that various rates change by different amounts at different times. The discussion ignores this possibility, which is why static GAP is not very meaningful as a risk measure.

expense rises by just \$6. With this positive GAP, NII now increases by \$0.50. It declines when rates fall.[5]

In this context, the sign and size of GAP provide information regarding a bank's interest rate risk position. The sign indicates the bank's interest rate bet. If GAP is positive, the bank wins (NII should rise) when rates rise and loses when rates fall. If GAP is negative, the bank wins when rates fall and loses when rates rise. The size of GAP indicates how much risk a bank assumes. Specifically, a zero GAP indicates the lowest risk. The farther GAP is from zero (lowest risk), the greater is the potential variation in NII and thus, the greater the assumed risk.

Changes in the Relationship between Asset Yields and Liability Costs. NII may similarly differ from that expected if the spread between earning asset yields and the interest cost of interest-bearing liabilities changes. There is no reason that all rates should change by the same amount over time. Asset yields may vary relative to interest costs because of an unexpected shift in the yield curve (when interest rates on similar securities with different maturities change by different amounts, the change is labeled a *nonparallel shift in the yield curve*), an increase or decrease in risk premiums, and nonsynchronous changes in indexes on floating-rate assets or liabilities. If, for instance, liabilities are short-term and assets are long-term, the spread will narrow when the yield curve inverts and will widen when the yield curve increases in slope. Similarly, asset yields may be tied to base rates that change monthly while liability costs change weekly with money market rates.

Section B of Exhibit 7.3 examines the impact of a 1 percent decrease in the spread (from 4 percent to 3 percent) on RSAs and liabilities for the year. With the portfolio composition unchanged, NII declines to \$34.20. Of course, NII increases whenever the spread increases. Changes in NII associated with changes in the difference between different interest rates, say prime minus three-month LIBOR, are a reflection of *basis risk*.

Changes in Volume. NII varies directly with changes in the volume of earning assets and interest-bearing liabilities, regardless of the level of interest rates. Consider Section C in Exhibit 7.3 where the bank doubles in size. The portfolio composition and interest rates are unchanged. NII doubles because the bank earns the same interest spread on twice the volume of earning assets such that NIM is unchanged. GAP now doubles to −\$200 but is the same fraction of total assets. The net effect is that growth, by itself, leads to an increase in the dollar amount of earnings but does not alter profitability measures or the relative size of GAP to assets. A bank that alternatively contracts in size experiences a decrease in NII with no change in profitability measures or the relative size of GAP to assets.

Changes in Portfolio Composition. Any variation in portfolio mix potentially alters NII. A manager who wants to reduce risk for the sample bank in Exhibit 7.3 might attempt to increase asset rate sensitivity by pricing more loans on a floating-rate basis or shortening maturities of investment securities. Alternatively, the manager might decrease liability rate sensitivity by substituting longer-term CDs for overnight federal funds purchased. These transactions change both the GAP and the bank's interest rate risk position. They also change NII from that initially expected. Section D of Exhibit 7.3 summarizes the impact of a \$40 shift of fixed-rate assets to RSAs and a corresponding \$40 shift from RSLs to fixed-rate liabilities. In this case, the level of rates is unchanged,

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[5] The reader should verify that interest income changes by the same amount as interest expense in these examples when the GAP equals zero.

EXHIBIT 7.3 Expected Changes in Net Interest Income from a Change in (A) the Level of Rates, (B) the Spread, (C) Asset Size (Volume), and (D) Balance Sheet Mix

A. 1% Increase in Level of All Short-Term Rates

	Assets	Yield Rates	Liabilities	Interest Costs
Rate sensitive	$500	7%	$600	3%
Fixed-rate	350	9%	220	4
Nonearning/Nonpaying	150		100	
			Equity	
			80	
Total	$1,000		$1,000	

Net interest income = 0.07($500) + 0.09($350) – 0.03($600) – 0.04($220)
= $66.50 – $26.80
= $39.70

Net interest margin = $39.70/$850 = 4.67%
GAP = $500 – $600 = –$100

B. 1% Decrease in Spread between Asset Yields and Interest Costs

	Assets	Yield Rates	Liabilities	Interest Costs
Rate sensitive	$500	6.5%	$600	3.5%
Fixed-rate	350	9	220	4
Nonearning/Nonpaying	150		100	
			Equity	
			80	
Total	$1,000		$1,000	

Net interest income = 0.065($500) + 0.09($350) – 0.035($600) – 0.04($220)
= $64.00 – $29.80
= $34.20

Net interest margin = $34.20/$850 = 4.02%
GAP = $500 – $600 = –$100

C. Proportionate Doubling of Size

	Assets	Yield Rates	Liabilities	Interest Costs
Rate sensitive	$1,000	6%	$1,200	2%
Fixed-rate	700	9	440	4
Nonearning/Nonpaying	300		200	
			Equity	
			160	
Total	$2,000		$2,000	

Net interest income = 0.06($1,000) + 0.091($700) – 0.02($1,200) – 0.04($440) = $81.40
Net interest margin = $81.40/$1,700 = 4.79%
GAP = $1,000 – $1,200 = –$200

D. Increase in RSAs and Decrease in RSLs

	Assets	Yield Rates	Liabilities	Interest Costs
Rate sensitive	$540	6%	$560	2%
Fixed-rate	310	9	260	4
Nonearning/Nonpaying	150		100	
			Equity	
			80	
Total	$1,000		$1,000	

$$\begin{aligned}\text{Net interest income} &= 0.06(\$540) + 0.09(\$310) - 0.02(\$560) - 0.04(\$260)\\ &= \$60.30 - \$21.60\\ &= \$38.70\end{aligned}$$

$$\begin{aligned}\text{Net interest margin} &= \$38.70/\$850 = 4.55\%\\ \text{GAP} &= \$540 - \$560 = -\$20\end{aligned}$$

Note: RSAs are rate sensitive assets; RSLs are rate sensitive liabilities.

and NII falls by $2 from the initial estimate of $40.70. This decline is caused by a decline in the average yield on earning assets that produces a $1.20 drop in interest income, and an increase in the average interest cost of liabilities that produces an $0.80 increase in interest expense. In addition to changing expected NII, this change in composition alters the GAP to −$20 and thus reduces the bank's interest rate risk profile.

There is no fixed relationship between changes in portfolio mix and NII. The impact varies with the relationships between interest rates on rate sensitive and fixed-rate instruments and with the magnitude of funds shifts. If, for example, the change in mix is reversed in the above case, NII would increase. NII would drop if the $40 shift in liabilities is the only change in portfolio composition. In many cases, banks change mix as part of initiatives to offset anticipated adverse changes in NIM. Generally, any shift to loans from securities will increase NII near-term because loan yields exceed most security yields on a pretax and pre-risk (default loss) basis. Similarly, any shift from core deposits to noncore liabilities reduces NII because noncore liabilities generally carry higher interest rates.

Changes in the magnitudes of nonearning assets and nonpaying liabilities also influence NII and NIM. If a bank can reduce its nonearning assets, NII increases automatically, with the magnitude determined by how the funds are invested. For example, NII rises by $3 [0.06($50) − 0] with a $50 shift to RSAs. A $50 shift to fixed-rate assets increases NII by $4.50 [0.09($50) − 0]. In both cases, NIM rises because the bank's funding costs are unchanged with higher interest income.

Rate, Volume, and Mix Analysis

Many financial institutions publish a summary in their annual report of how NII has changed over time. They separate changes attributable to shifts in asset and liability composition and volume from changes associated with movements in interest rates. Exhibit 7.4 represents such a report for Synovus, headquartered in Columbus, Georgia, for 2013 versus 2012, and 2012 versus 2011.

EXHIBIT 7.4 Rate/Volume Analysis for Synovus

	2013 Compared to 2012 Change Due to[a]			2012 Compared to 2011 Change Due to[a]		
(in thousands)	Volume	Yield/ Rate	Net Change	Volume	Yield/ Rate	Net Change
Interest earned on:						
Taxable loans, net	$ (7,067)	(50,045)	(57,112)	$(45,283)	(48,916)	(94,199)
Tax-exempt loans, net[b]	(1,754)	(258)	(2,012)	(392)	(142)	(534)
Taxable investment securities	(6,781)	(7,517)	(14,298)	3,506	(43,100)	(39,594)
Tax-exempt investment securities[b]	(621)	(12)	(633)	(789)	(59)	(848)
Trading account assets	(194)	(221)	(415)	(265)	303	38
Interest-earning deposits with banks	3	(57)	(54)	(14)	(24)	(38)
Due from Federal Reserve Bank	(290)	61	(229)	(3,163)	(46)	(3,209)
Federal funds sold and securities purchased under resale agreements	(31)	(24)	(55)	(21)	43	22
FHLB and Federal Reserve Bank stock	46	474	520	(303)	569	266
Mortgage loans held for sale	(1,567)	(193)	(1,760)	1,311	(1,305)	6
Total interest income	(18,256)	(57,792)	(76,048)	(45,413)	(92,677)	(138,090)
Interest paid on:						
Interest bearing demand deposits	846	(540)	306	374	(3,203)	(2,829)
Money market accounts	(1,950)	(4,027)	(5,977)	(346)	(20,349)	(20,695)
Savings deposits	54	(20)	34	50	(131)	(81)
Time deposits	(5,794)	(19,926)	(25,720)	(35,675)	(18,855)	(54,530)
Federal funds purchased and securities sold under repurchase agreements	(213)	(77)	(290)	(187)	(263)	(450)
Other borrowed funds	12,855	(12,409)	446	(6,745)	17,751	11,006
Total interest expense	5,798	(36,999)	(31,201)	(42,529)	(25,050)	(67,579)
NET INTEREST INCOME	**$ (24,054)**	**(20,793)**	**(44,847)**	**$ (2,884)**	**(67,627)**	**(70,511)**

[a] The change in interest due to both rate and volume has been allocated to the yield/rate component.

[b] Reflects taxable-equivalent adjustments, using the statutory federal income tax rate of 35 percent, in adjusting interest on tax-exempt loans and investment securities to a taxable-equivalent basis.

Source: Synovus 2013 Annual Report and 10–K.

Consider the data for 2013 compared with 2012. The figures refer to the change in either interest income, interest expense, or NII attributable to changes in the volume of earning assets and interest-bearing liabilities—under the "Volume" heading—or that attributable to changes in earning asset yields or rates paid on liabilities—under the "Yield/Rate" heading. The "Net Change" columns represent the sum of these two figures. Thus, for 2013, Synovus saw its NII fall by $44,847,000.

The purpose is to assess what factors influence shifts in NII over time. Data in the columns headed Volume indicate how much interest income and interest expense would have changed if rates were held constant at the prior year's levels and the only impact was balance sheet changes in the amounts of earning assets and interest-bearing liabilities. Using the data for 2013 assuming no change in interest rates, the volume of earning assets fell thereby lowering interest income by over $18 million, while the volume of interest-bearing liabilities increased thereby raising interest expense by almost $6 million. The combined impact was to lower NII by $24 million. Data in the columns for Yield/Rate largely indicate how much interest income and interest expense would have changed if the dollar volumes of assets and liabilities were held constant at 2012 levels. In this framework, interest income fell by $57.8 million in 2013 due to falling interest rates, while interest expense fell only $37 million. Because interest income fell more than interest expense, NII fell by $20.7 million. The combined impact of the volume and rate effects was to lower Synovus' NII by $44.8 million, from 2012 to 2013. From 2011 to 2013, Synovus reduced its earning assets by $2.6 billion, from $26.5 billion to $23.9 billion, in an effort to lower problem loans and increase regulatory capital ratios. Due to the shrinking balance sheet, both interest income and interest expense systematically fell. Similarly, because interest rates stayed at very low levels, Synovus replaced maturing assets with lower yielding earning assets and obtained more low-cost core deposits even while it lowered the rates it paid on all liabilities. In both years, interest income fell by more than interest expense such that NII fell. In 2013, yield/rate effects for Synovus exceeded volume effects for both interest income and interest expense Thus, changing rates adversely affected the bank's profitability by a substantial amount.

This previous view of GAP and NII is simplistic. Obviously, asset yields and interest costs do not change coincidentally or by equal amounts. Even within distinct time intervals, assets and liabilities are repriced at varied intervals, producing cash flows that may differ substantially from those implied by the GAP. For example, if all RSAs from Exhibit 7.2 matured in one month while all RSLs matured in six months, projected cash flows would reflect interest rate and portfolio changes occurring five months apart, such that the forecast change in NII could be substantially wrong.

In order to obtain more meaningful comparisons, managers should calculate the GAP over relatively short periods and allow for a wide range of interest rates and repricings. The next section introduces a rate sensitivity report, a framework that is commonly used as a starting point to evaluate a bank's interest rate risk position. It essentially calculates GAPs across different time buckets. Data for Security Bank, a $100 million organization, are presented in Exhibit 7.5 and are used to demonstrate the framework.

Rate Sensitivity Reports

Many managers monitor their bank's risk position and potential changes in NII using a framework like that in Exhibit 7.5. This report classifies Security Bank's assets and liabilities as rate sensitive in selected time buckets through one year. Underlying each report should be an assumed interest rate environment. The last column lists the totals for all balance sheet items as of year-end. Note that Security Bank reports $88.3 million in earning assets and $11.7 million in nonearning assets, $78.5 million in interest-bearing liabilities and $21.5 million in liabilities and equity not subject to interest payments. Each earlier column of data reflects the dollar volume of repriceable items within a distinct but sequential time period. For example, of the $12.5 million in Treasury and agency securities owned, $700,000 will reprice in 8 days to 30 days, $3.6 million will reprice in 31 days to 90 days, and so forth. All floating-rate commercial loans tied to a base rate are designated as rate sensitive from 8 days to 30 days out. This classification reflects Security Bank's experience in changing base rates monthly on average during the

EXHIBIT 7.5 **Rate Sensitivity Analysis for Security Bank, December 31, 2013**

	Time Frame for Rate Sensitivity							
	1–7 Days	**8–30 Days**	**31–90 Days**	**91–180 Days**	**181–365 Days**	**Over 1 Year**	**Non-Rate sensitive**	**Total**
Assets								
U.S. Treasury and agency securities		$0.7	$3.6	$1.2	$3.3	$3.7		$12.5
Money market investments			1.2	1.8				3.0
Municipal securities			0.7	1.0	2.2	6.6		10.5
Federal funds sold and repurchase agreements	$5.0							5.0
Commercial loans*	1.0	14.8	2.9	4.7	4.6	15.5		43.5
Installment loans	0.3	0.5	1.6	1.3	1.9	8.2		13.8
Earning assets								$88.3
Cash and due from banks							$7.0	7.0
Other assets							4.7	4.7
Nonearning assets								$11.7
Total assets	$6.3	$16.0	$10.0	$10.0	$12.0	$34.0	$11.7	$100.0
Liabilities and Equity								
Money market deposit accounts		$5.0	$9.3					$14.3
Time deposits <$100,000	$0.9	5.0	13.1	$6.9	$1.8	$5.9		33.6
CDs ≥$100,000	1.1	1.0	7.9	2.9	1.2			14.1
Federal funds purchased and repurchase agreements								
NOW accounts				14.6				14.6
Savings accounts						1.9		1.9
Market-rate liabilities								$78.5
Demand deposits							$13.5	13.5
Other liabilities							1.0	1.0
Equity							7.0	7.0
Nonpaying liabilities and equity							21.5	$21.5
Total liabilities and equity	$2.0	$11.0	$30.3	$24.4	$3.0	$7.8	$21.5	$100.0
Periodic GAP	$4.3	$5.0	−$20.3	−$14.4	$9.0	$26.2		
Cumulative GAP	$4.3	$9.3	−$11.0	−$25.4	−$16.4	$9.8		

*Floating-rate loans total $12 million and are classified as repriceable in 8 to 30 days. Base rates are assumed to change within this interval, but there is no guarantee that they will change in this time period.

Note: Figures are in millions of dollars.

past year. The column labeled "Non-Rate sensitive" indicates amounts that do not earn or pay interest.

Figures for RSLs similarly indicate when the items are expected to reprice. Thus, NOW accounts will presumably reprice within 91 to 180 days, whereas a portion of money market deposit accounts will reprice in 8 days to 30 days and the bulk in 31 days to 90 days. Note that savings accounts are assumed not to reprice for at least one year even though the rates can be changed more frequently. This classification differentiates between when an asset or liability can be repriced and when management believes it will be repriced. Prime-based loans can reprice daily if prime changes daily. The prime rate typically changes much less frequently. Banks can change MMDA rates daily, but unless they actually do, these deposits will only be as rate sensitive as their actual repricing schedule. A comparison of RSAs and RSLs that can change immediately would indicate differences in *contractual repricing,* but is likely not meaningful unless rates are highly volatile and these items actually reprice as frequently as contracts allow.

Periodic GAP versus Cumulative GAP. Two types of GAP measures are reported at the bottom of the report. The **periodic GAP** compares RSAs with RSLs within each of the different time buckets and is a measure of the relative mismatches across time. For Security Bank, RSAs exceed RSLs in each interval through 30 days and for 181 days through one year, while RSLs exceed RSAs in the 31–90 day and 91–180 day intervals. The **cumulative GAP**, by contrast, measures the sum of the periodic GAPs through the last day in each time interval and measures aggregate interest rate risk exposure from the present through this last day. Thus, the cumulative GAP at 31–90 days of −$11 million equals the sum of the periodic GAPs for 1–7 days ($4.3 million), 8–30 days ($5 million), and 31–90 days (−$20.3 million). It measures aggregate interest rate risk from day 0 through day 90.

Each periodic GAP figure simply indicates whether more assets or liabilities are expected to reprice within a specific time interval. Because it ignores whether assets and liabilities in other periods can be repriced, it is not all that meaningful. Cumulative GAP figures are more important because they directly measure a bank's net interest sensitivity through the last day of the time bucket by comparing how many assets and liabilities reprice through that last day. Thus, the cumulative GAP of −$11 million indicates that Security Bank is expected to reprice $11 million more of RSLs than RSAs during the next 90 days. The one-year cumulative GAP indicates that $16.4 million more in liabilities than assets are expected to reprice over this longer period. It is important to note that GAP figures for the interval over one year provide no new information about a bank's interest rate risk position because the time interval has no precise end point. The periodic GAP of $26.2 simply reflects the fact that the bank has $34 million in earning assets that reprice beyond one year, while it pays interest on $7.8 million in similar long-term liabilities. The subsequent $9.8 million cumulative GAP simply measures the difference between $88.3 million in earning assets and $78.5 million in interest-bearing liabilities.

Note that the cumulative GAPs are positive for the first two periods with the remainder negative through one year. According to the previous discussion, Security Bank has positioned itself to gain if rates fall over the next year. Specifically, because the bank operates with more RSLs versus RSAs, if rates decrease uniformly during the year, interest income should fall less than interest expense such that the bank's NII would increase unless offset by changes in portfolio mix or bank size. If rates increase, NII should decline. Furthermore, the size of the GAP indicates that the bank's performance may vary substantially, because the cumulative GAP through one year exceeds 16 percent of total assets. Many community banks have policy statements that presumably limit interest rate risk by specifying that selected GAPs, as a fraction of earning assets, cannot fall outside of +/−15 percent.

The rate sensitivity report provides a view of a bank's interest rate risk profile at a single point in time. It reflects a point estimate of risk implied by the basic concept of a static GAP. Most banks employ earnings sensitivity analysis to address weaknesses in the static GAP concept. They also evaluate interest rate risk using duration-based measures of relative asset and liability price sensitivity.

Strengths and Weaknesses of Static Gap Analysis

The attraction of static GAP analysis is that it is easy to understand. Periodic GAPs indicate the relevant amount and timing of interest rate risk over distinct maturities and clearly suggest magnitudes of portfolio changes to alter risk. They indicate the specific balance sheet items that are responsible for the risk. GAP measures can also be easily calculated once the cash-flow characteristics of each instrument are identified.

Unfortunately, the static GAP procedure also contains numerous weaknesses. First, there are serious *ex post* measurement errors. Consider, for example, loans with rates tied to base rates or indexes. The frequency of changes in base rates or indexes cannot be accurately forecast because management does not know when market interest rates will change. In 1980, the *Wall Street Journal* prime rate changed 52 times. In contrast, this prime rate was set at 3.25 percent in December 2008 and has remained there since. When there is uncertainty over the frequency of base rate changes, GAP measures reflect any errors in allocating loans differently than actual rate changes would require. To overcome this problem, a bank should evaluate the statistical rate sensitivity of all base rates to selected market indexes. To avoid mismeasuring risk, funds should be allocated to time buckets according to their effective (expected) rate sensitivity, which is often linked to the historical frequency of rate changes. With GAP analysis, managers do not know the true rate sensitivity for these loans.

Second, GAP analysis ignores the time value of money. The construction of maturity buckets does not differentiate between cash flows that arise at the beginning of the period versus those at the end. If a bank buys a one-month T-bill financed by overnight borrowing in the federal funds market, the one-month GAP is zero. This suggests no interest rate risk when, in fact, this transaction exposes the bank to losses when the federal funds rate rises. Whether a bank gains with rising or falling interest rates depends on the actual timing of repricings within each interval. Thus, a bank with a zero GAP will still see NII change when rates change. Similarly, GAP ignores interest flows. One attraction of duration-based measures of interest rate risk is that they incorporate the present value of all cash flows.

Third, the procedure essentially ignores the cumulative impact of interest rate changes on a bank's risk position. GAP measures should be calculated over the entire range of repricings, yet they often focus only on near-term changes in NII. As such, many banks evaluate GAP measures and variation in NII only through the upcoming year. Interest rate changes also affect the value of fixed-rate assets and liabilities and total risk beyond one year. The GAP framework ignores these changes.

Fourth, liabilities that pay no interest are often ignored in rate sensitivity comparisons because many banks allocate demand deposits as non-RSLs. As such, GAP analysis does not recognize any rate risk associated with demand deposit flows, even though a bank typically loses deposits when interest rates rise. This occurs because the opportunity cost of demand deposits increases for the owners as better cash management can increase their interest income. Many compensating balance agreements, in turn, allow the owners of demand deposits to reduce the dollar amount of compensating balances when rates rise because the bank can earn a higher yield from investing these funds. This casual treatment is especially risky in a low rate environment, such as that prevailing in 2014, because many depositors have parked funds at banks even though rates are low, because the opportunity cost is small and they plan to move balances quickly once rates start to rise. To be useful, GAP analysis must allocate the rate sensitive portion of demand deposits to the appropriate time buckets depending on their actual rate sensitivity. When rates are expected to increase, more demand deposits will be rate sensitive. It is extremely difficult, however, to know the exact rate sensitivity of these deposits.

Finally, static GAP does not capture risk associated with options embedded in the loans, securities, and deposits that banks deal with. Examples include the prepayment option that mortgage borrowers often exercise when interest rates fall, and the early withdrawal option that depositors often exercise when interest rates rise. These options have different values and a different probability of being exercised when interest rates are at different levels and rate volatility changes. The impact of these options is to alter the effective size of GAP over different time intervals when interest rates are rising versus falling and when rates are at high levels versus low levels. Earnings sensitivity analysis addresses these concerns.

GAP Ratio. Some ALM programs focus on the GAP ratio when evaluating interest rate risk. The GAP ratio equals RSAs divided by RSLs within the same time interval with the typical focus on a one-year cumulative GAP ratio.

$$\text{GAP ratio} = \text{RSAs}/\text{RSLs}$$

When GAP is positive, the GAP ratio is greater than 1. A negative GAP, in turn, is consistent with a GAP ratio of less than 1.

Neither the GAP nor GAP ratio provides direct information on the potential variability in earnings when rates change. The GAP ratio is further deficient because it ignores size. Consider two banks that have \$500 million in total assets. The first bank has \$3 million in RSAs and \$2 million in RSLs so that its GAP equals \$1 million and its GAP ratio equals 1.5. The second bank has \$300 million in RSAs and \$200 million in RSLs. Its GAP equals \$100 million, yet it reports the same 1.5 GAP ratio. Clearly, the second bank assumes greater interest rate risk because its NII will change more when interest rates change.

GAP Divided by Earning Assets as a Measure of Risk. A better risk measure relates the absolute value of a bank's GAP to earning assets. The greater this ratio, the greater the interest rate risk.[6] Many banks actually specify a target GAP-to-earning-asset ratio in their ALCO policy statements. Consider a bank with the policy target that the one-year cumulative GAP as a fraction of earning assets should be greater than −15 percent and not more than +15 percent. This target allows management to position the bank to be either asset sensitive or liability sensitive, depending on the outlook for interest rates. Yet, the policy limits the size of the GAP and, implicitly, how much risk management can take.

Suppose that the management of Security Bank specifies a policy target that the one-year cumulative GAP should not exceed 15 percent of earning assets or fall below −15 percent of earning assets. Using the data from Exhibit 7.5, Security Bank's one-year cumulative GAP is −\$16.4 million, or −18.6 percent of earning assets. At this value, the bank is outside its acceptable interest rate risk policy and management would note the

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[6] Remember that risk in this context is associated with the volatility in NII. The use of absolute value demonstrates that the sign of GAP does not influence the volatility of NII, only whether NII rises or falls when rates change in a specific direction.

exception to policy. Management then must decide to accept the greater risk or implement strategies to reduce interest rate risk.

$$-15\% < \frac{\text{1-year cumulative GAP}}{\text{earning assets}} < 15\%$$

Earnings Sensitivity Analysis

Most bank managers use an earnings sensitivity framework to measure and monitor interest rate risk. This framework extends static GAP analysis by making it dynamic. It does this by model simulation or "what if" analysis of all the factors that affect NII across a wide range of potential interest rate environments. The analysis essentially repeats static GAP analysis assuming different interest rate environments and compares expected NII between the different environments. The analysis includes the following six steps:

1. Forecast interest rates.
2. Forecast balance sheet size and composition given the assumed interest rate environment. The forecasts incorporate expected changes in loans, securities, core deposits, and noncore liabilities incorporating the likely change in asset size.
3. Forecast when embedded options in assets and liabilities will be in the money and, hence, exercised such that prepayments change, securities are called or put, deposits are withdrawn early, or rate caps and rate floors are exceeded under the assumed interest rate environment.
4. Identify which assets and liabilities will reprice over different time horizons, and by how much, under the assumed interest rate environment. Identify off-balance sheet items that have cash-flow implications under the assumed rate environment.
5. Calculate (estimated) NII and net income under the assumed rate environment.
6. Select a new interest rate environment and compare the forecasts of NII and net income across different rate environments versus the base case.

The primary value of this framework is that it allows managers to assess how much NII might vary across a wide range of interest rates. The typical comparison looks at seven different interest rate environments beginning with a base case, or most likely, scenario. *The choice of base case is important because all estimated changes in earnings are compared with the base case estimate*. For noncomplex banks, it is common to use a base case that assumes no change in interest rates. In this case, estimated earnings changes reflect amounts different than what would prevail if current rates never change. Some banks use forward rates implied by the yield curve or management's specific forecast of rates as an estimate of the most likely scenario. Each of the other scenarios then assumes different rate shocks where rates (or some benchmark rate) move systematically higher by plus 1 percent, +2 percent, and +3 percent or systematically lower by −1 percent, −2 percent, and −3 percent, respectively. An important part of these forecast environments is the recognition that different customer-owned and bank-owned options may go "in the money" such that they are exercised at different times. In addition, management can specify different interest rate changes for different instruments such that the spread between asset yields and liability costs varies. For example, if a bank's prime rate is assumed to increase by 1 percent, retail time deposit rates might be assumed to increase by just 0.5 percent. The difference in rate changes will have the impact of increasing a bank's NII.

In each environment, management determines different amounts of assets, liabilities, and off-balance sheet positions that are effectively rate sensitive, and implicitly calculates a different effective GAP for each scenario. The output then is the change in NII or change in NIM from the base case. Policy or risk limits are commonly set relative to allowable changes in NII and NIM from the base case. A more extensive framework has managers forecast the change in noninterest income and noninterest expense across different rate environments, with the final output being the change in net income versus the base case. Finally, the assumed rate changes may reflect instantaneous, or immediate, shocks or gradual rate changes over time.

Consider the data in Exhibit 7.6 for City Bank and Valley Bank. Both are small community banks that operate in the same trade area with the same general business strategy. The base case interest rate forecast is that all rates will remain constant at current levels. The data indicate the estimated impact on each bank's NII when interest rates are shocked 1 percent, 2 percent, and 3 percent higher and lower relative to the base case. The middle column of data shows the dollar amount of NII that City Bank is expected to earn when interest rates are shocked 1 percent, 2 percent, and 3 percent higher and lower relative to the base case. Ignoring the data in brackets, the third column provides the percentage change in NII relative to the base case for City Bank. Clearly, City Bank's earnings rise as rates fall, but fall as rates rise. The bank's "bet" is that it is positioned to benefit in a falling rate environment and lose in a rising interest rate environment. Any bank with this risk profile is said to be *liability sensitive* because it is consistent with having a negative GAP through one year. Note that the percentage changes are not symmetric, that is, a 1 percent rate increase does not have the same proportionate impact on NII as a 1 percent decrease does. As discussed later, this outcome arises largely because of embedded options and lags between when rates on earning assets change compared with when rates on interest-bearing liabilities change. Importantly, the magnitude of the percentage change in NII provides information about the size of the bet, that is, about how much risk the bank is taking.

EXHIBIT 7.6 Sample Earnings Sensitivity Output with Interest Rate Shocks

What is Each Bank's Bet? Which Bank Has the Greatest IRR?

Interest Rate Environment	Estimated Net Interest Income	Percentage Change in Net Interest Income	
		City Bank	Valley Bank
+3%	$ 910,000	–9%	[+13.2%]
+2%	$ 960,000	–4%	[+7.8%]
+1%	$ 985,000	–1.5%	[+2.9%]
Base Case	$ 1,000,000	....	
–1%	$ 1,024,000	+2.4%	[–2.1%]
–2%	$ 1,050,000	+5%	[–4.4%]
–3%	$ 1,055,000	+5.5%	[–6.9%]

Are these banks asset sensitive or liability sensitive?

The data for Valley Bank's percentage change in NII suggest a different risk exposure. For Valley Bank, NII increases when rates rise, but decreases when rates fall. Any bank with this profile is labeled *asset sensitive*. The percentages also differ from City Bank's percentages because Valley Bank has different embedded options and different lags between changes in asset and liability rates.

The question of whether City Bank or Valley Bank has the greatest risk is a little more complex. In statistical terms, the range of estimated changes in NII is greater for Valley Bank (−6.9 percent to +13.2 percent) than for City Bank (−9 percent to +5.5 percent), suggesting that Valley Bank might have the greater risk. Of course, the potential upside for Valley Bank is much higher, which is a good profile. From a different perspective, City Bank is exposed to the largest potential loss (−9 percent), so if the different rate shocks have an equal likelihood of occurring, City Bank might have the greater risk. Many banks address this issue by setting an interest rate risk policy that identifies a maximum acceptable loss. Suppose, for example, that both banks have policy statements that state: "for a +2 percent or −2 percent rate move, NII should not fall by more than 5 percent." In this case, both banks are within policy. For a +2 percent rate shock, City Bank is expected to lose 4 percent of NII, while Valley Bank is expected to lose 4.4 percent of its NII for a −2 percent rate shock. Even with different rate bets, both banks would lose less than 5 percent of earnings.

In summary, the key benefits of conducting earnings sensitivity analysis are that managers can estimate the impact of rate changes on earnings while allowing for the following:

- Interest rates to follow any future path
- Different rates to change by different amounts at different times
- Expected changes in balance sheet mix and volume
- Embedded options to be exercised at different times and in different interest rate environments
- Effective GAPs to change when interest rates change

Thus, a bank does not have a single static GAP, but instead will experience amounts of RSAs and RSLs that change when interest rates change.

Exercise of Embedded Options in Assets and Liabilities

To fully understand the risk inherent in a bank's operations, it is necessary to understand the different types of options that bank customers have. The most obvious include a customer's option to refinance a loan. Although the option is not generally explicit in a loan contract, any borrower can repay a loan early. Another option is the call option on a federal agency bond that a bank might sell to the issuer. For example, the Federal Home Loan Bank (FHLB) might issue a bond with a three-year maturity that is callable at face value after 30 days. This means that the FHLB, at its option, can pay the bank the principal any time after 30 days. Thus, the bank might expect to own the bond for three years, but end up owning it just 30 days or a fraction of the time until maturity. An option embedded in bank liabilities is a depositor's option to withdraw funds prior to final maturity. Such an early withdrawal might also surprise a bank by forcing it to pay the depositor back far in advance of final maturity.

The most common embedded options at banks include the following:

- Refinancing of loans
- Prepayment (even partial) of principal on loans
- Bonds being called
- Early withdrawal of deposits prior to final maturity
- Caps on loan rates or deposit rates
- Floors on loan rates or deposit rates
- Call or put options on FHLB advances
- Exercise of loan commitments by borrowers

To accurately assess interest rate risk, managers must identify the existence of these options, understand when they are likely to be exercised, and model the impact of option exercise on earnings.

Whenever options are embedded in bank assets and liabilities, managers should address three issues. The first is whether the bank is the buyer or seller of the option. This is the same as asking "Does the bank or its customer determine when the option is exercised?" The buyer is the party that controls when the option is exercised, while the seller presumably receives some compensation for selling (or writing) the option. In most of the examples shown in the bulleted list above, the bank is the seller of the option and the customer is the buyer. Borrowers decide when to refinance, the FHLB decides when to call (repay) the bond, and the depositor decides when to withdraw the deposit. Banks buy options when they set caps on deposit rates and floors on loan rates or when they borrow from the FHLB with the option to exit the liability when rates increase. The second issue is how, and in what amount, the bank is being compensated for selling the option, or how much it must pay if it buys the option. When the bank sells the option, there may be explicit prepayment penalties on a loan and deposit (for early withdrawal) that represent fees (if they are not waived), and the bank receives a higher promised yield on a callable bond compared with the yield on an otherwise similar noncallable bond. Finally, the bank should forecast when the option will be exercised. This involves forecasting how much interest rates will change over specific time intervals as well as when a loan will be prepaid, when the agency bond will be called, and when the depositor will withdraw funds early. These forecasts, in turn, will depend on the assumed rate environment. Loan refinancing (prepayments) typically rises sharply when interest rates fall. Bonds are called when interest rates fall. Deposits are withdrawn prior to maturity when deposit rates rise sufficiently. Mortgage refinancings also depend on borrower demographics including the rate of family formations and divorces and labor mobility.

Market participants cannot generally forecast interest rates accurately for long periods of time. The focus on embedded options is important, however, because it forces management to recognize the risks inherent in their portfolios. These risks exist even if rates do not change because there is always the possibility that rates might change. It also allows management to identify a worst case scenario and have a better sense of maximum loss potential.

When doing earnings sensitivity analysis, it is important to recognize that banks often enter into off-balance sheet contracts with futures, forward rate agreements, swaps, and options that also affect aggregate interest flows. Chapter 9 introduces these derivatives, including caps and floors on interest rates that are used to manage interest rate risk. Each type of contract may have different cash-flow effects in different rate environments that potentially alter a bank's interest income and/or interest expense. The effects of these must also be included in any forecast of NII and net income volatility.

Different Interest Rates Change by Different Amounts at Different Times

Earnings sensitivity analysis allows management to incorporate the impact of different competitive markets for various balance sheet accounts with alternative pricing strategies. This enables managers to forecast different spreads between asset yields and liability interest costs when rates change by different amounts. It is widely recognized, for example, that banks are quick to increase base loan rates, such as their prime rate, when interest rates increase in general, but are slow to lower base loan rates when interest rates fall. The implication is that floating-rate loans are more rate sensitive in rising-rate environments versus falling-rate environments. In like manner, banks typically increase loan rates more than they increase deposit rates in a rising-rate environment such that the spread widens. In a falling-rate environment, the opposite often occurs as deposit rates lag in being lowered relative to other money market rates and certain loan rates such that the spread narrows. The implication is that although the rate sensitivity of different instruments might be nominally the same, the impact is different due to different timing of rate changes and different magnitudes of rate changes.

This impact is even more apparent when examining callable bonds that banks own as part of their investment portfolios. Consider the three-year FHLB bond that is callable after 30 days, described earlier. If rates fall enough, the entire bond will likely be called because the FHLB can refinance at lower rates and save on interest expense. In a falling-rate environment, this bond is very rate sensitive and might be classified as such in the 31- to 90-day time interval. In a rising-rate environment, the bank might end up owning the bond for three years because the FHLB will not call it. As such, it is not rate sensitive because it will not be repriced for three years. It is clear that the bank's effective (actual) GAP will be different in a rising versus falling rate environment because the bond is only rate sensitive when rates fall.

The net effect is that when conducting the "what if" analysis, managers can examine the impact of these nonparallel shifts in interest rates and the differing degrees or effective rate sensitivity. Not surprisingly, the impact of interest rate changes is not as straightforward as that suggested by Equation 7.1 or simple GAP.

Earnings Sensitivity Analysis: An Example

Consider the rate sensitivity report for First Savings Bank (FSB) as of year-end 2013 that is presented in Exhibit 7.7. This report is based on the most likely interest rate scenario summarized in Charts A and B of Exhibit 7.8. FSB is a $1 billion bank that bases its analysis on forecasts of the federal funds rate (Chart A) and ties other loan, investment and deposit rates to this overnight rate. As such, the federal funds rate serves as the bank's benchmark interest rate. Chart A also presents implied forward rates from the market for federal funds futures contracts (market implied rates), which provide a consensus forecast of expected rates. FSB conducts earnings sensitivity analysis across seven different rate environments (rate shocks) with the specific forecasts for federal funds in three rising (plus 1 percent, +2 percent, +3 percent) and three falling (−1 percent, −2 percent, −3 percent) rate environments, as noted in Chart B. Rates are assumed to change gradually in each case. A 200 basis-point (2 percent) rate change is calculated by cumulatively adding or subtracting approximately 17 basis points per month for one year from the most likely scenario and maintaining these levels during a second year of forecasts.

Importantly, FSB uses a base case interest rate forecast that is drawn from market-implied forecast rates. Examine Chart A in Exhibit 7.8. Note the dashed line that represents federal funds futures rates. Because the futures rates increase continuously the

EXHIBIT 7.7 First Savings Bank Rate Sensitivity Report for Most Likely (Base) Case Interest Rate Risk Scenario: December 31, 2013 (in U.S. Dollars)

	Total	3 Months or Less	>3–6 Months	>6–12 Months	>1–3 Years	>3–5 Years	>5–10 Years	>10–20 Years	>20 Years
Loans									
Prime based	100,000	100,000							
Equity credit lines	25,000	25,000							
Fixed rate >1 yr.		170,000	18,000	18,000	36,000	96,000	2,000		
Var.-rate mortgage 1 yr.	55,000	13,750	13,750	27,500					
30-yr. fixed-rate mortgage	250,000	5,127	5,129	9,329	32,792	28,916	116,789	51,918	
Consumer	100,000	6,000	6,000	12,000	48,000	28,000			
Credit card	25,000	3,000	3,000	6,000	13,000				
Investments									
Eurodollars	80,000	80,000							
CMOs fixed-rate	35,000	2,871	2,872	5,224	13,790	5,284	4,959		
U.S. Treasury & agency securities	75,000		5,000	5,000	25,000	40,000			
Fed funds sold	25,000	25,000							
Cash & due from banks	15,000								15,000
Loan loss reserve	(15,000)								(15,000)
Nonearning assets	60,000								60,000
Total assets	1,000,000	278,748	53,751	101,053	228,582	104,200	121,748	51,918	60,000
Deposits									
MMDAs	240,000	240,000							
Retail CDs	400,000	60,000	60,000	90,000	160,000	30,000			
Savings	35,000								35,000
NOW	40,000								40,000
DDA Personal	55,000								55,000
DDA Commercial	60,000	24,000							36,000
Borrowings									
Treasury Tax & Loan	25,000	25,000							
L-T notes fixed rate	50,000						50,000		
Fed funds purchased									
Noninterest-bearing liabilities	30,000								30,000
Capital	65,000								65,000
Total liabilities & equity	1,000,000	349,000	60,000	90,000	160,000	30,000	50,000		261,000
Swap: Pay fixed/Receive floating		50,000			(25,000)	(25,000)			
Periodic GAP		(20,252)	(6,249)	11,053	43,582	49,200	71,748	51,918	(201,000)
Cumulative GAP		(20,252)	(26,501)	(15,448)	28,134	77,334	149,082	201,000	0

EXHIBIT 7.8 **Base Case Interest Rate Scenario and Rate Ramps**

Chart A

Fed Funds Forecast vs. Implied Forward Rates: Dec. 2013

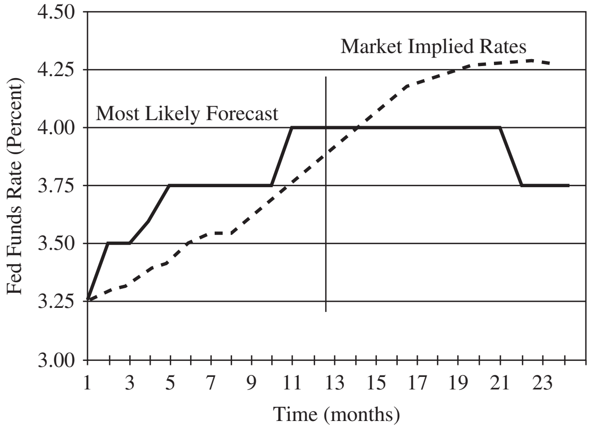
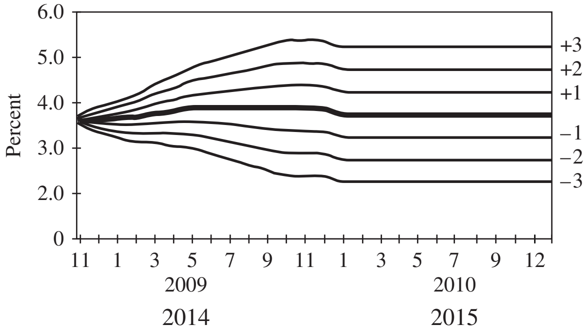


Chart B

Most Likely Forecast and Rate Ramps: Dec. 2013



farther from the present, the market is expecting an increase in the federal funds rate. FSB uses the data appearing as the solid line as its base case, or most likely, interest rate environment. As such, it is a most likely scenario if rates track those expected in the marketplace. After 12 months the federal funds rate is expected to level off around 4 percent for most of the second year. Importantly, this framework is quite different from using constant (rates remain at current levels) rates as the base case.

Ignore for now the explanation of the data for interest rate swaps (third row of data from the bottom of Exhibit 7.7) except the fact that the swaps effectively represent a RSA in the three-months-or-less time bucket.[7] Exhibit 7.7 reports data for eight different time buckets from three months or less to more than 20 years. The majority of assets are in 30-year fixed-rate mortgages, fixed-rate loans with maturities over one year, prime-based loans, and consumer loans. In fact, the assets have a very long average contractual maturity, as 25 percent of them are 30-year mortgages. The majority of deposits are retail CDs and MMDAs representing 64 percent of the total funding. According to this static GAP report, FSB's one-year cumulative GAP equals −$15,448,000, or −1.64 percent

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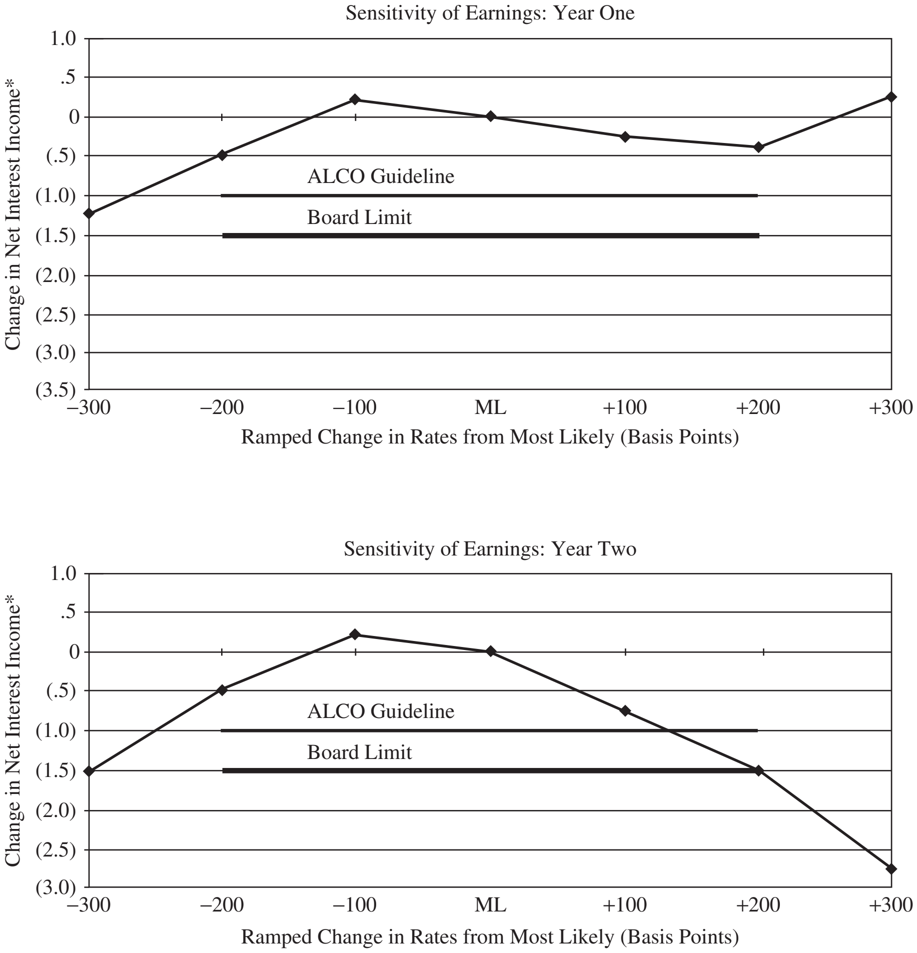
[7] Note that the $50,000 reported for swaps in under three months effectively increases the periodic GAP without swaps of −$70,252 to a periodic GAP after swaps of −$20,252.

EXHIBIT 7.9 **Earnings Sensitivity over One Year and Two Years versus Base Case (Most Likely) Rate Scenario**



*Millions of dollars.

of the $940 million in earning assets. Under static GAP analysis, the bank has little rate risk, but is positioned to lose modestly if interest rates increase through one year. Of course, this ignores the significant embedded options in the bank's mortgage holdings as well as other factors.

Exhibit 7.9 presents the results of earnings sensitivity analysis. The top figure is for the year 2014—one year out, while the bottom figure is for the year 2015—two years out. The seven different interest rate environments appear on the horizontal axis with the base case (most likely rising federal funds rate) scenario in the middle.

The +100, +200, and +300 listings refer to the environments where the federal funds rate is assumed to be 1 percent, 2 percent, and 3 percent higher, respectively, than the base case (most likely) scenario. The three assumed lower-rate environments are identified to the left of the most likely case. The vertical axis lists the change in NII from the most likely scenario under each interest rate scenario. Note the zero value for the base case because it is the reference point for comparing forecasts from the other rate environments. Each forecast of NII incorporates assumed shifts in volume and composition of assets and liabilities, changes in spreads recognizing that asset yields and liability interest costs do not change coincidentally by the same amount, and different exercises of embedded customer options.

As indicated in Exhibit 7.9, NII will fall slightly if rates increase by 1 to 2 percent during the first year relative to the most likely scenario. However, if rates increase by 3 percent, NII will actually increase, contrary to that suggested by a negative GAP. If rates fall by 1 percent relative to the most likely case, NII increases slightly, but if rates fall 2 or 3 percent, NII also falls. This again contradicts the implications of the negative GAP from Exhibit 7.7. This is possible because the GAP data in Exhibit 7.7 apply only to the most likely case. In each of the other rate scenarios, different amounts of assets and liabilities are rate sensitive based on the exercise of embedded options. Similarly, rates on each balance sheet item are assumed to change by different amounts when rates change.

Explanation of Sensitivity Results. The previous example demonstrates the importance of understanding the impact of exercising embedded options and the lags between the pricing of assets and liabilities. The framework uses the federal funds rate as the benchmark rate such that rate shocks indicate how much the funds rate changes. Thus, +100 means that the federal funds rate ends the first year at 5 percent (not the 4 percent under the most likely case).Other rates change by varying amounts depending on their relationship with the federal funds rate. In general, loan rates move more contemporaneously with the federal funds rate than do FSB's deposit rates, which follow movements in the federal funds rate with a lag. FSB similarly has a large amount of prepayment risk because many of the bank's assets are longer term and carry fixed rates. When rates fall, customers will typically exercise these options aggressively.

FSB's earnings sensitivity results reflect the impacts of rate changes on a bank with this profile. There are two basic causes or drivers behind the estimated earnings changes. First, other market rates change by different amounts and at different times relative to the federal funds rate. Second, embedded options potentially alter cash flows when the options go in the money. The combined impact is that FSB's effective GAP is different in each rate shock environment, as is the bank's spread.

When rates increase in the analysis, asset yields are assumed to increase more than liability costs and sooner such that spreads widen. The opposite occurs when rates fall. Such differences are common because banks have some pricing power over loans tied to base rates and with their core deposits. Consider the times when the Federal Reserve increases the target federal funds rate. Banks typically increase their quoted prime rates immediately by the same amount as the increase in the federal funds rate. In turn, they lag any increases in their deposit rates. Spreads thus initially widen.

Regarding embedded options, FSB owns many fixed-rate mortgages subject to prepayment risk. As rates decline, borrowers will refinance these mortgages so that they are effectively called away from FSB. Generally, fixed-rate loans are refinanced and callable bonds are called such that more assets become rate sensitive. When rates rise, these loans and securities are not nearly as rate sensitive to where mortgage prepayments and other loan refinancings drop sharply and there are fewer RSAs. Deposits are more rate sensitive when rates rise with more early withdrawals (RSLs increase). This shift may at least partially offset the impact of spreads widening. These same deposits are less rate sensitive (RSLs decrease) when rates fall, but the spread between earning asset yields and the cost of interest-bearing liabilities falls.

Under this structure, there is a different effective GAP for each rate scenario. If rates fall sharply by 2 or 3 percent, NII will fall because the effective GAP is positive, as many assets with embedded options must be repriced. If rates rise sharply, loan prepayment options are not exercised but early withdrawal options are. For FSB, an assumed reduction in rates of 1 percent is actually consistent with rates being virtually constant, as the federal funds rate would change from 3.25 percent initially to 3 percent, or 1 percent below that forecast at the end of 12 months. NII is thus forecast to remain fairly stable. Still, if rates fall by 2 or 3 percent, FSB sees NII decline as the long-term mortgages prepay and the funds are invested at lower rates. NII falls in the plus 1 percent and +2 percent cases because more liabilities than assets reprice as loan refinancings drop sharply. NII rises in the +3 percent case because the spread widens and offsets the impact of a small GAP. These factors explain why NII might fall when rates fall and not change significantly when rates rise.

The bottom part of Exhibit 7.9 reveals the comparative forecasts under each scenario in the years 2014 and 2015, or one and two years from the December 2013 date of the report. Over this time frame, the bank loses in both sharply rising and falling rate environments. FSB no longer gains with a +3 percent rate move because the interest cost of liabilities catches up with the increased asset yields, as banks cannot lag rate increases forever. Thus, the spread is no longer as large. This again reflects the fact that FSB's effective GAP becomes more negative in a rising-rate environment and positive in a falling-rate environment. The key point is that this analysis clearly reveals potential volatility in NII over sharply different rate environments. Also, FSB sets ALCO guidelines and risk policy limits according to allowable earnings sensitivity as noted in Exhibit 7.9. The bank has a board of directors' limit of a maximum $1.5 million reduction in NII for any 2 percent rate move up or down over two years. The bank violates its risk guidelines according to forecasts of year two in a +3 percent environment. Management must then stake steps to reduce the bank's risk exposure to meet these limits. In general, the greater the variation in forecast NII across rate environments, the greater the interest rate risk.

Some banks and bank analysts refer to the summary results of a bank's earnings sensitivity as **earnings-at-risk**, or **net interest income simulation**. Most banks measure interest rate risk using this framework because it is easy to understand and because it focuses on earnings, which drive bank performance in the near term.

Income Statement GAP

Many managers of community banks interpret their bank's interest rate risk using a simplified framework that is compared with comprehensive earnings sensitivity analysis. They feel comfortable with this because the complexity and size of assets and liabilities does not change dramatically over short periods of time. They similarly do not have significant risk exposure with off-balance sheet transactions that significantly affect the bank's NII. The models do, however, recognize the existence of embedded options and the different speeds and amounts of repricing specific assets and liabilities when rates change.

One common practice is to calculate an **income statement GAP**, or **Beta GAP**, that takes some of these factors into account. Consider the rate sensitivity report presented in Exhibit 7.10 for a bank with just under $30 million in total assets. This particular report uses the prime rate as the benchmark rate and contains two forecasts of the change in NII: one for an environment where the bank's prime rate is assumed to fall by 100 basis points and another when prime is assumed to increase by 100 basis points over the next

EXHIBIT 7.10 Income Statement GAP and Earnings Variability

Amounts in Thousands	**Prime Down 100bp**			**Prime Up 100bp**		
Report data as of December 31, 2013	**Balance Sheet GAP[a]**	**ECR[b]**	**Income Statement GAP**	**Balance Sheet GAP[a]**	**ECR[b]**	**Income Statement GAP**
Rate sensitive assets						
	A	B	A × B	C	D	C × D
Loans						
Fixed rate	$5,661	100%	$5,661	$5,661	100%	$5,661
Floating rate	3,678	100%	3,678	3,678	100%	3,678
Securities						
Principal cash flows						
Agencies	200	71%	142	200	71%	142
Agency callables	2,940	71%	2,087	300	60%	`180
CMO fixed	315	58%	183	41	51%	21
Fed funds sold	2,700	96%	2,592	2,700	96%	2,592
Floating rate						
Total rate sensitive assets	$15,494		$14,343	$12,580		$12,274
Rate sensitive liabilities						
Savings	$1,925	75%	$1,444	$ 1,925	5%	$ 96
Money market accounts	11,001	60%	6,600	11,001	40%	4,400
NOW	2,196	80%	1,757	2,196	20%	439
Fed funds purchased/repo.	0	96%	0	0	96%	0
CDs ≥$100,000	3,468	85%	2,948	3,468	85%	2,948
CDs <$100,000	4,370	84%	3,671	4,370	84%	3,671
Total rate sensitive liabilities	$22,960		$16,420	$22,960		$11,554
Rate sensitivity GAP (Assets–Liabilities)	($7,466)		($2,077)	($10,380)		$ 719
Total assets	$29,909		$29,909	$29,909		$29,909
GAP as a percentage of total assets	–24.96%		–6.94%	–34.71%		2.41%
Change in net interest income			$20.8			$ 7.2
Change in net interest margin			0.07%			0.02%
Net interest margin			5.20%			5.20%
Percentage change in net interest margin			1.34%			0.46%

[a] One-year balance sheet GAP includes all balances that may change in rate in the next 12 months.

[b] The earnings change ratio (ECR) is an estimate of the change in rate of a rate sensitive instrument per 100 basis-point (100bp) move in prime.

year. The first three columns of data relate to the case where the prime rate falls. The **balance sheet GAP** is a one-year cumulative GAP that reflects contractual repricing and indicates that the bank is liability sensitive in the amount of –$7,466,000, or almost 25 percent of assets. The second column of data provides information about each asset's or liability's **earnings change ratio (ECR)**. As the exhibit footnote suggests, this figure indicates how the yield on each asset, and rate paid on each liability, is assumed to change relative to a 1 percent drop in the prime rate. Thus, the effective yield on federal agency securities is assumed to fall by 71 basis points (0.71 percent), while the effective yield on federal funds sold will fall by 96 basis points (0.96 percent) if prime falls by 1 percent. Not surprisingly, deposit rates lag such that they generally fall by smaller amounts relative to the 1 percent drop in prime. Note that MMDA rates are assumed to fall by 60 basis points. The third column of data reports the amount of each balance sheet item that will effectively be repriced at a 1 percent lower rate and equals the ECR times the balance sheet amount. These figures represent how much of the balance sheet amount will be effectively repriced by 1 percent less if the prime rate falls by 1 percent. The objective is to obtain an income statement GAP figure that indicates the net amount of assets or liabilities that effectively reprices 1 percent lower.

The bank's income statement GAP is listed at −\$2,077,000 as the difference between \$14,343,000 in effective RSAs that will reprice 1 percent lower and \$16,420,000 in effective RSLs that will reprice 1 percent lower. This is an effective GAP estimate. As such, we can apply Equation 7.1 to interpret the impact on NII. Here, a 1 percent reduction in the prime rate will lead to an estimated \$20,770 increase in NII and a corresponding 7 basis-point increase in NIM.

$$\Delta \text{ NII} = -\$2{,}077{,}000(-0.01) = +\$20{,}770$$

The three columns of data at the right of Exhibit 7.10 refer to the estimated impact of a 1 percent increase in the prime rate over the next year. Note that in a rising-rate environment, a smaller amount of callable agency securities is assumed to be rate sensitive because fewer securities will likely be called. Also, the ECRs for some of the assets and core deposit liabilities are different, reflecting the fact that effective reinvestment rates on agency callables and CMOs will not rise as much with slower prepayments, and the bank will not increase its deposit rates in line with increases in prime or by the same amount as they would be lowered in a falling-rate environment. The net impact is that the bank's effective income statement GAP is positive at \$719,000. A 1 percent increase in prime will increase NII by an estimated \$7,190. Importantly, different assumed changes in prime will produce different estimated changes in NII depending on the same factors that alter a bank's effective rate sensitivity of assets and liabilities.

Managing the GAP and Earnings Sensitivity Risk

Effective GAP measures and the potential variation in NII indicate the general interest rate risk a bank faces. Equation 7.1 applies in the income statement GAP framework but not the general earnings sensitivity framework. It generally suggests that if interest rates are expected to increase during the GAP period, a positive cumulative GAP will lead to an increase in NII. If rates are expected to fall, a negative GAP will lead to an increase in NII. The actual change in NII will meet expectations only if interest rates change in the direction and amount anticipated and if RSAs and RSLs are accurately forecast. Importantly, the size of the effective GAP, or the range of variation in NII, signifies how much risk a bank is taking. The larger the absolute value of GAP, the greater the change in NII for a given change in rates. The greater the potential variation in NII from the base case, the greater the risk.

The GAP model suggests that a bank that chooses not to speculate on future interest rates can reduce interest rate risk by obtaining a zero effective GAP or no variability in NII. The bank is fully hedged because its interest rate risk is negligible. Of course, this zero-risk position is rarely achieved and is rarely desired. Alternatively, a bank may choose to speculate on future interest rates and actively manage the GAP. Equation 7.1

suggests that a bank can systematically increase NII if it can accurately forecast rates and vary its effective GAP accordingly. If management expects rates to increase, it should become more asset sensitive. If it expects rates to decrease, it should become more liability sensitive.

Listed below are steps that banks can take to reduce risk in the context of effective GAP management.

1. Calculate periodic GAPs over short time intervals.
2. Match fund repriceable assets with similar repriceable liabilities so that periodic GAPs approach zero.
3. Match fund long-term assets with Noninterest-bearing liabilities.
4. Use off-balance sheet transactions, such as interest rate swaps and financial futures, to hedge.

Management may alternatively choose to alter the rate sensitivity of assets and liabilities to take greater risk. Chapter 8 discusses the specific bets that management makes when it speculatively adjusts its effective GAP or earnings sensitivity profile. Listed below are various ways to adjust the effective rate sensitivity of a bank's assets and liabilities on-balance sheet.

Objective	**Approach**
Reduce asset sensitivity	Buy longer-term securities.
	Lengthen the maturities of loans.
	Move from floating-rate loans to term loans.
	Put floors on loan rates.
Increase asset sensitivity	Buy short-term securities.
	Shorten loan maturities.
	Make more loans on a floating-rate basis.
Reduce liability sensitivity	Pay premiums to attract longer-term deposit instruments.
	Issue long-term subordinated debt.
	Put caps on deposit rates.
Increase liability sensitivity	Pay premiums to attract short-term deposit instruments.
	Borrow more via noncore purchased liabilities.

The benefits and costs of these approaches are discussed at the end of Chapter 8.

Summary

Interest rate risk is a key component of a bank's sensitivity to market risk (S), which is a component of a bank's CAMELS rating. A bank's ALCO is responsible for monitoring and managing a bank's interest rate risk profile. This chapter initially introduces the traditional static GAP model as a means of measuring interest rate risk. While simplistic, the model provides an easy way to understand the basic sources of risk and approaches for measuring and managing risk. The chapter then extends the discussion to focus on earnings sensitivity analysis, which essentially represents net income simulation under different assumed interest rate environments. Earnings sensitivity analysis allows management to assess the sensitivity of NII to changes in balance sheet volume and composition, shifts in the relationship between asset yields and the costs of interest-bearing liabilities, and general shifts in the level of interest rates.

The earnings sensitivity framework is helpful for measuring the earnings impact when options embedded in bank loans, securities, and deposits are exercised. The analysis is critical in today's environment in which many banks have sold options on both sides of the balance sheet. Borrowers have the option to refinance loans, and depositors have the option to withdraw funds prior to deposit maturity. As such, interest income and interest expense may vary sharply from that expected when interest rates change. Earnings sensitivity analysis also allows management to assess the impact of different changes in asset yields versus liability costs when rates change. These spread adjustments are powerful drivers of a bank's performance as it responds to changing economic conditions.

The overall framework provides a methodology for analyzing the range of potential outcomes from interest rate changes, shifts in balance sheet composition, and the exercise of embedded options. The net result is an understanding of the relationship between the magnitude of change in NII over the next year or two relative to potential interest rate changes and the resulting level of risk that has been assumed by the institution. The earnings sensitivity framework provides information regarding how management might position itself to gain if it wants to take on additional risk or how it might hedge if it wants to reduce overall risk. These issues are exacerbated by the difficult environment facing ALCO members today. With rates low, most market participants believe that the next major rate move will be upward. Should managers position the bank to be more asset sensitive? If so, they will buy short-term assets, make floating-rate loans, and lengthen liability maturities. Each has the impact of lowering NII in the near-term.

Questions

1. List the basic steps in static GAP analysis. What is the objective of each?
2. Are the following assets rate sensitive within a six-month time frame? Explain.
    a. Three-month T-bill
    b. Federal funds sold (daily repricing)
    c. Two-year Treasury bond with semiannual coupon payments
    d. Four-year fully amortized car loan with \$350 monthly payments including both principal and interest (for the first six months, principal payments total \$448)
    e. Commercial loan priced at the bank's prime rate plus 2 percent
3. Consider the following bank balance sheet and associated average interest rates. The time frame for rate sensitivity is one year. Figures are in thousands.

Assets	**Amount**	**Rate**	**Liabilities & Equity**	**Amount**	**Rate**
Rate sensitive	$103,300	3.3%	Rate sensitive	$ 91,600	0.8%
Fixed rate	161,400	4.5%	Fixed rate	181,850	2.1%
Nonearning	27,500		Nonpaying liabilities & Equity	18,750	
Total	$292,200		Total	$292,200	

    a. Calculate the bank's GAP, expected NII, and NIM if interest rates and portfolio composition remain constant during the year. This bank is positioned to profit if interest rates move in which direction?

   b. Calculate the change in expected NII and NIM if the entire yield curve shifts 2 percent higher during the year. Is this outcome consistent with the bank's static GAP?
   c. Suppose that, instead of the parallel shift in the yield curve in Part b, interest rates increase unevenly. Specifically, suppose that asset yields rise by 0.50 percent while liability rates rise by 0.75 percent. Calculate the change in NII and NIM. Is this uneven shift in rates more or less likely than a parallel shift?
   d. Suppose the bank converts $20,000 of RSLs to fixed-rate liabilities during the year and interest rates remain constant. What would the bank's NII equal compared with the amount initially expected? Explain why there is a difference.

4. Suppose that your bank buys a T-bill yielding 4 percent that matures in six months and finances the purchase with a three-month time deposit paying 3 percent. The purchase price of the T-bill is $3 million financed with a $3 million deposit.
   a. Calculate the six-month GAP associated with this transaction. What does this GAP measure indicate about interest rate risk in this transaction?
   b. Calculate the three-month GAP associated with this transaction. Is this a better GAP measure of the bank's risk? Why or why not?

5. What is the fundamental weakness of the GAP ratio as compared with GAP as a measure of interest rate risk?
6. Discuss the problems that loans tied to a bank's base rate present in measuring interest rate risk where the base rate is not tied directly to a specific market interest rate that changes on a systematic basis.
7. Consider the following asset and liability structures:

County Bank

Asset: $10 million in a one-year, fixed-rate commercial loan

Liability: $10 million in a three-month CD

City Bank

Asset: $10 million in a three-year, fixed-rate commercial loan

Liability: $10 million in a six-month CD

   a. Calculate each bank's three-month, six-month, and one-year cumulative GAP.
   b. Which bank has the greatest interest rate risk exposure as suggested by each GAP measure? Consider the risk position over the different intervals.

8. Consider the rate sensitivity report shown in Exhibit 7.7.
   a. Is FSB positioned to profit or lose if interest rates rise over the next 90 days? Include in your discussion an analysis of the most likely rate environment.
   b. Suppose that management has misstated the rate sensitivity of the bank's money market deposit accounts because the bank has not changed the rate it pays on these liabilities for six months and doesn't plan to change them in the near future. Will the bank profit if rates rise over the next 90 days?

9. Assume that you manage the interest rate risk position for your bank. Your bank currently has a positive cumulative GAP for all time intervals through one year. You expect that interest rates will fall sharply during the year and want to reduce your bank's risk position. The current yield curve is inverted with long-term rates below short-term rates.
   a. To reduce risk, would you recommend issuing a three-month time deposit and investing the proceeds in one-year T-bills? Will you profit if rates fall during the year?
   b. To reduce risk, would you recommend issuing a three-month time deposit and making a two-year commercial loan priced at prime plus 1 percent? Why?
10. Your bank has 50 percent of its loans priced off the current prime rate at prime plus 1 percent, on average. The majority of the bank's liabilities are interest-bearing core deposits (NOWs, MMDAs, and small time deposits).
    a. Assume that the prime rate immediately rises from 6 percent to 6.5 percent. Will management likely increase deposit rates by 0.50 percent immediately? Explain why or why not. What will be the impact on the bank's spread?
    b. Assume that the prime rate immediately falls from 6 percent to 5.5 percent. Will management likely decrease deposit rates by 0.50 percent immediately? Explain why or why not. What will be the impact on the bank's spread?
11. An embedded option associated with each of the following instruments potentially alters the rate sensitivity of the underlying instrument. Indicate when the option is typically exercised and how it affects rate sensitivity. The current prime rate is 3.25 percent.
    a. Fixed-rate mortgage loan with a yield of 5.5 percent and 30-year final maturity.
    b. Time deposit with five years remaining to maturity; carries a fixed rate of 4 percent.
    c. Commercial loan with a two-year maturity and a floating rate set at prime plus 2.5 percent. There is a cap of 6 percent representing the maximum rate that the bank can charge on the loan.
12. What information is available from earnings sensitivity analysis that is not provided by static GAP analysis?
13. Exhibit 7.9 demonstrates that FSB loses in year two if rates either rise or fall sharply from the most likely scenario. Explain why in terms of when embedded options are expected to be exercised and what happens to spreads.
14. Interpret the following earnings-at-risk data. What does it suggest regarding the bank's risk exposure?

	Earnings-at-Risk	
Interest Rate Change (%)	**1 Year**	**2 Years**
+1% shock	+2.4%	+4.9%
−1% shock	−1.7%	−5.5%
−1% yield curve inversion	+1.1%	−2.6%

15. Given the following information for AmBank, calculate its income statement (effective) GAP. How much will NII change if the prime rate rises 1 percent? The ECR reflects the relationship of each account's rate to the prime rate.

Income Statement GAP With Rising Rates

Rate sensitive Assets	1-Year Balance Sheet GAP	ECR
Loans	$55,120,000	82%
Securities	$28,615,000	67%
Rate sensitive Liabilities		
MMDAs	$41,640,000	34%
NOWs	$37,260,000	90%
CDs ≥$100,000	$20,975,000	85%

Activities

The data on the next page are taken from the 2013 annual report for Synovus, which reported $812 million in NII before provisions and $26.3 billion in average assets in 2013. Review the information and answer the following questions:

1. What happened to earning asset yields between 2012 and 2013? What happened to the interest cost of liabilities over the same period?
2. What were the bank's spread and NIM in 2013? Why did the two figures differ?
3. How much did earning assets and interest-bearing liabilities change in 2013 versus 2012? What was the likely impact on NII from the differential change? Explain.

TABLE 4 Average Consolidated Average Balances, Interest, and Yields

	2013			2012			2011		
(dollars in thousands)	**Average Balance**	**Interest**	**Yield/ Rate**	**Average Balance**	**Interest**	**Yield/ Rate**	**Average Balance**	**Interest**	**Yield/ Rate**
ASSETS									
Interest-earning assets:									
Taxable loans, net[(1)(2)]	$19,494,216	862,833	4.43%	$19,645,210	919,945	4.68%	$20,563,724	1,014,144	4,93%
Tax-exempt loans, net[(1)(2)(3)]	112,030	5,564	4.97	145,767	7,576	5.20	153,181	8,110	5.29
Less Allowance for loan losses	341,658	—	—	469,714	—	—	649,024	—	—
Loans, net	19,264,588	868,397	4.51	19,321,263	927,521	4.80	20,067,881	1,022,254	5.09
Investment securities available for sale:									
Taxable investment securities	3,070,019	52,118	1.70	3,419,556	66,416	1.94	3,309,981	106,010	3.20
Tax-exempt investment securities[(3)]	10,827	686	6.34	20,451	1,319	6.45	32,177	2,167	6.73
Total investment securities	3,080,846	52,804	1.71	3,440,007	67,735	1.97	3,342,158	108,177	3.24

TABLE 4 (continued)

	2013			2012			2011		
(dollars in thousands)	**Average Balance**	**Interest**	**Yield/ Rate**	**Average Balance**	**Interest**	**Yield/ Rate**	**Average Balance**	**Interest**	**Yield/ Rate**
Trading account assets	10,090	548	5.43	12,632	963	7.62	17,706	925	5.22
Interest-earning deposits with banks	21,598	22	0.10	20,700	76	0.37	23,712	114	0.48
Due from Federal Reserve Bank	1,258,473	3,222	0.26	1,374,634	3,451	0.25	2,639,885	6,660	0.25
Federal funds sold and securities purchased under resale agreements	95,838	85	0.09	123,732	140	0.11	149,893	118	0.08
FHLB and Federal Reserve Bank stock	67,998	1,679	2.47	65,379	1,159	1.77	99,028	893	0.90
Mortgage loans held for sale	109,761	4,441	4.05	146,892	6,201	4.22	121,244	6,195	5.11
Total interest-earning assets	23,909,192	931,198	3.89%	24,505,239	1,007,246	4.11%	26,461,507	1,145,336	4.33%
Cash and due from banks	431,003			450,965			437,648		
Premises and equipment, net	477,688			479,878			502,390		
Other real estate	142,570			198,295			261,369		
Other assets[4]	1,368,791			734,944			849,279		
TOTAL ASSETS	**$26,329,244**			**$26,369,321**			**$28,512,193**		
LIABILITIES AND EQUITY									
Interest bearing liabilities:									
Interest bearing demand deposits	$3,943,616	7,773	0.20%	$3,540,734	7,467	0.21%	$3,416,021	10,296	0.30%
Money market accounts	6,334,248	20,817	0.33	6,834,271	26,794	0.39	6,884,462	47,489	0.69
Savings deposits	601,036	632	0.11	551,803	598	0.11	513,123	679	0.13
Time deposits	4,579,979	35,170	0.77	5,062,826	60,890	1.20	7,320,737	115,420	1.58
Federal funds purchased and securities sold under repurchase agreements	208,267	324	0.16	320,338	614	0.19	389,582	1,064	0.27
Long-term debt	1,806,351	54,106	3.00	1,457,020	53,660	3.68	1,731,218	42,654	2.46
Total interest bearing liabilities	17,473,497	118,822	0.68%	17,766,992	150,023	0.84%	20,255,143	217,602	1.07%
Noninterest-bearing demand deposits	5,353,819			5,507,895			5,082,164		
Other liabilities	206,431			235,307			263,184		
Equity	3,295,497			2,859,127			2,911,702		
TOTAL LIABILITIES AND EQUITY	**$26,329,244**			**$26,369,321**			**$28,512,193**		

TABLE 4 (continued)

	2013			2012			2011		
(dollars in thousands)	**Average Balance**	**Interest**	**Yield/ Rate**	**Average Balance**	**Interest**	**Yield/ Rate**	**Average Balance**	**Interest**	**Yield/ Rate**
Net interest income/ margin		812,376	3.40%		857,223	3.50%		927,734	3.51%
Less Taxable-equivalent adjustment		2,184			3,106			3,580	
NET INTEREST INCOME, ACTUAL		**810,192**			**854,117**			**924,154**	

(1)Average loans are shown net of deferred fees and costs. Non-performing loans are included.

(2)Interest income includes loan fees as follows: 2013—$25.6 million, 2012—$19.8 million, and 2011—$17.3 million.

(3)Reflects taxable-equivalent adjustments, using the statutory federal tax rate of 35%, adjusting interest on tax-exempt loans and investment securities to a taxable-equivalent basis.

(4)Includes average net unrealized gains on investment securities available for sale of $12.0 million, $66.3 million, and $98.6 million for the years ended December 31, 2013, 2012, and 2011, respectively.

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8 Managing Interest Rate Risk: Economic Value of Equity

GAP and earnings sensitivity analysis emphasize a bank's risk profile over the short run and largely ignore cash flows beyond one or two years. Yet, an institution's assets and liabilities may be substantially mismatched beyond two years and thus exhibit considerable risk, which goes undetected. Duration gap (DGAP) and economic value of equity sensitivity analysis represent alternative methods of analyzing interest rate risk. They emphasize the price sensitivity of assets and liabilities to changes in interest rates and the corresponding impact on stockholders equity. As the label suggests, DGAP incorporates estimates of the duration of assets and duration of liabilities, which reflect the value of promised cash flows through final maturity, with the gap indicating the difference in average asset versus liability durations. This gap figure provides a comprehensive measure of the interest rate risk embodied in the entire balance sheet of a bank. In most cases, DGAP analysis is consistent with funding GAP and earnings sensitivity analysis in terms of when a bank gains and loses, but the magnitude of the estimated effects may differ sharply.

The following summary demonstrates differences in the perspectives of the two frameworks with regard to the measurement and management of interest rate risk.

Risk Framework	Target Performance Measure	Risk Measure
GAP and earnings sensitivity	Net interest income/NIM Net income	GAP/earning assets GAP ratio (RSAs/RSLs) Variation in net interest income versus base case Maximum acceptable loss of net interest income versus base case
Duration gap and economic value of equity sensitivity	Economic Value of Equity (EVE)	Duration gap Variation in economic value of equity Maximum acceptable loss of economic value of equity versus base case

While the two models differ in focus, they address similar issues and generally have similar implications. Does a rate increase help or hurt the bank? What is the impact of a rate decrease? How much risk has management assumed? After reading the material in this chapter, you will be able to assess a bank's aggregate interest rate risk according to DGAP and economic value of equity sensitivity and explain why it is useful to assess interest rate risk under this framework.

This chapter examines the management of a bank's interest rate risk position in terms of DGAP and the sensitivity of the market value of stockholders equity to changes in interest rates. In this framework, interest rate risk refers to the volatility in the economic (market) value of stockholders equity (EVE) attributable to changes in the level of interest rates and associated changes in balance sheet and off-balance sheet mix and volume. A bank that assumes substantial risk will see its value of stockholders equity rise or fall sharply when interest rates change unexpectedly.

EVE sensitivity analysis is linked with the ongoing debate concerning whether market value accounting is appropriate for financial institutions. During the financial crisis that commenced in 2007, many large commercial and investment banks reported large write-downs of problem loans, mortgage-related assets, collateralized debt obligations and other securities, which depleted their capital. The write-downs often induced banks to tighten lending standards and raise external capital, when possible, while they strengthened their balance sheets. Some banks also sold preferred stock to the Treasury under the Capital Purchase Program (CPP) as part of the Troubled Asset Relief Program (TARP). Some managers argued that the write-downs far exceeded the decline in economic value of the assets, and because banks did not need to sell the assets, they should not be forced to recognize the "paper" losses.

DGAP analysis represents an application of duration concepts to a bank's entire balance sheet. As such, the model builds on the discussion of Macaulay's duration applied to single securities introduced in Chapter 6. It parallels static GAP and earnings sensitivity analysis in the sense that both DGAP and the potential variation in EVE are viewed as measures of risk, with more sophisticated users focusing on the latter. Some banks set targets for allowable risk in terms of how much EVE is allowed to change for specific 2 percent or 3 percent rate shocks. The analysis is dynamic in the sense that it incorporates the impact of potential rate increases and decreases in deposit and loan growth, and it recognizes that customers' exercise of embedded options will affect a bank's true risk exposure depending on how interest rates change. As such, the analytical procedure is similar to that for earnings sensitivity analysis. This analysis appears under such labels as economic value of equity (EVE), market value of equity (MVE), and net portfolio value (NPV) analysis.

EVE analysis is essentially a liquidation analysis. It uses market value accounting where all assets and liabilities are recorded at estimated market values. The value of EVE is a residual figure equal to the difference between the market value of assets and the MVE.

Consider a community bank with an estimated $100 million in market value of assets and $90 million in equity to liabilities at prevailing interest rates. EVE is thus $100 million minus $90 million, or $10 million.

Community Bank

Market Value of Assets	Market Value of Liabilities + EVE
Total assets $100	Total liabilities $90
	EVE $10

Suppose next that all interest rates increase. In this situation, market values for virtually all balance sheet items will decrease. Note that the market value of liabilities represents the price at which a bank could repurchase its debts. When rates increase, the price or value of these liabilities falls, indicating that the bank would have to pay less (it benefits) because it has locked in bank deposits and other borrowings at below-market rates. When rates fall, the value of these liabilities will rise, indicating that the bank would have to pay more (it loses) because it has locked in depositors at above-market rates.

In the following example, the market value of assets falls to $96 million and the market value of liabilities falls to $88 million with the increase in interest rates. Note that the decrease in asset value is greater than the decrease in liability value, such that the bank's EVE declines from $10 million to $8 million.

Market Value of Assets	Market Value of Liabilities + EVE
Total assets = $96	Total liabilities = $88
	EVE = $8

Why does EVE fall? One way of analyzing the impact is to focus on the average duration of bank assets versus liabilities. In this example, the market value of assets falls by 4 percent (4/100), while the market value of liabilities falls by 2.2 percent (2/90). If interest rates on the assets change by the same amount as rates on the liabilities, the assets must have a longer duration than the liabilities, on average. The implication is that a simple comparison of these duration estimates indicates whether assets or liabilities will change proportionately more in market value when rates change. The differential change reflects the DGAP and ultimately the impact on EVE.

Measuring Interest Rate Risk with Duration Gap

Economic value of equity analysis differs from earnings sensitivity analysis in its focus on stockholders equity rather than net interest income and its emphasis on all cash flows, not just those arising one or two years beyond the date of the analysis. Rather than focus on the variation in one year of earnings, it takes a longer-term perspective of risk. The analysis incorporates duration estimates of each category of assets and liabilities. Changes in the economic value of equity reflect differences in the durations of assets and liabilities and thus differences in the market value sensitivity of assets and liabilities.

As Chapter 6 demonstrates, duration is an elasticity measure. As such, it provides information regarding how much a security's price will change when market interest rates change. Recall that the longer is duration, the greater is price sensitivity. Thus, the price of a five-year duration bond will change more than the price of a one-year duration bond for a similar change in interest rates. **Duration gap analysis** compares the price sensitivity of a bank's total assets with the price sensitivity of its total liabilities to assess whether the market value of assets or liabilities changes more when rates change. Any differential impact will indicate how the bank's economic value of equity will change. Before introducing the model, we provide a brief review of duration concepts.

Duration, Modified Duration, and Effective Duration

Market participants often use three different duration measures—Macaulay's duration, modified duration, and effective duration—as if they were the same. In fact, while the interpretations are similar, they differ in terms of how they are calculated and how they should be used.[1]

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[1] There are many other definitions of duration, using different discount rates and cash flow assumptions, that are ignored here. For a useful discussion, see Bierwag (1987) and Fabozzi (2011).

Macaulay's duration (D) is computed as a weighted average of the time until cash flows are received. The weights equal the present value of each cash flow as a fraction of the security's current price, and time refers to the length of time in the future until payment or receipt. It is measured and quoted in units of time. Conceptually, duration measures the average life of an instrument. In the context of immunization, an investor knows that by matching duration with the preferred holding period, interest rate risk can be minimized because price risk is balanced with reinvestment risk. For example, a bond with four years until final maturity with a Macaulay's duration of 3.5 years indicates that an investor with a 3.5-year holding period could lock in a rate of return by buying a 3.5-year duration instrument. If interest rates increase, the decrease in market value of the bond will be just offset by higher reinvestment income from the periodic coupon interest payments, so that the promised return is realized after 3.5 years. If interest rates decrease, the price appreciation will offset the lost reinvestment income. Thus, value and total return are fixed.[2]

Following is Macaulay's duration (D) formula for a security with n cash flows discounted at the market interest rate i, with an initial price P*, and t equal to the time until the cash payment is made.

$$D = \sum_{t}^{n} \frac{[\text{cashflow}_t/(1+i)^t] \times t}{P^*} \tag{8.1}$$

We use this measure of price sensitivity in the approximate price elasticity relationship where P refers to the price of the underlying security:

$$\frac{\Delta P}{P} \cong -\frac{D}{(1+i)} \times \Delta i \tag{8.2}$$

with

$$\text{Modified duration} = D/(1+i) \tag{8.3}$$

Modified duration equals Macaulay's duration divided by $(1+i)$. It has the useful feature of indicating how much the price of a security will change in percentage terms for a given change in interest rates. A five-year zero coupon bond will have a Macaulay's duration of 10 semiannual periods, or five years. Assume that its current price is \$7,441 and market rate of interest is 6 percent (3 percent semiannual compounding). The bond's modified duration equals 9.71 semiannual periods (10/1.03), or 4.85 years. If the market interest rate rises to 7 percent ($\Delta i = 0.005$), the bond's price will fall by 4.85 percent, or by \$361 ($0.005 \times 9.71 \times \$7{,}441$). Securities can be easily ranked by modified duration to determine which ones are most price volatile.

Both of these measures calculate duration assuming that all promised cash flows will be realized as scheduled. While this is typically true for option-free securities, it does not hold for securities with options. When a loan is prepaid or a bond is called, the exercise of the underlying option changes the instrument's cash flows and hence its duration. For example, a three-year bond may be callable in one year. If market rates fall and the bond is called, its duration changes in comparison with when rates are higher and the bond is not called. The concept of **effective duration** is used to estimate how price sensitive a security is when the security contains embedded options. It compares a security's estimated price in a falling-rate environment with an estimated price in a rising-rate environment relative to the initial price times the assumed rate differential. Formally, effective duration (Eff Dur) equals:

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[2] This ignores the fact that duration will change as time passes and that immunization would require a rebalancing of the security or portfolio's duration. To be useful, the user must specify ex ante (beforehand) what rebalancing is appropriate.

$$\text{Eff Dur} = \frac{P_{i-} - P_{i+}}{P_0(i+ - i-)} \tag{8.4}$$

where

$\mathbf{P_{i-}}$ = price if rates fall
$\mathbf{P_{i+}}$ = price if rates rise
$\mathbf{P_0}$ = initial (current) price
i+ = initial market rate plus the increase in rate
i− = initial market rate minus the decrease in rate

Consider a three-year, 9.4 percent coupon bond selling for $10,000 par to yield 9.4 percent to maturity. This bond is callable at par and will presumably be called if rates fall 50 basis points or more. Macaulay's duration for the option-free version of this bond with semiannual coupons and compounding was calculated in Chapter 6 to be 5.36 semiannual periods, or 2.68 years at the market rate of 4.7 percent semiannually. The modified duration was 5.12 semiannual periods or 2.56 years. If this bond is immediately callable at par, its price will never increase much more than to $10,000. When the call option is in the money—that is, when market rates fall by 0.5 percent (25 basis points semiannually) or more and the bond will likely be called—the bond's price will equal its call price of $10,000. If rates rise, the bond will not be called and its price will fall as it would for a bond without any embedded option. As noted in Chapter 6, a 30 basis-point increase in rate to 5 percent semiannually will lower the price to $9,847.72. Using these figures, the callable bond's effective duration for a 30 basis-point (0.3 percent) semiannual movement in rates either up or down is 2.54.

$$\text{Eff Dur} = \frac{\$10{,}000 - \$9{,}847.72}{\$10{,}000(0.05 - 0.044)} = 2.54$$

As expected, the chance that the bond will be called shortens duration from what it would be if all cash flows materialized as originally scheduled.

The use of effective duration allows the cash flows of the underlying instrument to change when interest rates change. An analyst must incorporate different rate forecasts and have a model to explain the pricing of the security in different interest rate environments to calculate effective duration. It is just an approximation, but is useful because it recognizes that an embedded option may be exercised and thus dramatically alter the expected cash flows and value of a security. Effective duration also demonstrates how some securities can exhibit **negative duration**. Negative duration actually refers to an effective duration calculation that is negative. For this to happen, the price of a security in a falling-rate environment must fall below the price in a rising-rate environment, such that the numerator of Equation 8.4 is negative. This can occur when some types of mortgage-backed securities prepay so rapidly that the promised cash-flow stream collapses.[3]

Duration Gap Model

DGAP models focus on managing net interest income or the economic value of stockholders equity, recognizing the timing of all cash flows for every instrument on a

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[3] The standard example is a high coupon, interest-only (IO) mortgage-backed security that currently prepays at a high speed. The holder of this IO receives only the interest payments on the principal outstanding for a pool of mortgages. If rates fall, the pool prepays even faster so that expected interest payments fall—perhaps to zero. With fewer payments made, the price drops. If rates increase, the pool prepays slower so that expected interest payments increase and will occur over a longer period of time. Thus, the IO's price might increase. This security will have a negative effective duration.

bank's balance sheet.[4] The following analysis emphasizes duration's use as an elasticity measure. Unlike static GAP analysis, which focuses on **rate** sensitivity or the frequency of repricing, DGAP analysis focuses on **price** sensitivity. The Contemporary Issues box, "Rate Sensitivity versus Price Sensitivity," clarifies the difference. Duration is an attractive measure because it is additive across securities in a portfolio such that the duration of the portfolio equals the sum of the durations of the individual components. DGAP is a measure of a bank's aggregate portfolio interest rate risk that compares the weighted average duration of assets with the weighted average duration of liabilities. As with GAP analysis, the sign and magnitude of DGAP provide information about when a bank potentially wins and loses as rates change, and the magnitude of the interest rate bet. Management can adjust DGAP to hedge or accept interest rate risk by speculating on future interest rate changes.

The following analysis formally defines DGAP and discusses applications that incorporate embedded options and sensitivity analysis for potential variation in the economic value of stockholders equity.

There are four steps in DGAP analysis:

1. Forecast interest rates.
2. Estimate the market value of all bank assets and liabilities. EVE equals the amount that makes the market value of assets equal to the market value of liabilities plus EVE.
3. Estimate the weighted average duration of assets and weighted average duration of liabilities. The effects of both on- and off-balance sheet items and embedded options are incorporated. Use these estimates to calculate DGAP.
4. Management forecasts changes in EVE across different interest rate environments taking into account differential changes in rates and the exercise of embedded options.

CONTEMPORARY ISSUES

Rate Sensitivity versus Price Sensitivity

GAP and DGAP represent two ways of viewing interest rate risk. To better appreciate the differences, you should understand how rate sensitivity differs from price sensitivity. **Rate sensitivity** refers to the ability to reprice the principal amount of an asset or liability when interest rates change. **Price sensitivity** refers to how much the price of an asset or liability will change when interest rates change. If an instrument is very rate sensitive, it is typically not very price sensitive, and vice versa.

GAP and earnings sensitivity analysis focus on how frequently managers can reprice the principal amount of an asset or liability. For example, if a bank's federal funds sold mature daily, this asset is extremely rate sensitive because the bank can reinvest (reprice) the principal amount at the prevailing rate every 24 hours. However, the same federal funds loan is not price sensitive. Because the rate changes daily when the principal matures, the lender will receive the outstanding principal plus one day's interest. The value of the loan will remain at par (face value) daily. The interest earned will reflect only the change in rates. In contrast, a 10-year zero coupon bond is not very rate sensitive because the owner cannot reinvest the principal for 10 years without selling the bond. This same bond is very price sensitive, however, because its value will rise or fall sharply in percentage terms as rates fall or rise. Thus, rate sensitivity and price sensitivity are two alternate, but consistent, ways of interpreting a security's features.

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[4] The following discussion focuses on EVE as a target performance variable and follows the discussion in Kaufman (1984). Toevs (1983) addresses the use of net interest income as a target measure of performance. See also Payant (2007) and Veronesi (2010) who provide sample calculations and applications to portfolio management.

The weighted average duration of bank assets (DA) is calculated as:

$$\mathrm{DA} = \sum_{i}^{n} w_i \mathrm{Da}_i \tag{8.5}$$

where

$\mathbf{A_i}$ = market value of asset i (i equals 1, 2, . . . n)
$\mathbf{w_i}$ = A_i divided by the market value of all bank assets (MVA); (MVA = $A_1 + A_2 + \ldots + A_n$)
$\mathbf{Da_i}$ = Macaulay's duration of asset i
n = number of different bank assets

The weighted average duration of bank liabilities (DL) is calculated similarly as:

$$\mathrm{DL} = \sum_{j}^{m} z_j \mathrm{Dl}_j \tag{8.6}$$

where

$\mathbf{L_j}$ = market value of liability j (j equals 1, 2, … m)
$\mathbf{z_j}$ = L_j divided by the market value of all bank liabilities (MVL); (MVL = $L_1 + L_2 + \ldots + L_m$)
$\mathbf{Dl_j}$ = Macaulay's duration of liability j
m = number of different bank liabilities

With the focus on EVE and the general level of interest rates (characterized by y):

$$\Delta\mathrm{EVE} = \Delta\mathrm{MVA} - \Delta\mathrm{MVL} \tag{8.7}$$

Using Equation 8.2 we know that $\Delta A_i = -\mathrm{Da}_i[\Delta y/(1+y)]A_i$; and $\Delta L_j = -\mathrm{Dl}_j[\Delta y/(1+y)]$, such that:

$$\Delta\mathrm{EVE} = -[\mathrm{DA} - (\mathrm{MVL}/\mathrm{MVA})\mathrm{DL}][\Delta y/(1+y)]\ \mathrm{MVA} \tag{8.8}$$

If we define a bank's duration gap (DGAP) as

$$\mathrm{DGAP} = \mathrm{DA} - (\mathrm{MVL}/\mathrm{MVA})\mathrm{DL}$$

then

$$\Delta\mathrm{EVE} = -\mathrm{DGAP}[\Delta y/(1+y)]\mathrm{MVA} \tag{8.9}$$

Note that both DA and DL take into account the present value of all promised or expected cash flows. There is no need for time buckets to classify assets and liabilities. DGAP indicates the difference between the weighted average duration of assets and the leverage-adjusted weighted average duration of liabilities. Hence, it is an approximate estimate of the sensitivity of EVE to changes in the general level of interest rates. The leverage adjustment takes into account the existence of equity as a means of financing assets. The interest factor (y) is typically measured as some weighted average of earning asset yields across all interest-earning assets.

DGAP as a Measure of Risk. The sign and size of DGAP provide information about the bank's interest rate bet, that is, whether rising or falling rates are beneficial or harmful and how much risk the bank is taking (the size of the rate bet). Consider the implications of Equation 8.9. If DGAP is positive, an increase in rates will lower EVE, while a decrease in rates will increase EVE. If DGAP is negative, an increase in rates will increase EVE, while a decrease in rates will lower EVE. The closer DGAP is to zero, the smaller is the potential change in EVE for any change in rates.

These relationships signal how a bank is positioned relative to future rate changes. In terms of aggregate rate risk, the greater is DGAP, the greater is the potential variation in EVE for a given change in interest rates. As such, DGAP provides information about when a bank wins and loses and the amount of risk assumed.

A Duration Application for Banks

Most bank managers are concerned with the bank's total risk exposure from all assets and liabilities. When a bank receives cash inflows from assets prior to making its obligated payments on liabilities, it bears the risk that it may have to reinvest the proceeds at reduced rates. When it makes debt payments before it receives cash inflows, it bears the risk that borrowing costs will increase. Any differential in the timing of aggregate asset and liability cash flows is reflected in average durations.

DGAP analysis requires that a bank specify a performance target, such as EVE, and strategically manage the difference between the average duration of total assets and the average duration of total liabilities. Consider the balance sheet of Forest Bank (FB) in Exhibit 8.1. The bank just opened for business and all dollar amounts are market values. FB owns $1,000 worth of three assets: cash, a three-year final maturity commercial loan earning 12 percent, and a six-year Treasury bond earning 8 percent. It pays interest on one-year time deposits (TDs) at 5 percent and on three-year CDs at 7 percent. The economic value of equity represents the difference (residual figure) between asset and liability values and equals $80, or 8 percent of assets. The analysis assumes that there will be no defaults, prepayments, or early deposit withdrawals. All securities make equal annual interest payments with annual compounding. Macaulay's duration for each item is listed

EXHIBIT 8.1 **EVE Analysis: Forest Bank Balance Sheet**

Assets	Market Value	Rate	Duration	Liabilities and Equity	Market Value	Rate	Duration
Cash	$100			1-yr. time deposit	$620	5%	1.00 yr.
3-yr. commercial loan	700	12%	2.69 yrs.	3-yr. certificate of deposit	300	7%	2.81 yrs.
6-yr. Treasury bond	200	8	4.99	Total liabilities	920		1.59 yrs.
				Equity (EVE)	$80		
Total	$1,000		2.88 yrs.		$1,000		

Weighted avg. duration of assets (DA) = ($100/$700)(0) + ($700/$1,000)(2.69) + ($200/$1,000)(4.99) = 2.88 yrs.

Weighted avg. duration of liabilities (DL) = ($620/$920)(1.0) + ($300/$920)(2.81) = 1.59 yrs.

Expected economic net interest income = 0.12($700) + 0.08($200) – 0.05($620) – 0.07($300) = $48.00

DGAP = 2.88 – ($920/$1,000)(1.59) = 1.42 yrs.

Sample Duration Calculations Using Equation 8.1

$$\text{Commercial loan} = \frac{\dfrac{84}{(1.12)^1} + \dfrac{84(2)}{(1.12)^2} + \dfrac{784(3)}{(1.12)^3}}{\$700} = 0.107(1) + 0.096(2) + 0.797(3) = 2.69 \text{ years}$$

$$\text{Certificate of deposit} = \frac{\dfrac{21}{(1.07)^1} + \dfrac{21(2)}{(1.07)^2} + \dfrac{321(3)}{(1.07)^3}}{\$300} = 0.065(1) + 0.061(2) + 0.874(3) = 2.81 \text{ years}$$

beside the current market rate. The duration of cash is zero because cash doesn't change in value when interest rates change. Duration measures for the commercial loan, the three-year CD, and the weighted average total asset and liability durations are computed at the bottom of the exhibit. Initially, the average duration of assets equals 2.88 years and exceeds the 1.61 year average duration of liabilities by over one year. Expected net interest income, assuming no change in interest rates, is $48 per $1,000 of assets.[5]

Implications of DGAP > 0. The value of DGAP at 1.42 years indicates that the bank has a substantial mismatch in average durations of assets and liabilities. When interest rates change, the market values of assets and liabilities will change by different amounts, and future interest income will change relative to future interest expense. The fact that DGAP is positive where the average duration of assets exceeds the average duration of liabilities (adjusted for leverage) indicates that the market value of assets will change proportionately more than the market value of liabilities if all rates change by comparable amounts. For example, suppose that all interest rates increase by 1 percent immediately after FB contracts for its assets and liabilities. An adjusted balance sheet at market values appears in Exhibit 8.2. It shows that with the increase in rates, the market value of assets declines by $26, the market value of liabilities decreases by $14, and EVE falls by $12 to $68.

EXHIBIT 8.2 EVE Analysis: Forest Bank Balance Sheet after an Immediate 1 Percent Increase in All Interest Rates

Assets	Market Value	Rate	Duration	Liabilities and Equity	Market Value	Rate	Duration
Cash	$100			1-yr. time deposit	$614	6%	1.00 yr.
3-yr. commercial loan	683	13%	2.68 yrs.	3-yr. certificate of deposit	292	8	2.80
6-yr. Treasury bond	191	9	4.97	Total liabilities	$906		1.58 yrs.
Total	$974		2.86 yrs.	Equity (EVE)	$68		
					$974		

Duration of assets $= 0.702(2.68) + 0.196(4.97) = 2.86$ yrs.

Duration of liabilities $= 0.68(1) + 0.32(2.80) = 1.58$ yrs.

Expected economic net interest income = $45.81.

DGAP $= 2.86 - (\$906/\$974)(1.58) = 1.36$ yrs.

Change in market value of: assets = −$26

liabilities = −$14

equity = −$12

Sample Duration Calculations of Market Value Using Equation 8.2

Commercial loan: $\Delta P = (0.01/1.12)(-2.69)(\$700) = -\$16.8$

Certificate of deposit: $\Delta P = (0.01/1.07)(-2.81)(\$300) = -\$7.9$

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[5] This analysis uses economic income instead of accounting income. Economic interest is calculated as the product of the market value of each asset or liability and its market interest rate. Economic income varies directly with accounting income in these examples, although the relationship is not linear. Note that the use of Macaulay's duration ignores the impact of embedded options.

This result reflects the positive DGAP. The new value of each instrument can be approximated using Equation 8.2. The value of assets falls more than the value of liabilities because the weighted duration of assets (2.86 years) exceeds the weighted duration of liabilities (1.58 years) by a substantial amount. The ratio of EVE to the market value of assets declines from 8 percent to 7.1 percent. Expected net interest income similarly decreases because the bank will pay higher rates on liabilities relative to the higher yields it receives on reinvested cash inflows over the combined lifetime of the securities. Clearly, FB's operating position has worsened with the increase in rates.

A decrease in rates produces the opposite result. Because of the duration mismatch, the market value of assets will increase more than the market value of liabilities so that EVE will increase. Net interest income also rises, and the bank is better off. The general relationship between the sign of a bank's DGAP and the impact of changing rates on EVE is summarized below:

DGAP Summary

		Change in Economic (Market) Value				
DGAP	**Change in Interest Rates**	**Assets**		**Liabilities**		**Equity**
Positive	Increase	Decrease	>	Decrease	→	Decrease
Positive	Decrease	Increase	>	Increase	→	Increase
Negative	Increase	Decrease	<	Decrease	→	Increase
Negative	Decrease	Increase	<	Increase	→	Decrease
Zero	Increase	Decrease	=	Decrease	→	None
Zero	Decrease	Increase	=	Increase	→	None

The summary chart indicates that when DGAP > 0 a bank benefits when rates fall (EVE rises) and loses when rates rise (EVE falls). This result is similar for a bank with a negative GAP, although the performance targets differ. Longer duration assets generally will not be repriced as soon or as frequently as shorter duration liabilities. Hence, rising rates signal rising interest expense relative to interest income such that the decrease in EVE measures the present value of the expected decline in net interest income. Note also that when DGAP < 0, a bank benefits when rates rise (EVE rises) and loses when rates fall (EVE falls) such that this profile is similar to that of a bank with a positive GAP. In this case, rising rates improve performance because the shorter duration assets reprice higher sooner and more frequently than do the longer duration liabilities such that interest income rises relative to interest expense.

DGAP as a Measure of Risk. Bank management can use duration measures to evaluate interest rate risk. It is, however, a static measure. The greater is the absolute value of DGAP, the greater is interest rate risk. A bank that is perfectly hedged will have a DGAP of zero and thus operate with its average asset duration slightly below its average liability duration due to the leverage adjustment, MVL/MVA, which has a value between zero and one.

DGAP measures can be used to approximate the expected change in economic value of equity for a given change in interest rates. In particular, Equation 8.9 can be used to estimate the change in EVE.

Applying this to FB in Exhibit 8.1, the 1 percent increase in interest rates lowered EVE by approximately 1.27 percent of assets, or $12.70.[6]

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[6] As an approximation, it is acceptable to use the average yield on total assets as the market interest rate, y. In the case of the hypothetical bank of Exhibit 8.1, y equals 10 percent $[(700/1{,}000)0.12 + (200/1{,}000)0.08 = 0.10]$.

$$\begin{aligned}\Delta \text{EVE} &= -\text{DGAP}[\Delta y/(1+y)]\text{MVA}\\ \Delta \text{EVE} &= -1.42[0.01/1.10]\$1{,}000\\ &= -0.0127[\$1{,}000]\\ &= -\$12.70\end{aligned}$$

The actual decrease was $12. Note that a bank with DGAP equal to –1.42 years would benefit from rising rates by the same magnitude in this example (+$12.70). The farther DGAP is from zero, the greater is the potential impact on EVE and hence the greater the risk.

An Immunized Portfolio. Suppose that bank management wants to minimize interest rate risk evidenced by DGAP. To insulate, or immunize, EVE from rate changes, FB would need to either shorten its asset duration by 1.42 years, increase its liability duration by 1.54 years $(0.92 \times 1.54 = 1.42)$, or use some combination of these adjustments. For example, immunization as measured by obtaining a DGAP equal to zero, could be accomplished by reducing TDs to $340 and issuing $280 in new six-year zero coupon CDs (see Exhibit 8.3). With this profile, DGAP approximately equals zero and any immediate rate change leaves EVE unchanged. This is demonstrated in the bottom part of the exhibit, where all interest rates are assumed to increase by 1 percent. The market value of every price-sensitive account

EXHIBIT 8.3 Immunized Portfolio

Bank Balance Sheet: DGAP = 0

Assets	Market Value	Rate	Duration	Liabilities and Equity	Market Value	Rate	Duration
Cash	$100			1-yr. time deposit	$340	5%	1.00 yr.
3-yr. commercial loan	700	12%	2.69 yrs.	3-yr. certificate of deposit	300	7	2.81
6-yr. Treasury bond	200	8	4.99	6-yr. zero coupon CD*	280	8	6.00
			2.88 yrs.	Total liabilities	$920		3.11 yrs.
				Equity	$80		
Total	$1,000				$1,000		

DGAP = 2.88 – 0.92(3.11) ≅ 0

1% Increase in All Rates

Assets	Market Value	Rate	Duration	Liabilities and Equity	Market Value	Rate	Duration
Cash	$100			1-yr. time deposit	$337	6%	1.00 yr.
3-yr. commercial loan	683	13%	2.68 yrs.	3-yr. certificate of deposit	292	8	2.80
6-yr. Treasury bond	191	9	4.97	6-yr. certificate of deposit	265	9	6.00
			2.86 yrs.	Total liabilities	$894		3.07 yrs.
				Equity	$80		
Total	$974				$974		

*Par (maturity) value = $444.33

declines. EVE remains constant at \$80, because the \$26 decrease in market value of assets just equals the \$26 decrease in market value of liabilities. There are, of course, many other alternatives that adjust the size of DGAP to zero, but each would produce the desired hedge.

The implication is that strategies for managing interest rate risk using on-balance sheet tools should reflect the following general objectives:

Objective: Reduce Interest Rate Risk with DGAP > 0

- Shorten asset durations by
  - —buying short-term securities and selling long-term securities.
  - —making floating-rate loans and selling fixed-rate loans.
- Lengthen liability durations by
  - —issuing longer-term CDs.
  - —borrowing via longer-term FHLB advances.
  - —obtaining more core transactions accounts from stable sources.

Objective: Reduce Interest Rate Risk with DGAP < 0

- Lengthen asset durations by
  - —buying long-term securities and selling short-term securities.
  - —buying securities without call options.
  - —making fixed-rate loans and selling floating-rate loans.
- Shorten liability durations by
  - —issuing shorter-term CDs.
  - —borrowing via shorter-term FHLB advances.
  - —using short-term purchased liability funding from federal funds and repurchase agreements.

Banks may choose to target variables other than EVE in managing interest rate risk. Many banks, for example, are interested in stabilizing the book value of net interest income. This can be done for a one-year time horizon, with the appropriate DGAP measure shown below:[7]

$$\text{DGAP}^* = \text{MVRSA}(1 - \text{DRSA}) - \text{MVRSL}(1 - \text{DRSL}) \qquad \textbf{(8.10)}$$

where

MVRSA = cumulative market value of rate-sensitive assets (RSAs)
MVRSL = cumulative market value of rate-sensitive liabilities (RSLs)
DRSA = composite duration of RSAs for the given time horizon; equal to the sum of the products of each asset's duration with the relative share of its total asset market value

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[7] Toevs (1983) introduces this formula and discusses its implications in detail. Alternatives include targeting the market value of net interest income by setting the duration of a bank's equity equal to the length of the time horizon that the bank wishes to use in hedging net interest income. Duration of equity (DUR EQ) can be approximated as follows, where MV refers to market value:

$$\text{DUR EQ} = \frac{\text{MV of assets} \times \text{duration of assets} - \text{MV of liabilities} \times \text{duration of liabilities}}{\text{Economic value of equity}}$$

DRSL = composite duration of RSLs for the given time horizon; equal to the sum of the products of each liability's duration with the relative share of its total liability market value

If DGAP* is positive, the bank's net interest income will decrease when interest rates decrease, and increase when rates increase. If DGAP* is negative, the relationship is reversed. Only when DGAP* equals zero is interest rate risk eliminated. The important point is that banks can use duration analysis to stabilize a number of different variables reflecting bank performance.

Economic Value of Equity Sensitivity Analysis

Many bank managers use an EVE sensitivity analysis framework like that for earnings sensitivity to better assess interest rate risk. The framework extends the static DGAP analysis by making it dynamic. As with earnings sensitivity analysis, the procedure consists of conducting "what if" analysis of all the factors that affect EVE across a wide range of interest rate environments. The analysis repeats static DGAP analysis under different assumed interest rates. It is often labeled NPV or MVE analysis. Bank regulators generally require stress testing of a bank's risk exposures using some form of EVE analysis with rate changes as much as plus or minus 4 percent.

The basic output of this analysis is a comparison of changes in EVE across different interest rate environments. It signals how much EVE might change relative to some base case or most likely rate scenario. The steps in EVE analysis follow the steps in DGAP analysis beginning with an initial (base case) interest rate forecast. The final output compares EVE estimates across different interest rate environments beginning with the base case, then scenarios that alternatively raise and lower rates by 1 percent, 2 percent, etc., versus the base case. With low interest rates in recent years, it is not meaningful to model shocks where rates fall by more than 2 percent, but regulators encourage modeling rates rising as much as 4 percent.

An important component of this sensitivity analysis is the rate shock analysis that incorporates different projections of when embedded customer options will be exercised and what different values assets and liabilities might take. Management also varies assumptions about rate spreads and shifts or twists in the yield curve. The same embedded options that affect earnings sensitivity, such as loan prepayments, bonds being called and early deposit withdrawals, sharply influence the estimated volatility in EVE. The greater the potential volatility in EVE, the greater is the risk. More importantly, the greater the potential reduction in EVE, the greater is the risk.

Estimating the timing of cash flows and subsequent durations of assets and liabilities is complicated by the existence of these options. Generally,

1. Prepayments that exceed (fall short of) those expected will shorten (lengthen) duration.
2. A bond being called will shorten duration.
3. A deposit that is withdrawn early will shorten duration. A deposit that is not withdrawn as expected will lengthen duration.
4. An interest rate cap on a floating rate loan that becomes binding will generally lower duration by reducing the cash flows that are discounted at higher rates.
5. An interest rate floor on a floating rate loan that becomes binding will generally increase duration by increasing the cash flows (interest income) that are discounted at lower rates.

Unanticipated changes in interest rates typically cause durations to vary over time. The effective duration calculation supposedly accounts for some of this variation, and should be used in EVE analysis. Alternatively, an analyst may use an estimated price consistent with call price, expected prepayment impact, and so on, for each asset or liability with an embedded option.

EVE Sensitivity Analysis: An Example

Consider First Savings Bank (FSB) with the rate sensitivity report introduced in Exhibit 7.6 of Chapter 7. This bank had a portfolio of relatively long-term, fixed-rate mortgages and other loans financed largely by liabilities that exhibited greater rate sensitivity. Charts A and B of Exhibit 7.7 summarize the most likely rate environment and six alternative rate environments. Exhibit 8.4 provides a summary of the same balance sheet data in both book value and market value terms. The final two columns of data list the book yield and estimated duration under the most likely rate scenario. Under the most likely scenario, the market value of assets exceeds the book value by $1,963,000, and EVE equals $82,563,000, or $17,563,000 more than book value. Note that the average duration of assets equals 2.6 years, while the average duration of liabilities equals 2 years. For this discussion, ignore how the duration estimates for demand deposit accounts (DDAs) are obtained.[8]

Using these duration estimates and the market values listed, FSB's DGAP is 0.765 years [2.6 − (919,400/1,001,963)2.0]. In light of the previous DGAP discussion and assuming no change in duration when rates change, a 1 percent increase in rates would be expected to reduce FSB's economic value of equity by approximately $7.2 million (0.765)(0.01/1.0693)(1,001,963,000).

This estimate ignores the impact of interest rates on embedded options and the effective duration of assets and liabilities. It also ignores the impact of interest rate swaps that are noted at the bottom of the exhibit.[9] EVE sensitivity analysis incorporates these influences. Exhibit 8.5 presents a summary of the changes in EVE for six interest rate environments compared with the most likely (zero shock) rate scenario. Three of the scenarios are for higher rates (+100, +200, and +300 basis points), and three are for lower rates (−100, −200, and −300 basis points). The vertical axis lists the estimated change in EVE from the most likely case for each scenario. In contrast with earnings sensitivity analysis, which projected earnings one year forward and two years forward, there is only one comparative exhibit because duration analysis incorporates the present value of all cash flows.

Note that higher rates are associated with a decline in EVE, while lower rates are associated with an increase in EVE. This change is consistent with FSB having a positive DGAP in all rate environments attributable largely to FSB's huge portfolio of long-term, fixed-rate mortgages. If rates rise unexpectedly, market values will drop substantially. If rates fall sharply, prepayments will temper the potential gains in market value because borrowers will refinance such that the bank will replace high-rate loans with lower-rate ones. Thus, the benefit of selling the prepayment option to borrowers effectively places a cap on potential portfolio gains. According to Exhibit 8.5, FSB's EVE will change by $8.2 million, either up or down, if rates are 1 percent lower or higher

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[8] Remember that demand deposits do not pay interest. A crucial part of duration analysis involves determining the effective duration of these liabilities, which typically make up a substantial portion of most banks' liabilities. Most models incorporate assumed decay rates representing the amount and speed of deposit outflows across different rate environments.

[9] Chapter 9 describes the characteristics of interest rate swaps and how banks use swaps to hedge interest rate risk.

EXHIBIT 8.4 First Savings Bank's Economic Value of Stockholders Equity

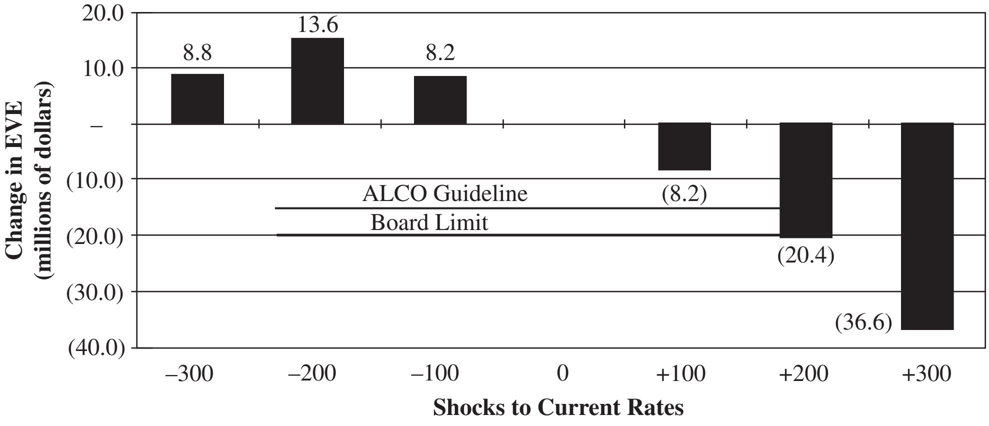
Market Value/Duration Report as of 12/31/2013
Most Likely Rate Scenario—Base Strategy

	Book Value	Market Value	Book Yield	Duration*	
Loans					
Prime based	$ 100,000	$ 102,000	9.00%	—	
Equity credit lines	25,000	25,500	8.75%	—	
Fixed rate > 1 yr.	170,000	170,850	7.50%	1.1	
Var.-rate mortgage 1 yr.	55,000	54,725	6.90%	0.5	
30-year fixed-rate mortgage	250,000	245,000	7.60%	6.0	
Consumer	100,000	100,500	8.00%	1.9	
Credit card	25,000	25,000	14.00%	1.0	
Total loans	725,000	723,575	8.03%	2.6	
Loan loss reserve	(15,000)	(11,250)	0.00%	8.0	
Net loans	710,000	712,325	8.03%	2.5	
Investments					
Eurodollars	80,000	80,000	5.50%	0.1	
CMOs fixed rate	35,000	34,825	6.25%	2.0	
U.S. Treasury	75,000	74,813	5.80%	1.8	
Total investments	190,000	189,638	5.76%	1.1	
Fed funds sold	25,000	25,000	5.25%	—	
Cash & due from banks	15,000	15,000	0.00%	6.5	
Noninterest-bearing assets	60,000	60,000	0.00%	8.0	
Total assets	1,000,000	1,001,963	6.93%	2.6	
Deposits					
MMDAs	240,000	232,800	2.25%	—	
Retail CDs	400,000	400,000	5.40%	1.1	
Savings	35,000	33,600	4.00%	1.9	
NOW	40,000	38,800	2.00%	1.9	
DDA Personal	55,000	52,250		8.0	
DDA Commercial	60,000	58,200		4.8	
Total deposits	830,000	815,650		1.6	
Treasury tax & loan	25,000	25,000	5.00%	—	
L-T notes fixed rate	50,000	50,250	8.00%	5.9	
Fed funds purchased	—	—	5.25%	—	
Noninterest-bearing liabilities	30,000	28,500		8.0	
Total liabilities	935,000	919,400		2.0	
Equity capital	65,000	82,563		9.9	
Total liabilities & equity	1,000,000	1,001,963		2.6	
Off-balance sheet					Notional
Interest rate swaps	—	1,250	6.00%	2.8	$ 50,000
Adjusted equity	65,000	83,813		7.9	

*Duration is reported in years.

Note: Values are in thousands of dollars.

EXHIBIT 8.5 **Sensitivity of Economic Value of Equity (EVE) versus Most Likely (Zero Shock) Interest Rate Scenario**



Note: *Sensitivity of economic value of equity* measures the change in the economic value of the corporation's equity under various changes in interest rates. Rate changes are instantaneous changes from current rates. The change in EVE is derived from the difference between changes in the market value of assets and changes in the market value of liabilities.

than the base case. By definition, duration measures the percentage change in market value for a given change in interest rates, hence a bank's *duration of equity* measures the *percentage* change in EVE that will occur with a 1 percent change in rates. Thus, FSB's duration of equity is 9.9 (\$8,200/\$82,563). The following Contemporary Issues box, "Interest Rate Risk at Freddie Mac and Fannie Mae," demonstrates how duration data are used. Note that both Fannie Mae and Freddie Mac were nationalized by the U.S. government in 2008.

EVE sensitivity analysis clearly provides a different type of information to FSB's management. In contrast to the earnings sensitivity results, the bank is exposed to substantive losses in EVE if rates increase sharply above that expected. This is further evidenced by the fact that FSB will see its EVE decline more than the asset and liability management committee guideline if rates increase 2 percent or more from the base case. The EVE decline will exceed the limit set by the bank's board of directors in a +3 percent rate environment. FSB's management must address these violations of policy.

Earnings Sensitivity Analysis versus EVE Sensitivity Analysis: Which Model Is Better?

Bankers use both static GAP and DGAP models, as well as earnings sensitivity and EVE sensitivity analysis, when assessing interest rate risk. Each has slightly different objectives and implications. GAP and earnings sensitivity analysis focus on the potential volatility of net interest income over distinct time intervals. Net interest income is calculated in book value terms, not market values. A bank manages the effects of volatile interest rates within each time period separately. By contrast, the DGAP and EVE sensitivity approaches focus on the potential variability of a bank's economic value of equity. DGAP is a single measure that summarizes the cumulative impact of interest rate changes on a bank's total portfolio. Thus, the bank continuously manages total firm rate risk according to this one number. Because the models have different objectives, they address different issues.

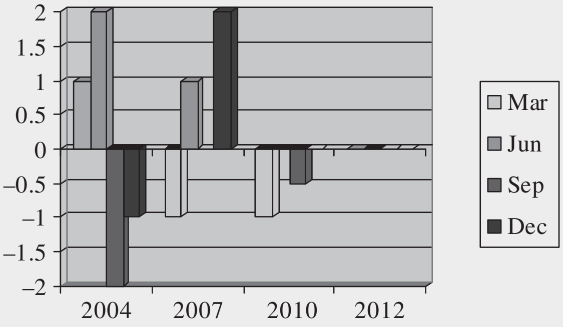
CONTEMPORARY ISSUES

Interest Rate Risk at Freddie Mac and Fannie Mae

For many years, the Federal National Mortgage Association (FNMA or Fannie Mae) and the Federal Home Loan Mortgage Corporation (FHLMC or Freddie Mac) were dominant government-sponsored enterprises (GSEs) that supported housing in the U.S. While they consistently reported large profits and were the darlings of both political parties in Washington, D.C., their performance was never quite what it seemed. Both entities assisted the housing market by buying mortgages and providing guarantees, and for years both claimed to hedge interest rate risk. Still, in 2004 Fannie Mae's auditors concluded that management had used unacceptable hedge accounting to smooth earnings over the prior years. In one instance, management had deferred expenses so that senior management could be paid incentive bonuses in a year when the bonus payments totaled more than $70 million for the top 21 managers. On September 6, 2008, Fannie and Freddie became causalities of the mortgage crisis as mounting losses in their mortgage assets proved too much for the companies to remain open without assistance. In an unprecedented move, Treasury Secretary Henry Paulson and James Lockhart, director of the Federal Housing Finance Agency, placed the two companies into conservatorship to be overseen and run by the Federal Housing Finance Agency. Today, they are awaiting their ultimate fate as Congress evaluates various proposals that address their futures.

Both Fannie and Freddie report effective duration gap data that provide information regarding aggregate interest rate risk. Fannie Mae's definition of effective duration gap is that the statistic measures the net sensitivity in months of the fair value of assets minus the fair value of liabilities to a change in interest rates. Thus, a positive figure represents greater asset sensitivity, while a negative figure represents greater liability sensitivity. A value of zero evidences no net sensitivity, with large positive or negative values indicating greater risk. In 2003, Fannie Mae's effective duration gap ranged from –5 months to 6 months, a wide swing that occurred over two months from May to July. The chart at the bottom indicates that Fannie Mae has sharply reduced its net exposure over time, especially after conservatorship. In 2012, Fannie Mae's reported effective duration gap was zero in every month, indicating a perfectly hedged portfolio.

Fannie Mae's Effective Duration Gap (in months)



Data Source: Fannie Mae Monthly Summary.

Strengths and Weaknesses: DGAP and EVE Sensitivity Analysis

The principal attraction of duration analysis is that it provides a comprehensive measure of interest rate risk for the total portfolio. The smaller the absolute value of DGAP, the less sensitive the MVE is to interest rate changes. Unlike GAP, DGAP recognizes the time value of each cash flow, avoiding the difficulty with time buckets. Cash flows that arise after one year are included in duration calculations, but often ignored in GAP calculations. Duration measures are also additive so the bank can match total assets with total liabilities rather than match individual accounts. Finally, duration analysis takes a longer-term viewpoint and provides managers with greater flexibility in adjusting rate sensitivity because they can use a wide range of instruments to balance value sensitivity.

Duration and EVE sensitivity analysis have weaknesses as well. First, it is difficult to compute duration accurately. Duration measurement requires numerous subjective assumptions. Data needs are complex, requiring information on each account's interest rate, repricing schedule, possibility of principal prepayment, call and put options, early withdrawal potential, and default probability. A bank must routinely assess the probability that contracted cash flows will be received on a timely basis, forecast the timing of base rate changes and the level of rates at the time of future cash flows, and constantly monitor whether actual cash flows conform to expectations. To be meaningful, DGAP and sensitivity analysis further require accurate forecasts of when embedded options will be exercised and what their value is. Of course, this is the same information necessary for conducting earnings sensitivity analysis.

Second, to be correct, duration analysis requires that each future cash flow be discounted by a distinct discount rate reflecting the expected future rate at the time the cash flow arises. Most analysts use forward rates from the Treasury spot yield curve for this purpose. To eliminate coupon bias, they first estimate a zero coupon-equivalent yield curve, then compute forward rates. It is well known, however, that these forward rates do not accurately predict future interest rates. Also, there is a real concern that the Fed's quantitative easing efforts systematically bias forward rates obtained from the Treasury yield curve. Finally, the complexity of calculating duration increases more when nonparallel shifts in the yield curve are considered.

Third, a bank must continuously monitor and adjust the duration of its portfolio. As Macaulay's duration measure indicates, duration changes with changes in interest rates. Thus, a bank should recalculate duration and EVE sensitivity and potentially restructure its balance sheet whenever rates change substantially, which could be daily or weekly. As discussed in Chapter 6, the duration calculation is only accurate for small changes in interest rates. Furthermore, even when rates are constant, duration changes with the passage of time as the time factor decreases over time. The duration of assets and liabilities may "drift" at different rates and require constant rebalancing. These problems are compounded by difficulties in estimating price effects and effective durations when there are embedded options.

Finally, it is difficult to estimate the duration on assets and liabilities that do not earn or pay interest. To get an accurate assessment of cash flows and market value changes, a bank must estimate the true rate sensitivity of demand deposits and estimate their duration. While most interest rate risk models attempt to estimate durations, there is little agreement as to how this should be done.[10] As noted in Exhibit 8.4, the management of FSB estimated the duration of personal DDAs at 8 years and the duration of commercial DDAs at 4.8 years. The difference presumably reflects the greater propensity of businesses to move DDAs in rising-rate environments. Still, what are the estimated cash flows when DDAs have no stated fixed maturity or periodic cash payments? Many models attempt to estimate a core amount of DDAs that remain on deposit and classify these funds as having a long duration. Other, noncore DDAs are more volatile and have a shorter duration. Market participants routinely estimate decay rates and beta coefficients that attempt to measure the speed at which non-maturity deposits run-off (decay rate) and the effect of a change in market rates on the rate a bank pays on an individual deposit or savings account. In the latter case, a beta of 0.4 indicates that a 1 percent increase in some benchmark rate will lead a bank to pay 40 basis points (0.40%) more to a depositor. The key point is that these are imprecise estimates. Given the size of most

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[10] Blaxal, Glueck, and Velligan (2008) demonstrate the importance of core deposits in the valuing of community banks and present a framework for estimating the effective duration of core deposits. Jean Dermine (2009) similarly analyzes how the duration of non-maturing deposits affects bank valuation. Such estimation requires an understanding of the relationships between rates paid on deposits, market rates, and run-off or decay rates at which depositors move balances.

banks' DDA balances, any misestimate, in turn, can produce wide swings in a bank's DGAP value and wide variations in EVE sensitivity.

In summary, duration measures are highly subjective. Active management requires constant tinkering with the bank portfolio to adjust the DGAP. For many firms with simple balance sheets without significant amounts of customer options that are commonly exercised, the costs may exceed the benefits.

A Critique of Strategies for Managing Earnings and Economic Value of Equity Sensitivity

The business of banking involves taking risks. Most bankers feel comfortable making loans to individuals and businesses because they spend a considerable amount of time nurturing customer relationships, analyzing the firm's financial statements and the individual's financial condition, and monitoring loans after they have been granted. In general, bankers are less comfortable investing in bonds and taking interest rate risk. This may reflect a lack of familiarity with the relationship between the different sources of risk or a belief that the returns have not historically warranted the risks taken. Because most banks depend on net interest margin to generate earnings growth, it is imperative that managers develop strategies for maintaining or growing their net interest income over time and for maintaining and growing the market value of stockholders equity. The following discussion emphasizes the risks assumed in managing GAP, DGAP, and the sensitivity of net interest income and EVE. The implication for managers is, "know your bets."

GAP and DGAP Management Strategies: What Are Your Bets?

Chapter 7 introduced a variety of objectives and strategic approaches for managing a bank's GAP and earnings sensitivity. The discussion was incomplete because it did not address how to apply the approaches to changing asset and liability sensitivity and did not identify the risk and return trade-offs of different strategies. Generally, it is widely accepted that banks do and should assume some interest rate risk. The issue is to determine how much risk is acceptable and how to best achieve the desired risk profile.

Unfortunately, it is difficult to actively vary GAP or DGAP and consistently win. First, interest rate forecasts are frequently wrong. To change an asset or liability's rate or price sensitivity accurately and increase earnings and EVE, management must predict future interest rates better than consensus market forecasts embedded in current rates, and act accordingly. Second, even when management predicts rate changes correctly, banks have limited flexibility in varying GAP and DGAP and must often sacrifice yield to do so. Managers may achieve the targeted risk profile, but at the expense of lowering near-term profitability. Loan customers and depositors select terms from a range of alternatives provided by a bank such that banks have only partial control over pricing and maturities. To entice a customer to select the bank's preferred alternative, management must often offer favorable yields or prices as an inducement. This has a cost because profits are below what they otherwise would be without the inducement.

These difficulties can be demonstrated by an example. Suppose a bank is liability sensitive and operates with a negative GAP through one year and a positive DGAP. Management believes that interest rates will rise and decides to hedge by taking steps that move the GAP closer to zero through one year. At this time, the yield curve is upward sloping because the consensus forecast is that interest rates will increase over time. Active GAP management strategies typically focus on increasing RSAs and lowering RSLs. If a stable EVE is desired, DGAP strategies would emphasize shortening average asset durations and lengthening average liability durations.

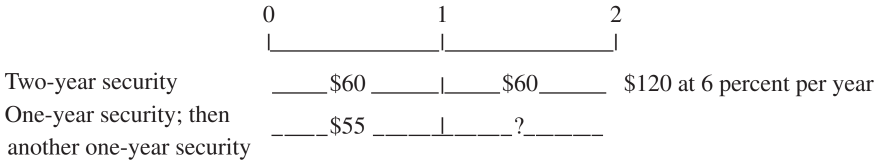
Consider the effect of the following strategies: the bank (1) shortens the maturities of its bond portfolio, and (2) reprices its CDs to attract long-term deposits relative to short-term deposits. With an upward sloping yield curve, long-term interest rates exceed short-term interest rates. The bank will accept a lower yield initially when it buys short-term securities rather than longer-term securities, and can only attract long-term deposits by paying a premium rate over short-term deposit rates. The first strategy lowers interest income near-term, while the second increases interest expense. Both tend to reduce a bank's initial net interest margin, which is a cost of hedging.

More importantly, management should know the explicit bets that it has made regarding future interest rates by implementing these strategies. Specifically, the bank gains in terms of an increase in net interest income and EVE only when interest rates move and remain above current forward rates. The investment in short-term rather than long-term securities is advantageous only if interest rates rise above forward rates; that is, only if rates increase above the "break-even" yield contained in the yield curve. Long-term deposits are better than short-term deposits only in the same instance when market rates ultimately rise above forward rates. The bank loses if rates remain below forward rates, because it would earn less interest income on the short-term securities versus long-term securities and could have borrowed at lower cost by issuing a series of short-term deposits rather than a long-term deposit. By adjusting GAP or DGAP, management is speculating that its interest rate forecast is better than the consensus forecast.

Interest Risk Management: An Example

Consider the case where a liability-sensitive bank loses when rates rise, and management decides to reduce risk by marketing two-year TDs paying 6 percent to retail customers rather than one-year TDs paying 5.5 percent. As described in Chapter 6, these two spot rates embody a one-year forward rate, one year from the present. The following time line and analysis indicate that this forward rate equals 6.5 percent—ignoring compounding and assuming annual interest payments. This represents the deposit holder's break-even rate when comparing the two alternatives.

Cash flows from investing $1,000 either in a two-year security yielding 6 percent or two consecutive one-year securities, with the current one-year yield equal to 5.5 percent.


0
1
2
Two-year security
$60
$60
$120 at 6 percent per year
One-year security; then another one-year security
$55
?

Of course, it is not known today what a one-year security will yield in one year. Investment in the two-year security earns $120 in interest income. For the two consecutive one-year securities to generate the same $120 in interest, ignoring compounding, the one-year security must yield 6.5 percent one year from the present. This break-even rate is a one-year forward rate, one year from the present

$$6\% + 6\% = 5.5\% + ?$$

where the forward rate (?) equals 6.5 percent.

The depositor is effectively speculating on future interest rates unless he or she has another position that this transaction offsets. Ignoring that, a depositor who acquires a one-year TD today rather than the two-year deposit is positioned to benefit relatively if a one-year rate exceeds 6.5 percent one year from today. The depositor will lose by giving up potential income if the one-year rate is anything less than 6.5 percent. By contrast, a depositor who buys the two-year TD will benefit (lose) if the one-year rate, one year from the present, is anything below (above) 6.5 percent. By choosing one or the other, the depositor has "placed a bet" that the actual rate in one year will differ from the forward rate of 6.5 percent.

Importantly, a bank that markets the two-year deposit has placed a similar bet. Specifically, the bank will benefit as a borrower by lowering its borrowing cost only if the one-year rate exceeds 6.5 percent in one year. If this occurs, the bank will have locked in a customer with a below-market rate (6 percent versus an average of more than 6 percent). Of course, the depositor will lose, which may create a different set of problems. The implication is that even though management tries to reduce risk by reducing the bank's liability sensitivity, it could see its interest expense rise and NIM fall over time because of the bet against the forward rate.

The second cost follows in similar fashion. Suppose, for example, that a retail bank desires to increase RSAs because it expects interest rates to increase. While the bank plans to make only variable-rate or floating-rate loans, its customers seek fixed-rate loans because they also expect rates to rise. The bank must offer a substantial inducement, such as a significantly lower initial floating interest rate, to increase asset sensitivity and position itself for earnings growth in a rising-rate environment. This would lower the interest spread and offset part of the benefit from increasing the GAP. If the bank refused to make fixed-rate loans, it would not be competitive and might lose both the customer and considerable goodwill. When adjusting asset and liability maturities and durations and making pricing decisions, a bank may have to make yield concessions or assume additional interest rate risk. Active strategies to adjust earnings or EVE in light of rate forecasts may thus be highly speculative.

Yield Curve Strategies

Many portfolio managers are aware of general macroeconomic and business-cycle impacts on the U.S. Treasury yield curve and try to take advantage of long-term trends in rates. Exhibit 8.6 characterizes movements in the level of rates over time and shifts in the shape of the yield curve. Typically, analysts view business-cycle effects in terms of how the 10-year (long-term) Treasury yield varies relative to the 1-year (short-term) Treasury yield.[11] Starting at the left of the diagram, the yield curve is inverted (1-year rate above the 10-year rate) during the latter stages of an expansionary period and during the peak of economic activity. Both of these periods are characterized by strong consumer spending, strong and growing consumer and business loan demand, and limited liquidity at banks because the Federal Reserve has slowed money growth out of fear that inflation expectations will get out of control. The peak is followed by a contractionary period as consumer and business spending decline along with loan demand. At some point, the Federal Reserve gets concerned that growth has slowed too much and starts to increase liquidity by expanding reserves and the money supply. This was essentially the intent behind the Federal Reserve's traditional monetary policy actions during the financial crisis to keep short-term interest rates low. It also led to unconventional policy known as Quantitative Easing (QE).[12] QE involves the Federal Reserve buying large amounts of longer-term Treasury securities and

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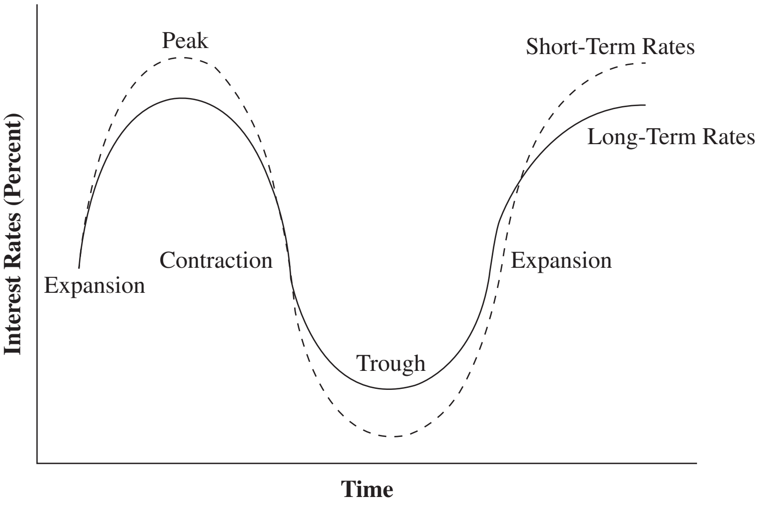
[11] In February 2001 the Treasury stopped issuing one-year T-bills, so the comparison will involve a different short-term rate, perhaps the six-month T-bill rate.

[12] The Federal Reserve implemented QE as part of its monetary policy to stimulate the economy. In 2013, specific actions consisted of buying as much as $85 billion monthly of Treasury securities and mortgage-backed securities to keep long-term interest rates low and thereby stimulate the demand for credit. In 2014, the Fed started 'tapering' by reducing its purchases under QE by $10 billion per month.

EXHIBIT 8.6 **Interest Rates over the Business Cycle with Constant Inflation Expectations**



The inverted yield curve has predicted the last five recessions

DATE WHEN 1-YEAR RATE FIRST EXCEEDS 10-YEAR RATE	LENGTH OF TIME UNTIL START OF NEXT RECESSION
Apr. ’68	20 months (Dec. ’69)
Mar. ’73	8 months (Nov. ’73)
Sept. ’78	16 months (Jan. ’80)
Sept. ’80	10 months (July ’81)
Feb. ’89	17 months (July ’90)
Dec. ’00	15 months (March ’01)
Jun. ’06	23 months (Dec. ’07)

Expansion: Increasing consumer spending, inventory accumulation, rising loan demand, Federal Reserve begins to slow money growth.

Peak: Monetary restraint, high loan demand, little liquidity.

Contraction: Falling consumer spending, inventory contraction, falling loan demand, Federal Reserve accelerates money growth.

Trough: Monetary ease, limited loan demand, excess liquidity.

Source: Federal Reserve.

mortgage-backed securities. These purchases were labeled QE1, QE2 … QEinfinity as the Federal Reserve through 2013 indicated that it would continue its purchases for an unspecified length of time. At the trough, or recession, the Federal Reserve is providing ample liquidity to banks, but loan demand is low due to high unemployment and slow spending. Eventually, low interest rates stimulate retail spending and business investment, and the economy starts to grow again.

Many analysts believe that this pattern repeats itself over time. If so, it has interesting implications for interest rate risk management. For example, when the U.S. economy hits its peak, the yield curve inverts. After the yield curve inversion, the economy falls into recession. Note the data at the bottom-right corner of the exhibit. This documents recent times that the 1-year Treasury rate has exceeded the 10-year Treasury rate and the length of time until the U.S. economy was in recession. In every instance a recession followed the yield curve inversion. Since World War II, only twice has the yield curve inverted and a recession not followed. This occurred in 1965 during the Vietnam War and in 1999 when the U.S. Treasury instituted a program to buy back outstanding long-term Treasury bonds. The average lag since 1968 is just over 14 months. The implication is that when the yield curve inverts, a recession will follow in a fairly short period of time. The initial phase of the 2008 recession was unusual in that the yield curve was very flat, or slightly inverted, for a longer period of time prior to the beginning of the recession than it had been prior to the earlier recessions. NBER determined that the recession began in December 2007 such that it had been 12 months in duration by December 2008 with no end in sight.

Portfolio managers who want to take advantage of this trend will do the following when the yield curve inverts:

1. Buy long-term noncallable securities.
2. Make fixed-rate noncallable loans.

3. Price deposits on a floating-rate basis.
4. Follow strategies to become more liability sensitive and/or lengthen the duration of assets versus the duration of liabilities.

Note that during the deepest part of the recession, the yield curve is typically at its steepest. Portfolio managers often attempt to do the opposite of that summarized above by buying short-term securities at the peak because they want yield, and short-term instruments carry higher rates. Of course, this analysis is very simplistic. Interest rates do not follow the straightforward pattern of Exhibit 8.6. Interest rates alternatively rise and fall even within general rate moves upward and downward. Managers, in turn, have internal pressures to meet loan demand at the peak, after which asset quality will deteriorate, and find higher yields at the trough, which can largely be attained by taking added credit risk or interest rate risk (buying long-term, fixed-rate assets). Still, managers should be aware of these general trends and the impact on forward rates.

Summary

A bank's ALCO or risk committee is responsible for monitoring the bank's risk and return profile. Traditional asset and liability management focuses on measuring interest rate risk, managing risk by setting policies and pursuing specific strategies to stabilize or increase net interest income, and then monitoring performance. This chapter introduces a DGAP model and economic value of equity sensitivity analysis to analyze interest rate risk. DGAP analysis considers a bank's entire balance sheet and calculates measures of the weighted average durations of all assets and all liabilities. The difference in these weighted durations adjusted for financial leverage is labeled *duration gap*, which provides a measure of how the market value of stockholders equity will change when interest rates change. With DGAP analysis, the target measure of performance is typically the economic value of bank equity. Risk is measured by the sign and size of DGAP and the potential variation in economic value of equity across different interest rate scenarios. As with earnings sensitivity analysis, a bank's ALCO conducts sensitivity analysis across different assumed interest rate environments to assess this potential variation in economic value of stockholders equity. Greater risk is evidenced by greater potential variation and the size of the potential loss in value.

Duration measures have their limitations, including the fact that the effective price sensitivity and duration of individual assets and liabilities change with changes in interest rates. It is also difficult to accurately forecast rate changes and the price impact because of customer options embedded in bank assets and liabilities. Still, duration-based sensitivity analysis represents a useful alternative to GAP and earnings sensitivity analysis because it focuses on the present value of all cash flows over the entire range of maturities.

The chapter also examines the specific assumptions managers make when they try to actively manage a bank's interest rate risk exposure. By pursuing strategies for changing asset or liability rate sensitivities or durations in line with rate forecasts, managers are explicitly speculating that forward rates implied by current interest rates will not be realized in the future. Whether the bank gains or loses is determined by whether actual rates vary favorably relative to forward rates.

Questions

1. List the basic steps in DGAP analysis. What is the importance of different interest rate forecasts?

2. Which has a longer Macaulay's duration: a \$1 million face value zero coupon bond with a two-year maturity and a yield of 6 percent, or a \$1 million face value coupon bond with a two-year maturity that pays 6 percent coupon interest? Explain your reasoning.
3. You own a corporate bond that carries a 5.8 percent coupon rate and pays \$10,000 at maturity in exactly two years. The current market yield on the bond is 6.1 percent. Coupon interest is paid semiannually and the market price is \$9,944.32.
    a. Calculate the bond's Macaulay's duration and modified duration.
    b. If the market rate falls by 1 percent, what is the estimated impact on the bond's price?
4. Assume that you own a \$1 million par value corporate bond that pays 7 percent in coupon interest (3.5 percent semiannually), has four years remaining to maturity, and is immediately callable at par. Its current market yield is 7 percent and it is priced at par. If rates on comparable securities fall by more than 40 basis points (0.2 percent semiannually), the bond will be called.
    a. Calculate the bond's price if the market rate increases by 50 basis points (0.25 percent semiannually) using the present value formula from Chapter 6.
    b. Calculate the bond's effective duration assuming a 50 basis-point increase or decrease in market rates.
5. A 5-year zero coupon bond and a 15-year zero coupon bond both carry a price of \$7,500 and a market rate of 8 percent. Assuming that the market rates on both bonds fall to 7 percent, calculate the percentage change in each bond's price using Equation 8.2.
6. Use DGAP analysis to determine if there is interest rate risk in the following transaction: A bank obtains \$25,000 in funds from a customer who makes a deposit with a five-year maturity that pays 5 percent annual interest compounded daily. All interest and principal are paid at the end of five years. Simultaneously, the bank makes a \$25,000 loan to an individual to buy a car. The loan is at a fixed rate of 12 percent annual interest but is fully-amortized with 60 monthly payments, such that the borrower pays the same dollar amount (principal plus interest) each month.
7. Compare the strengths and weaknesses of GAP and earnings sensitivity analysis with DGAP and EVE sensitivity analysis.
8. Is the following statement generally true or false? Provide your reasoning.
    "A bank with a negative GAP through three years will have a positive DGAP."
9. Conduct DGAP analysis using the following information:

Assets	**Amount**	**Rate**	**Macaulay's Duration**
Cash	\$23,000	0%	0
Bonds	\$102,000	7.2%	1.8 years
Commercial loans	\$375,000	11.0%	1.5 years
Liabilities & Equity			
Small time deposits	\$130,000	3.6%	4.0 years
Large CDs	\$70,000	6.3%	1.0 year
Transactions accounts	\$250,000	2.8%	3.3 years
Equity	\$50,000		

   a. Calculate the bank's DGAP if the ALCO targets the economic value of stockholders equity. Is this bank positioned to gain or lose if interest rates rise?
   b. Estimate the change in economic value of equity if all market interest rates fall by an average of 1.5 percent. Compare the results of applying Equation 8.2 to each balance sheet item—adding up the total change in assets less the total change in liabilities to get the change in equity—versus using Equation 8.9 to find the estimated change in EVE.
   c. Provide a specific transaction that the bank could implement to immunize its interest rate risk. The transaction may be a new asset funded by a new liability or an asset sale and the simultaneous purchase of another asset.

10. Suppose that your bank currently operates with a DGAP of 2.2 years. Which of the following will serve to reduce the bank's interest rate risk?
    a. Issue a one-year zero coupon CD to a customer and use the proceeds to buy a three-year zero coupon Treasury bond.
    b. Sell \$5 million in one-year bullet (single payment) loans and buy three-month Treasury bills.
    c. Obtain two-year funding from the Federal Home Loan Bank and lend the proceeds overnight in the federal funds market.
11. ALCO members are considering the following EVE sensitivity estimates. The figures refer to the percentage change in economic value of equity compared with the base rate forecast scenario. What does the information say about the bank's overall interest rate risk? Discuss the role and impact of embedded options.

	Rate Change from Base Case					
	–3	–2%	–1%	+1%	+2%	+3%
% change in EVE	–38%	–47%	–19%	+5%	+14%	+18%

12. Discuss what impact each of the following will have, in general, on EVE sensitivity to a change in interest rates. Consider two cases where rates rise sharply and fall sharply.
    a. Bank owns a high percentage of assets in bonds that are callable anytime after three months.
    b. Bank pays below-market rates on TDs, and market interest rates move sharply higher.
    c. A large percentage of the bank's assets are in 30-year fixed-rate mortgages.

Activity

Review the most recent annual reports of the largest banks throughout the world. Collect information on their summary analysis of interest rate risk. Interpret whatever data are provided for earnings-at-risk and MVE at risk. Note that in some instances EVE sensitivity is labeled as value-at-risk for the bank's equity.

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9 Using Derivatives to Manage Interest Rate Risk

Prior to the recent financial crisis, many bankers, regulators, and analysts viewed the creation of derivatives and their use by financial institutions as one of the great financial innovations in recent times. In 2003, Alan Greenspan, then Federal Reserve Chairman, said "What we have found over the years in the marketplace is that derivatives have been an extraordinarily useful vehicle to transfer risk from those who shouldn't be taking it to those who are willing to and are capable of doing so."[1] When derivatives were criticized by Congress and the media, Greenspan often publicly defended them. Market participants now generally agree that derivatives played a central role in the financial crisis. Different parties used them to speculate wildly, while bank regulators generally overlooked the risks inherent in many institutions' abusive practices.

The term **derivative** in financial markets refers to any instrument or contract that derives its value from another underlying asset, instrument, or contract. The most common interest rate derivatives are interest rate swaps, caps, floors, and financial futures, particularly those that are based on the London Interbank Offer Rate (Libor). Large banks are also dominant participants in the market for credit default swaps (CDSs), which institutions use to manage credit risk. Due to the role of CDSs and other derivatives during the financial crisis—especially the problems embodied in AIG's behavior—the Dodd–Frank Act of 2010 requires the SEC and the Commodity Futures Trading Commission (CFTC) to write new rules regarding how derivatives are traded. The initial proposals emphasized using central clearinghouses rather than having the bulk of trades be over the counter and having derivatives transactions that are not hedges conducted outside of insured banks. The first proposal would provide greater price transparency and give better information to participants and regulators about actual transaction terms. The second would ensure that speculative derivatives trades not be funded with insured deposits. It is important to note that when derivatives are used prudently, they represent a cost-effective means to manage risk.

This chapter describes the characteristics of off-balance sheet derivatives, such as financial futures, forward rate agreements (FRAs), basic interest rate swaps and CDSs. It demonstrates how market participants use these instruments in a meaningful way to hedge other positions that expose them to risk. In many cases, a bank can replicate on-balance sheet transactions entirely with off-balance sheet contracts so derivatives

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[1] Remarks to the Senate Banking Committee, 2003.

can serve as substitute positions. However, the chapter also demonstrates how participants can use derivatives to speculate on anticipated price moves thereby increasing the user's risk. For example, imagine a situation where your bank makes only floating-rate loans. One of your best business customers approaches you and wants to borrow, but only on a fixed-rate basis. Do you try to change the customer's mind, somehow convincing the firm to borrow at the prevailing prime rate plus a spread? Or can you make a fixed-rate loan and effectively convert it to a floating-rate loan? If you do the latter, everyone benefits: the customer gets fixed-rate financing and the bank gets a floating-rate loan. Derivatives may help you achieve this result.

Banking professionals constantly search for new products and opportunities to improve bank operating performance. Financial futures, FRAs, interest rate swaps, and interest rate caps and floors are four types of derivatives that commercial banks actively use to help manage interest rate risk. Institutions use these contracts primarily to hedge asset yields or the interest cost of liabilities, adjust maturities, protect the value of assets from changing rates, and adjust the overall sensitivity of earnings or economic value of stockholders equity.

Characteristics of Financial Futures

Financial futures contracts represent a commitment between two parties—a buyer and a seller—on the price and quantity of a standardized financial asset or index. There is a fixed point in time when the commitment is terminated and the contracts expire. The contracts are transferable because they are traded on organized exchanges called **futures markets**, and all contracts are subject to a daily settlement procedure. Buyers of futures contracts, referred to as *long* futures, agree to pay the underlying futures price, while sellers of futures contracts, referred to as *short* futures, agree to receive the futures price or deliver the underlying asset as stipulated in the contract. Buyers and sellers can eliminate their commitments by taking the opposite position prior to contract expiration by selling and buying the same futures contract, or by making or taking delivery of the underlying asset at expiration.

Because futures prices fluctuate daily, buyers and sellers find that their initial position changes in value daily. When futures prices increase, buyers gain at the expense of sellers, while sellers gain at the expense of buyers when futures prices fall. At the end of each day, participants must pay any decrease in value or, alternatively, they receive any increase in value as part of the daily settlement procedure. When the contract expires, they pay or receive the final change in value (cash settlement) or exchange the actual underlying asset (physical delivery) for cash at the initial negotiated price. The process essentially fixes the underlying instrument's price at the time of the trade for the future date designated by the contract. The underlying financial asset may be a short-term money market instrument, a long-term bond, units of a foreign currency, precious metals, or even common stock indexes. When the underlying asset is an interest-bearing security, the contracts are labeled **interest rate futures**. Futures contracts are traded daily prior to the formal expiration/delivery date, with the price changing as market conditions dictate. These unique features stand out when compared with cash market transactions and forward contracts.

Cash market or **spot market** transactions represent the exchange of any asset between two parties who agree on the asset's characteristics and price, where the buyer tenders payment and takes possession of the asset when the price is set. Most transactions take this form. A **forward contract** involves two parties agreeing on an asset's characteristics, quantity, and price, but defers the actual exchange until a specified future date. Forward contracts do not necessarily involve standardized assets. Both parties to the transaction must simply agree on the asset's quality and price. Because the underlying asset is not standardized, the parties deal directly with each other and there is little opportunity to walk away from the commitment prior to delivery. Finally, once the terms of a forward contract are set, the parties do not make any payments or deliveries until the specified forward transactions date. However, forward contracts often require collateral or a letter of credit to guarantee performance.

A Brief Example

Suppose that you want to invest $1 million in 10-year Treasury bonds in six months and have a strong belief that rates will fall from now until the investment date. You would like to "lock in" the 3 percent, 10-year yield prevailing today. If such a contract existed, you would buy a futures contract on 10-year Treasury bonds with an expiration date just after the six-month period. Assume that such a contract is priced at a 3.25 percent rate.[2] If 10-year Treasury rates actually fall sharply during the next six months, the futures rate will similarly fall such that the futures price rises. An increase in the futures price, in turn, generates a profit on the futures trade. Prior to investing the $1 million, you will sell the futures contract to exit the trade. At this time, your effective yield will be determined by the prevailing 10-year Treasury rate and the gain (or loss) on the futures trade. In the above situation, the opportunity loss from a drop in the10-year rate below 3 percent will be offset at least partially by a profit on the long futures position. The following chart demonstrates the general strategy and nature of the trade outcome.

	Today	Six months later: exit futures contract
10-yr Treasury rate	3.0%	2.70%
10-year Treasury futures rate	3.25%	2.68%
Opportunity loss on the cash Treasury		**Buy@2.70%,** not 3.0% = 0.30%
Gain on the futures contract	**Buy@3.25%**	**Sell@2.68%** Gain = 0.57%
Effective yield on the investment		2.70% + 0.57% = 3.27%

In this example, the 10-year Treasury rate falls by 0.30 percent, which represents an opportunity loss. However, buying a futures contract generates a 0.57 percent profit. The buyer of the futures contract would see a gain in the position whenever the futures rate falls below 3.25 percent. The seller of this contract would experience a loss. The effective yield on the investment equals the prevailing 2.7 percent rate at the time of investment plus the 0.57 percent futures profit, or 3.27 percent.

Types of Futures Traders

Futures contracts are traded on exchanges, the most prominent of which in the United States are the Chicago Board of Trade (CBT) and the Chicago Mercantile Exchange (CME). The CFTC is the primary regulator of financial futures and option markets. Many of the contracts traded on U.S. exchanges are also traded outside the United States, such that participants have the opportunity to trade 24 hours a day. Continuous

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[2] Reasons why the 3.25 percent futures rate differs from the current 3 percent rate are discussed later in the chapter.

trading is important, given that many trades are implemented to reduce risk, and participants need immediate access to hedge instruments.

Futures traders are generally classified by the strategies they pursue. At one extreme is the **speculator**, who takes a position with the objective of making a profit. Speculators try to anticipate the direction that prices will move and time their trades to sell at higher prices than the purchase price. They are often distinguished by the length of time they hold their positions. A **scalper** tries to time price movements over very short time intervals and takes positions that remain outstanding for just minutes. A **day trader** similarly tries to profit from short-term price movements during trading hours in any day, but offsets the initial position before market closing so that no position remains outstanding overnight. Finally, a **position trader** is a speculator who holds a position for a longer period in anticipation of a more significant, longer-term market move.

At the other extreme is the hedger. A **hedger** has an existing or anticipated position in the cash market and trades futures contracts (or some other contract) to reduce the risk associated with uncertain changes in value of the cash position. The cash position might involve owning or buying an asset, might involve borrowing by issuing an interest-bearing liability, or might be a bank's overall earnings and EVE sensitivity profile. With hedging, the trader takes a position in the futures market whose value varies in the opposite direction as the value of the cash market position. Aggregate risk is reduced because gains or losses on the futures position at least partially offset gains or losses on the cash position. The essential difference between a speculator and a hedger is the objective of the trader. A speculator wants to profit on trades while a hedger wants to reduce risk.

Traders may also be classified as **spreaders** or **arbitrageurs**. Both spreaders and arbitrageurs are speculators who take relatively low-risk positions. For example, a **futures spreader** may simultaneously buy a futures contract and sell a related futures contract, trying to profit on anticipated movements in the price difference between the contracts. The position is generally lower risk because the prices of both contracts typically move in the same direction. Losses on one contract are thus at least partially offset by gains on the other. An arbitrageur tries to profit by identifying the same asset that is being traded at two different prices in different markets at the same time. The arbitrageur buys the asset at the lower price and simultaneously sells it at the higher price, profiting on the difference. **Arbitrage** transactions are thus lower risk and serve to bring prices back in line, in the sense that the same asset should trade at the same price in all markets.

The Mechanics of Futures Trading

Futures contracts are traded on formal, organized exchanges that serve as clearinghouses. Each party to a futures transaction effectively trades with exchange members who, in turn, guarantee the performance of all participants. In practice, a buyer and seller are found for each transaction, but the exchange assumes all obligations at the end of each trading day, forcing members to settle their net positions. This procedure enables any trader to offset an initial position by taking the opposite position any time prior to the futures contract's delivery date. For example, a buyer of a Eurodollar futures contract with delivery in 60 days can offset the position by selling the same contract one week later when 53 days remain to delivery. This liquidity is not found with forward contracts. It results from trading standardized assets through an exchange, where each party does not have to renegotiate with the same party who initiated the contract.

Futures contracts entail cash-flow obligations for buyers and sellers during the entire time the position is outstanding. At initiation of a futures position, traders must post a cash deposit or U.S. government securities as **initial margin** with the exchange member simply for initiating a transaction. In most cases, the amount is small, involving less than 5 percent of the underlying asset's value. Initial margin represents a good faith deposit that serves to cover losses if prices move against the trader. Exchange members also require traders to meet **maintenance margin** requirements that specify the minimum deposit allowable at the end of each day. Unlike margin accounts for stocks, futures margin deposits represent a form of performance bond by which a trader guarantees that mandatory payment obligations will be met. When the margin deposit falls below this minimum, the customer must deposit more funds or the exchange member can close out the account.

Because futures prices vary prior to expiration of the contract, each trader must either increase the cash deposit or can withdraw any excess deposit, depending on whether prices move unfavorably or favorably. Consider the previous example with 10-year Treasuries. A trader who buys a futures contract in an effort to lock in a yield, agrees to pay the negotiated price at delivery.[3] If the futures price increases (as the futures rate falls) in the interim, the market value of the initial position also rises and the buyer can withdraw this increase in contract value. If, instead, the futures price falls (futures rate increases), the value of the initial long position declines, and the buyer must cover this decrease in value. Formally, exchanges identify the change in value of each trader's account at the end of every day, then credit the margin accounts of those with gains and debit the margin accounts of those with losses. The market labels this daily settlement process **marking-to-market** and the daily change in value as **variation margin**.

Every futures contract has a formal expiration date. At expiration, trading stops and participants settle their final positions. Contracts may provide for either physical delivery of the underlying asset or a cash settlement. With physical delivery, the buyer of futures will make a cash payment to a seller, while the seller supplies the physical asset. Because financial futures contracts involve securities, delivery is handled via the wire transfer of funds and securities. With cash settlement, there is no physical delivery as participants simply exchange the final change-in-position value after the last trading day. Less than 1 percent of financial futures contracts require physical delivery at expiration because most participants offset their futures positions in advance.

An Example: 90-Day Eurodollar Time Deposit Futures

One of the most liquid interest rate futures contracts is the 90-day Eurodollar time deposit future. Its popularity is due to the breadth of participants who use Eurodollars, the allowance for cash settlement at delivery, and the growth of interest rate swaps and option contracts based on LIBOR. LIBOR-based contracts remain popular even after several large institutions admitted manipulating the quoted rate during the financial crisis and subsequently paid large fines.[4]

Eurodollar futures contracts are traded on the International Monetary Market (IMM), a division of the CME.[5] The underlying asset is a Eurodollar time deposit with a three-month maturity. Conceptually, Eurodollars are U.S. dollar-denominated deposits in banks located outside the United States. The holder cannot write checks against the

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[3] Futures contracts with cash settlement at delivery differ from contracts with physical delivery in that traders settle their positions by paying or receiving the change in value of the contract between the trade date and expiration date.

[4] Through mid-2013, Barclays, UBS and Royal Bank of Scotland settled cases, paying more than $2.5 billion, in which they admitted submitting false quotes to the association responsible for determining the benchmark LIBOR value. In March 2014, the FDIC sued 16 banks for fraud by presumably manipulating LIBOR with the intent of generating profits. All of these banks served on the panel that set LIBOR daily.

[5] Equivalent Eurodollar futures contracts are traded on the Singapore International Monetary Exchange.

account but earns interest at a rate slightly above that on domestic CDs issued by the largest U.S. banks. Eurodollar rates are quoted on an interest-bearing basis assuming a 360-day year. Each Eurodollar futures contract represents $1 million of initial face value of Eurodollar deposits maturing three months after contract expiration. More than 40 separate contracts are traded at any point in time as contracts expire in March, June, September, and December, more than 10 years out from the current date.[6] Settlement or delivery is in the form of cash, with the price established from a survey of current Eurodollar rates.

Eurodollar futures contracts trade according to an index that equals 100 percent minus the futures interest rate expressed in percentage terms. An index of 95.50, for example, indicates a futures rate of 4.5 percent. Each basis-point change in the futures rate equals a $25 change in value of the contract (0.0001 × $1 million × 90/360). If futures rates increase, the value of the contract decreases and vice versa.

Buyers of Eurodollar futures are classified as "long" because they own a commitment regarding the final price that can be realized at expiration. Sellers are said to be "short" because they may ultimately be forced to come up with cash they may not currently have. With cash settlement, buyers and sellers of Eurodollar futures have simply agreed on the price at expiration. What the buyer owns is a commitment from the seller to pay cash if the price of the underlying asset rises in the interim. The seller owns a commitment from the buyer to pay cash if the asset price falls. Buyers make a futures profit when futures rates fall (prices rise), while sellers gain when futures rates rise (prices fall). Conceptually, profits arise because buyers can offset their initial position by selling the same futures contract after prices have increased. Sellers can similarly profit if they can buy the futures back at a lower price after rates rise. As indicated earlier with daily settlement, the Eurodollar futures contract changes in value daily when prices change, and participants can withdraw profits from their margin accounts prior to expiration.

Exhibit 9.1 indicates how *Chicago Mercantile Exchange* (online) reports June 21, 2013, price quotes for these three-month Eurodollar futures contracts for contracts expiring through December 2021. On this day, three-month LIBOR closed at 0.27% in the spot market. The first column indicates the settlement month and year. The first six contracts expire during the month indicated in 2013. Except for the upcoming year, these contracts expire sequentially at three-month intervals near the middle of each month. Each row lists price data—and implicitly the Eurodollar futures rate—for a distinct futures contract. The second, third, fourth, and fifth columns report the index price at the open of trading (Open), the high (High) and low (Low) prices during the day, and the last price quoted (Last). The next two columns indicate the basis-point change between the last price quoted and the closing price the previous day (Change) and the settlement price. The final two columns list the estimated trading volume and information for the prior day's **open interest**, which equals the total number of futures contracts outstanding at the end of the day.

The following discussion will focus both on futures prices and futures rates. For Eurodollar futures, you convert the settlement price to a Eurodollar futures rate as:

$$100 - \text{Futures price} = \text{Futures rate}$$

For example, the Eurodollar futures contract expiring in June 2014, one year in the future, had a closing futures price of 99.455 for a futures rate of 0.545 percent. On June 21, 2013, the contract opened trading at 99.515, rose as high as 96.53, and fell as low as 99.435 during trading hours. The last price was 6.5 basis points below the close the prior

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[6] During the upcoming year, contracts are added for intervening months. Subsequent exhibits do not reveal price quotes for all Eurodollar futures contracts. The last day of trading (expiration day) is the second London business day prior to the third Wednesday in each delivery month.

EXHIBIT 9.1 **Data for Three-Month Eurodollar Futures on June 21, 2013**

	Daily Settlements for Eurodollar Future Futures						Trade Date: 06/21/2013	
Month	**Open**	**High**	**Low**	**Last**	**Change**	**Settle**	**Estimated Volume**	**Prior Day Open Interest**
JLY 13	99.7150	99.7200	99.7050	–	–.0075	99.7100	16,402	43,757
AUG 13	99.7050	99.7100	99.6750	–	–.0150	99.6900	8,984	16,713
SEP 13	99.6900	99.7000	99.6500	99.6700B	–.0200	99.6750	338,871	823,125
OCT 13	99.6800	99.6800	99,6350A	–	–.0250	99.6550	132	3,431
NOV 13	99.6650	99.6700B	99.625OA	–	–.0250	99.6400	6	1,648
DEC 13	99.6450	99.6600	99.5850	99.6100B	–.0400	99.6150	368,808	838,379
MAR 14	99.5900	99.6000	99.5150	99.5400A	–.0550	99.5400	401,869	773,976
JUN 14	99.5150	99.5300	99 .4350	99.4550	–.0650	99.4550	433,370	627,058
SEP 14	99.4200	99.4400	99.3350	99.3550A	–.0700	99.3500	387,154	663,122
DEC 14	99.2900	99.3200	99.2000	99.2200	–.0750	99.2150	421,912	708,199
MAR 15	99.1300	99.1700	99.0250	99.0550A	–.0750	99.0500	312,712	547,308
JUN 15	98.9400	98.9850	98.8200	98.8500A	–.0800	98.8500	330,045	715,292
SEP 15	98.7300	98.7750	96.5900	96.6250A	–.0900	98.6250	300,681	500,929
DEC 15	98.5000	98.5450	98.3450	98.3850A	–.1000	98.3800	276,843	594,628
MAR 16	98.2600	98.3100	98.0950	98.1350A	–.1050	98.1350	204,667	416,468
JUN 16	98.0200	98.0700	97.8450	97.8950A	–.1100	97.8900	191,158	328,142
SEP 16	97.7800	97.8350	97.6050	97.6600A	–.1100	97.6500	161,063	257,091
DEC 16	97.5500	97.6100	97.3750	97.4350A	–.1100	97.4250	121,071	156,645
MAR 17	97.3250	97.4050	97.1700	97.2400A	–.1100	97.2200	95,065	184,213
JUN 17	97.1250	97.2050	96.9700	97.0400A	–.1050	97.0250	85,401	154,189
SEP 17	96.9400	97.0250	96.7950	96.8600A	–.1000	96,8500	58,950	107,550
DEC 17	96.7800	96.8500	96.6200	96.7000A	–.0900	96.6850	80,878	133,565
MAR 18	96,6600	96.7050B	96.4850	96.5600A	–.0800	96.5500	53,009	60,520
JUN 18	96.5300	96.5750	96.3550	96.4300A	–.0750	96.4200	30,326	34,546
SEP 18	96.4100	96.4550	96.2500A	98.3350A	–.0700	96.3050	5,717	12,632
DEC 18	96.2950	96.3400B	96.1300	96.2200A	–.0700	96.1900	3,255	11,962
MAR 19	96.1850	95.2600	96.0550	96.1350A	–.0650	96.1100	2,675	8,084
JUN 19	96.1100	96.1750	95.9550	96.0500A	–.0650	96.0250	2,696	5,112
SEP 19	96.0250	96.0950	95.8950A	95.9700A	–.0650	95.9450	1,181	5,147
DEC 19	95.9400	96.0150	95.8000A	95.8850A	–.0650	95.8600	1,057	5,391
MAR 20	96.9000	96.9650	95.7550A	95.8350A	–.0650	95.8100	800	2,672
JUN 20	95.9150	95.9200	95.7050A	95.7850A	–.0700	95.7550	1,915	3,591
SEP 20	95.8750	95.8750	95.6800A	95.7350A	–.0750	95.7000	232	1,005
DEC 20	95.8100	95.8250	95.6250A	95.6750A	–.0800	95.6350	321	1,241
MAR 21	95.7050	95.7450B	95.5950A	95.6450A	–.0850	95.6000	329	654
JUN 21	95.7700	95.7700	95.5550A	95.6150A	–.0850	95.5700	149	995
SEP 21	95.7400	95.7400	95.5300A	95.5750A	–.0900	95.5250	38	461
DEC 21	95.6950	95.6950	95.4850A	95.5350A	–.0900	95.4850	48	627

day, indicating that the futures rate increased 6.5 basis points. An estimated 433, 370 contracts traded during the session, with 627,058 outstanding at the beginning of the session.

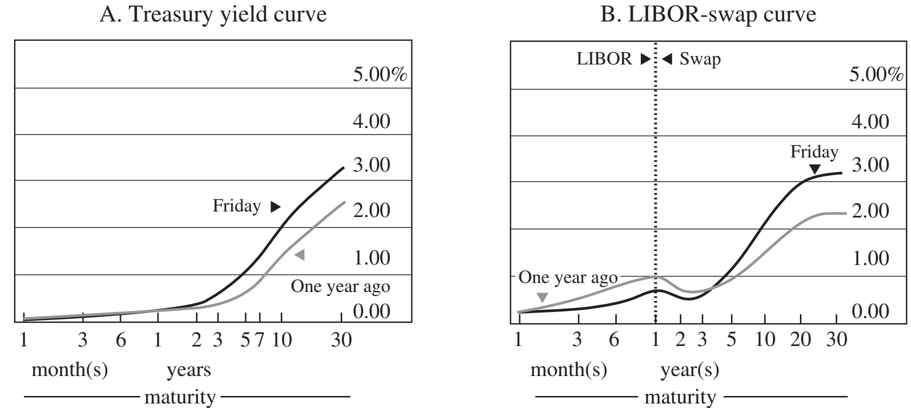
Each successive row of data provides similar information for contracts that expire farther from the present. The data generally indicate that the farther out the contract expiration is, the lower the futures price is and thus the higher the futures rate. Thus, the three-month Eurodollar futures contract that expires in June 2018 had a closing price of 96.43, suggesting a futures rate of 3.57 percent. The price is 3.025 lower than that for the June 2014 contract, which corresponds to a futures rate that is 3.025 percent higher. Thus, the pricing of the June 2018 contract, which expires in 5 years, signaled that participants expected a sharp increase in Eurodollar futures rates. The market exhibited high volatility on this day as most of the futures rates increased (futures prices fell) by as much as 11 basis points relative to their values the previous day. Finally, the open interest demonstrates that the farther out the expiration, the greater the decline in the number of contracts outstanding, which is consistent with the fact that liquidity is greatest for the nearby futures contract and generally decreases with time until expiration.

Exhibit 9.2 presents two yield curves at the close of business on June 21, 2013. Figure A represents the yield curve for U.S. Treasury securities in which rates ranged from 0.18 percent on one-month T-bills to 3.59 percent on 30-year bonds. Note the increase in rates compared to one year prior for maturities beyond two years. Note also the relatively steep slope after two years, as the difference between the 2-year and 30-year Treasury rates was 321 basis points. One year prior, the Treasury yield curve was relatively flat through 5 years. Figure B provides the yield curve for interest rate swaps based off three-month LIBOR, which is discussed later. According to the unbiased expectations theory, an upward-sloping yield curve indicates a consensus forecast that short-term interest rates are expected to rise. A flat yield curve suggests that rates will remain relatively constant.

Expectations Embedded in Futures Rates

One interpretation of futures rates is that they provide information about consensus expectations of future cash rates. When futures rates continually rise as the expiration dates of the futures contracts extend into the future, it signals an expected increase in subsequent cash market rates. In this context, a futures rate should provide similar

EXHIBIT 9.2 **Yield Curve Data for June 21, 2013**



Source: *Wall Street Journal* online, June 22, 2013.

information as a forward rate derived from cash rates representing the prevailing yield curve. Data for the LIBOR swap curve, which is defined later in the chapter, reveal a similar pattern as that for the Treasury yield curve. If the Eurodollar futures rates provided in Exhibit 9.1 are viewed as forecasts of three-month Eurodollar cash rates when each of the futures contracts expire, the increase in futures rates suggests rising Eurodollar rates as well.

Daily Marking-to-Market

The cash flows associated with daily settlement of futures trading can be demonstrated by an example. Consider a trader who buys one December 2014 three-month Eurodollar futures contract at 99.2, or 0.80 percent, on June 21, 2013, posting $1,100 in cash as initial margin. Maintenance margin is set at $700 per contract. The futures contract expires on December 17, 2014, approximately 18 months after the initial purchase, during which time the futures price and rate fluctuate daily. Because our trader is long futures, the contract increases in value when the futures price rises or the futures rate declines. Suppose that on July 20, 2013, the December 2014 futures rate falls to 0.70 percent. The trader could withdraw $250 (10 basis points × $25) from the margin account, representing the increase in value of the position. For this example, assume that the funds stay in the margin account. Now suppose that the futures rate increases to 0.88 percent the next day so that the trader's long position decreases in value. The 16 basis-point increase represents a $400 drop in margin, such that the ending account balance would equal $950. If at market close on August 20, 2013, the December 2014 futures rate increases further to 1.01 percent, the trader must make a variation margin payment sufficient to bring the account up to $700. In this case, the account balance would have fallen to $575 and the margin contribution would equal $125. The exchange member may close the account if the trader does not meet the variation margin requirement.

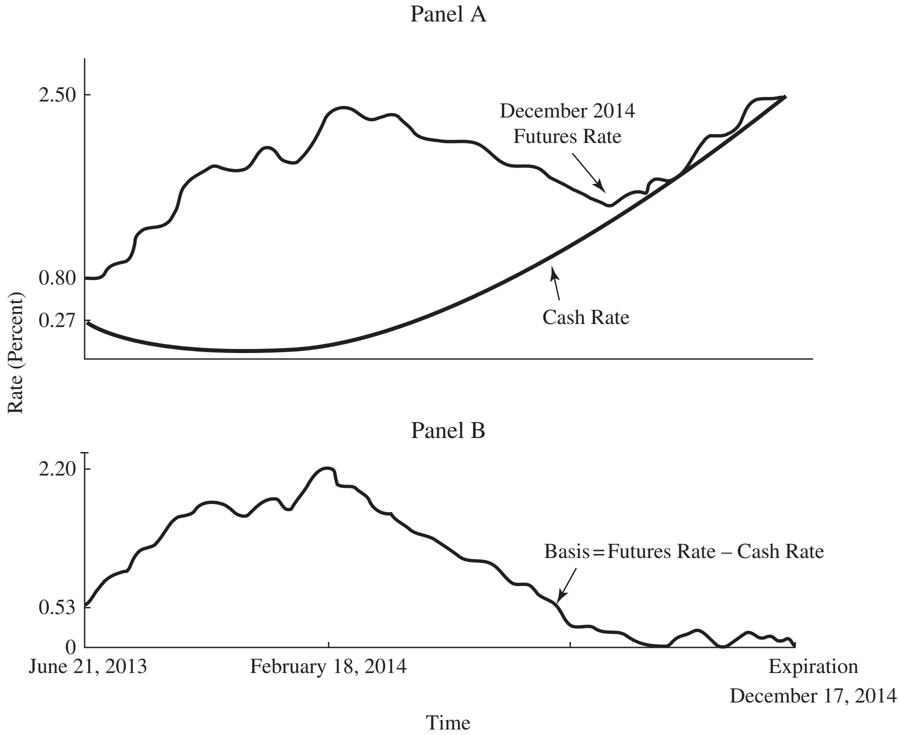
Panel A of Exhibit 9.3 reveals one possible pattern in the movement of the three-month cash Eurodollar rate and the December 2014 futures rate after June 21. Initially, the cash rate equals 0.27 percent, and the futures rate is 0.80 percent. While the cash rate declines initially then increases systematically until expiration, the futures rate immediately increases. When the contract expires on December 17, 2014, both the futures rate and cash rate equal 2.50 percent. In this case, the futures rate rises 170 basis points, such that the long futures position is worth $4,250 (170 basis points × $25) less than its value on June 21, 2013. If the trader had held the contract to expiration, the position would have immediately decreased in value as the futures rate rose and would have remained at a loss through expiration because the futures rate never went below 0.80 percent. The futures trader would have lost some amount less than $4,250 if he had exited his position earlier. Note that the cash rate increased by 223 basis points to reach the same 2.50 percent.

The Basis. The term **basis** refers to the cash price of an asset minus the corresponding futures price for the same asset at a point in time. Typically, it applies to the cash price of a security that is being hedged. For Eurodollar futures, the basis can be calculated as cash price minus the futures price, or the futures rate minus the cash rate.

$$\begin{aligned}\text{Basis} &= \text{Cash price} - \text{Futures price}\\ &= \text{Futures rate} - \text{Cash rate}\end{aligned}$$

Consider the previous example with three-month December 2014 Eurodollar futures. On June 21, 2013, the futures rate exceeded the cash rate by 53 basis points (0.80% − 0.27%), which represents the basis on this date. Panel B of Exhibit 9.3 shows the movement in the basis associated with the cash and futures rates presented in Panel

EXHIBIT 9.3 **The Relationship between Futures Rates and Cash Rates—One Possible Pattern**



A of the exhibit. It initially increases to 220 basis points on February 18, 2014, as the futures rate rises and cash rate falls, then systematically declines as expiration approaches. Note that the basis equals zero at expiration and is close to zero prior to expiration. This is a typical pattern. Later discussions will indicate that the basis is important in determining the effectiveness of hedging interest rate risk.

The basis may not behave as nicely as it does in Exhibit 9.3. It may be positive or negative, depending on whether futures rates are above or below cash rates, and may swing widely in value far in advance of contract expiration. The basis rises and falls daily as economic conditions and market sentiment change. While the basis can take any value, there are two general price relationships between futures and cash instruments.

1. The basis must equal zero at expiration.
2. Because futures and cash rates must be equal at expiration, the basis normally narrows as expiration approaches. If it is positive, it declines to zero. If it is negative, it increases to zero.

The first relationship occurs so that no trader can earn a riskless arbitrage profit. For example, suppose that the basis equals some nonzero value just prior to expiration. Any trader could buy the cheaper cash instrument or futures contract and sell the more expensive one, making a riskless profit. Such arbitrage drives the two prices together. The second relationship, in turn, suggests that a positive basis will decline toward zero over time, while a negative basis will increase toward zero, on average. These patterns must occur so that the basis equals zero at expiration. Both phenomena are demonstrated in Exhibit 9.3.

Speculation versus Hedging

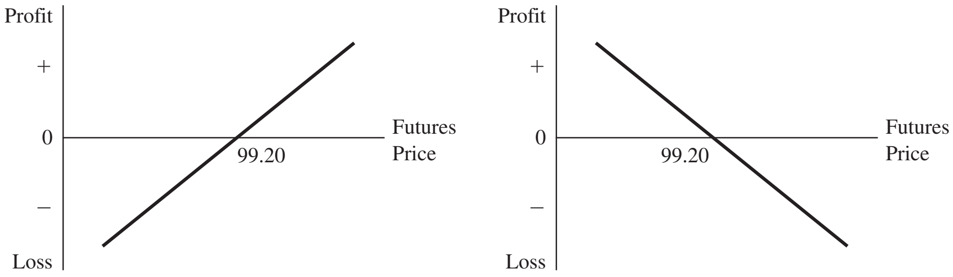
Participants use futures for a variety of purposes. According to the previous discussion, futures prices may represent the consensus forecast of the underlying asset's future price at contract expiration. A trader who expects the actual price to differ from that expected and represented by the futures price can either buy or sell the futures contract, depending on whether the contract is perceived to be undervalued or overvalued. Such a participant is a speculator who takes on additional risk to earn speculative profits. For example, a speculator who on June 21, 2013, believed that December 2014 Eurodollar futures at 0.80 percent were undervalued (futures price was too low, or futures rate was too high) would buy the contract, anticipating a decline in futures rates and an increase in price prior to expiration. Speculators who felt the contract was overvalued (futures price was too high, or futures rate was too low) would alternatively sell futures, expecting to make a profit after futures rates increased and prices fell.

Speculators Take on Risk to Earn Speculative Profits

The top part of Exhibit 9.4 characterizes speculation in terms of two profit diagrams for the December 2014 Eurodollar futures data from Exhibit 9.1. The first (A) summarizes the profits and losses from buying the futures contract at the settlement price relative to possible futures prices after the contract is purchased. Specifically, on June

EXHIBIT 9.4 **Profit Diagrams for the December 2014 Eurodollar Futures Contract from Exhibit 9.1**

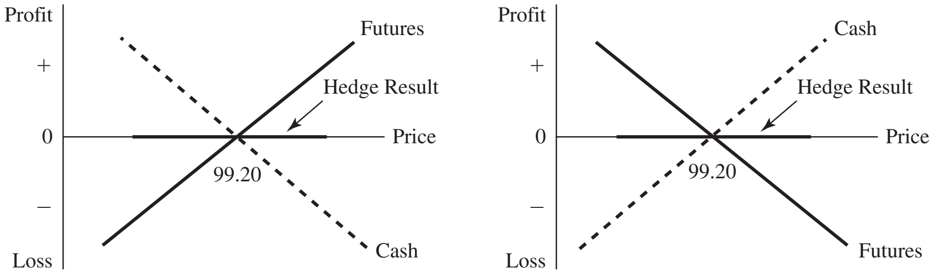
A. Speculation



A. Buy Dec. 2014 Eurodollar Futures at 99.20

B. Sell Dec. 2014 Eurodollar Futures at 99.20

B. Hedging



Hedge: Long Futures—Cash Loss When Rates Fall

Hedge: Short Futures—Cash Loss When Rates Rise

21, 2013, the settlement price equals 99.20. If a speculator later sells the futures contract at any higher price, he or she earns a profit equal to $25 times the difference between the sales price and 99.80. If the futures price declines and the speculator sells at less than 99.80, he or she suffers a loss. The second diagram (B) summarizes expected profits and losses for the seller of the same futures contract on June 21. Not surprisingly, the seller profits when the futures price declines and loses when the price rises.

Speculation is extremely risky. For the most part, futures rates and prices on nearby contracts are determined by arbitrage activity. Even when a speculator views a contract as overvalued or undervalued, any position taken can backfire in that a major market move can overwhelm the initial mispricing. Exhibit 9.4 demonstrates that the loss potential is virtually unlimited. Holding a pure speculative position with a single contract for a lengthy period is thus relatively rare.

Hedgers Take Positions to Avoid or Reduce Risk

Hedging differs from speculation in terms of the participants' risk position prior to executing a trade and overall trade objectives. Speculators take a position that increases their risk profile. Hedgers focus on avoiding or reducing risk. They enter futures transactions because their normal business operations involve certain risks that they are trying to reduce. This preexisting risk can be at least partially offset because futures prices tend to move directly with cash prices, so futures rates closely track cash interest rates. Hedgers take the opposite position in a futures contract relative to their cash market risk so that losses in one market are reduced by gains in the other market.

For example, a trader who loses when cash market interest rates decrease will normally gain in the futures market with a long position as futures rates (prices) also decrease (increase) and the contract increases in value. This is characterized at the bottom of Exhibit 9.4. The lower left diagram adds to the long futures position a dashed line that indicates the profit and loss from an unhedged cash position. In this case, the hedger loses in the cash market when prices increase (rates decrease) and gains when prices decrease (rates increase). In a *perfect hedge* the net profit, denoted by adding the profits and losses on both the futures and cash position, equals zero at each price. A perfect hedge is characterized by the bold horizontal line at the zero profit level. Of course, perfect hedges are only known ex post. The diagram on the lower right demonstrates the identical result when a short futures position is used to offset losses from a cash position that loses when prices fall (interest rates rise). Note here that rate increases (price decreases) produce simultaneous cash losses and futures profits. Rate decreases (price increases), in turn, produce simultaneous cash profits and futures losses, hence the hedge.

Participants also use futures because transactions costs are lower with futures than cash assets. Subsequent hedges are really transactions whereby participants can essentially replicate cash market positions but lower their cost of taking a position. For example, an investor who has funds to invest for nine months in the Eurodollar market on June 21, 2013, could simply buy a nine-month Eurodollar time deposit. Alternatively, he or she could buy a three-month Eurodollar time deposit and three-month Eurodollar futures contracts that expire in September 2013 and December 2013, respectively. In September and December the investor would reinvest the proceeds from the original three-month cash Eurodollar time deposit in another three-month Eurodollar time deposit to get a nine-month return. The latter might be attractive if the combined yield exceeds that for the nine-month Eurodollar net of transactions costs.

Steps in Hedging. In general, there are seven basic steps financial institutions should take when implementing futures hedges:

1. Identify the cash market risk exposure that management wants to reduce.
2. On the basis of the cash market risk, determine whether a long or short futures position is appropriate for reducing risk.
3. Select the best futures contract.
4. Determine the appropriate number of futures contracts to trade.
5. Implement the hedge by buying or selling futures contracts.
6. Determine when to get out of the hedge position, either by reversing the trades in Step 5, letting contracts expire, or making or taking delivery.
7. Verify that futures trading meets regulatory requirements and conforms to the bank's internal risk management policies.

The first step indicates that hedging requires each futures position to be associated with a cash position and that the objective is to reduce risk. The second step follows from Exhibit 9.4, and the fact that cash and futures rates on similar underlying instruments generally move in the same direction. If losses arise in the cash market when cash rates fall, a hedger will buy futures contracts because the futures should gain when futures rates fall. Similarly, if losses arise when cash rates rise, a hedger will sell futures contracts. The third step suggests that there is a "correct" futures contract for each cash position. In fact, the best contract is known only after the fact. What is known at the time of trading is that a hedger wants a futures contract whose rate will change in the same direction and by the same magnitude as the cash rate. Thus, a hedger chooses a "correct" futures contract where the correlation between the cash rate and futures rate is high. The other question is, "What contract expiration is best?" Generally, a hedge will remain in place for a predetermined time interval. For reasons discussed later related to minimizing basis risk, a hedger will also generally trade the futures contract that expires immediately after the date at which the cash market risk disappears.

The fourth step addresses the determination of the appropriate *hedge ratio,* or number of futures contracts relative to the cash market exposure. There are several procedures for this, depending on whether the hedger's objective is to minimize the expected return variance or the change in total portfolio value. An example is provided later, but a detailed analysis of hedge ratios is left to other texts. The fifth step refers to the actual execution of the futures contracts trading based on the analysis of Steps 1–4. Along with the decision to hedge, a hedger decides how long the hedge should be in place. In most cases, the cash market risk exposure exists for a predetermined period of time. Once cash market risk is eliminated, a hedger will get out of the hedge position. To continue to hold a long or short futures position with no linked cash position would be speculating, because changes in the futures contract would not offset any associated change in the cash position. Thus, the sixth step involves identifying when cash market risk either disappears or reaches an acceptable level.

A futures trade that serves as a hedge generally will be kept in place as long as the cash risk exposure exists and will be offset once the exposure is gone. There are two important extensions. First, if the cash market risk is unchanged over a period of time, it is inappropriate to trade futures contracts in and out in an attempt to time market movements. For example, a bank that trades futures in order to reduce the risk of price volatility with a portfolio of bonds should take an initial position and hold it until the bonds are sold, mature, or management decides to alter its risk preference. The bank should not sell futures initially, then buy them back only to sell futures again prior to the above ending points. Such day trading or position trading is speculative and simply increases trading costs. Second, management should determine a priori what its desired risk exposure is. It is appropriate for management to change its preference for risk and time whether the institution is hedged or unhedged accordingly. These risk preferences should not, however, change frequently over short periods such that management is constantly buying and selling futures against an unchanged cash market position. To do so is speculative because the implicit unstated intent is to time interest rate movements and trade futures to profit, rather than to reduce risk.

Finally, banks must meet strict regulatory guidelines, and management must have internal policies in place that authorize hedge trades. Specifically, only certain types of positions are allowed to constitute a hedge in futures trading. Among other requirements, banks must maintain a contemporaneous hedge log that associates futures trades with the cash position in terms of the objective and nature of the trade, and they must meet strict accounting requirements for hedge gains and losses.

A Long Hedge: Reduce Risk Associated with a Decrease in Interest Rates

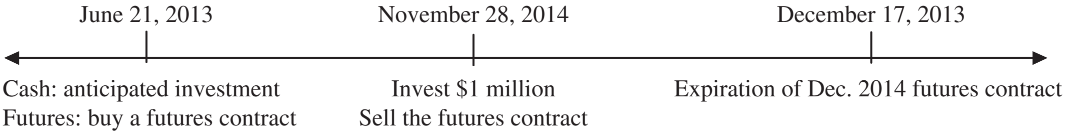
As indicated in Exhibit 9.4, a long hedge is applicable for a participant who wants to reduce cash market risk associated with a decline in interest rates. The applicable strategy is to buy futures contracts on securities similar to those evidencing the cash market risk. If cash rates decline, futures rates will typically also decline so that the value of the futures position will likely increase. Any loss in the cash market is at least partially offset by a gain in futures. Of course, if cash market rates increase, futures rates will also increase and the futures position will show a loss. Using futures essentially fixes a rate or price. This latter instance reveals an important aspect of hedging. If cash rates rise, the investor will profit more from not hedging because cash rates move favorably. A hedger thus forgoes gains associated with favorable cash market price moves. The hedge objective, however, is assumed to be risk reduction. With hedging, risk is lower because the volatility of returns is lower.

The following example applies the key steps in hedging to a bank that implements a Eurodollar futures hedge.

Hedge Objective: reduce cash market risk associated with a decline in interest rates

Strategy: buy the appropriate futures contract(s)

Consider the following time line:


June 21, 2013
November 28, 2014
December 17, 2013
Cash: anticipated investment
Futures: buy a futures contract
Invest $1 million
Sell the futures contract
Expiration of Dec. 2014 futures contract

Suppose that on June 21, 2013, your bank expects to receive a $1 million payment on November 28, 2014, and anticipates investing the funds in three-month Eurodollar time deposits at that time. If the bank had the funds in hand in June, it would immediately buy Eurodollar deposits. The cash market risk exposure is that the bank would like to invest the funds at today's rates, but will not have access to the funds for over five months. If cash rates move lower between June and November, the bank will realize an opportunity loss because it will have to invest the $1 million at rates below those available today.

In June 2013, the market expected Eurodollar rates to increase as evidenced by rising futures rates. In order to hedge, the bank should buy futures contracts such that if cash rates fall, futures rates will also likely fall, and the long futures position will increase in value as an offset to the cash losses. Also, if futures rates overstate the likely increase in Eurodollar rates, a long position may capture any benefit. For hedging, the best futures contract will generally be the first contract that expires after the known cash transaction date. This contract is best because its futures price will generally show the highest correlation with the cash price. In this example, the December 2014 Eurodollar futures contract is the first to expire after November 2014.

Using the data in Exhibit 9.1, the December 2014 futures rate equals 0.80 percent, while the current cash market rate equals 0.27 percent. This produces a basis of 0.53 percent. Exhibit 9.5 summarizes hedge results, assuming the bank buys a December 2014 futures contract on June 21, 2013 and sells it on November 28, 2014, when the bank actually buys Eurodollars in the cash market. The three-month Eurodollar futures contract has a $1 million par value, so each 1 basis-point change in futures rates is worth the same $25 as a 1 basis-point change in cash Eurodollar rates. The assumed hedge ratio is 1-to-1. Note that once the bank buys the futures contract, it is fully hedged. It implements the trade at the time it identifies the cash market risk and decides to reduce the risk. Because it plans to invest the funds in November, its cash risk will no longer exist after that time, and the bank will need to get out of its initial long futures position, or it will be speculating. It is assumed that the bank has a hedge policy in place that authorizes futures trading to reduce risk associated with the planned investment of funds and that Eurodollar futures are an acceptable vehicle. It is also assumed that management has the accounting and hedge performance monitoring systems in place. The transactions are summarized at each date under the cash and futures market headings with the basis values in the final column of Exhibit 9.5.

Change in the Basis. The basis at the time of hedge initiation and change in basis at the time the hedge is offset determine the risk and net performance of the overall hedged position. Suppose that cash rates rise by 89 basis points through November 28 such that the bank actually invests the $1 million at 1.16 percent. This investment produces an opportunity gain of $2,250 in interest for the three-month period as indicated by the net effect

EXHIBIT 9.5 Long Hedge Using Eurodollar Futures

Date	Cash Market	Futures Market	Basis
6/21/13 (Initial futures position)	Bank anticipates investing $1 million in Eurodollars in eight months; current cash rate = 0.27%	Bank buys one December 2014 Eurodollar futures contract at 0.80%; price = 99.20	0.80% – 0.27% = 0.53%
11/28/14 (Close futures position)	Bank invests $1 million in three-month Eurodollars at 1.16%	Bank sells one December 2014 Eurodollar futures contract at 1.22%; price = 98.78	1.22% – 1.16% = 0.06%
Net effect	Opportunity gain: 1.16% – 0.27% = 0.89%; 89 basis points worth $25 each = $2,225	Futures loss: 1.22% – 0.80% = –0.42%; 42 basis points worth $25 each = $1,050	Basis change: 0.06% – 0.53% = –0.47%

Cumulative investment income:

Interest at 1.16% = $1,000,000(0.0116)(90/360) = $2,900
Loss from futures trades = –$1,050
Total = $1,850
Effective return = ($1,850)(360)/($1,000,000)(90)
= 0.74%

reported in the column under the cash market heading. On November 28, the December 2014 futures rate had increased by 42 basis points to 1.22 percent. At that time the bank sells its contract at a higher price (98.78), thereby losing $1,050 on the trade. In this case, the opportunity gain in the cash market is partially offset by the loss in the futures market. The basis on November 28 is 0.06 percent, or 47 basis points lower than on June 21.

The bank's effective percentage return is calculated at the bottom of Exhibit 9.5. The combined income equals investment income from the cash Eurodollar reduced by the loss on the futures trade. In this case, income consists of $2,900 in interest and a $1,050 loss in futures for a 0.74 percent return relative to the $1 million investment. This net percentage return is 47 basis points above the initial cash Eurodollar rate on June 21, which is represented by the change in the basis. The hedge worked because the volatility of the return from the combined futures and cash position was below the volatility of the return with the unhedged cash position. Of course, with no hedge, the bank would have earned 1.16 percent.

A Short Hedge: Reduce Risk Associated with an Increase in Interest Rates

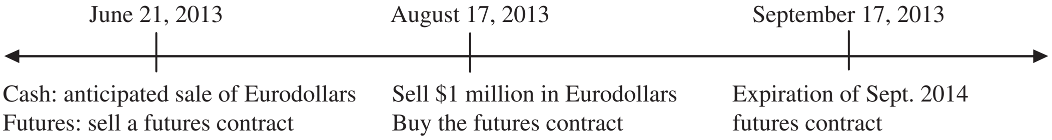
A short hedge applies to any participant who wants to reduce the risk of an increase in cash market interest rates (or reduction in cash market prices). The applicable strategy is to sell futures contracts on securities similar to those evidencing the cash market risk. If cash rates increase, futures rates will generally increase so the loss in the cash position will be at least partially offset by a gain in value of futures. Again, if cash rates actually decrease, the gain in the cash market will be offset by a loss from futures, and a hedger gives up potential gains from an unhedged position. A hedger essentially attempts to fix the interest rate realized.

The following example examines a short hedge associated with a bank that wants to protect the value of its existing securities portfolio from potential losses at future sale.

Hedge Objective: reduce cash market risk associated with an increase in interest rates

Strategy: sell the appropriate futures contract(s)

Consider the following time line:



Suppose that on June 21, 2013, a bank anticipates it will need to sell a six-month Eurodollar deposit from its investment portfolio on August 17, 2013. The Eurodollar deposit yields 0.58 percent and management, expecting a sharp increase in interest rates, would like to hedge against a decline in value of the Eurodollar at the time of sale. The cash market risk of loss is that Eurodollar time deposit rates will be higher in August. To hedge, the bank will want to immediately sell Eurodollar futures. The example assumes that the bank immediately sells one September 2014 Eurodollar futures contract and expects to buy it back in August when it sells its cash Eurodollar investment.[7]

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[7] Note that a $1 million, six-month Eurodollar deposit is priced differently than a $1 million, three-month Eurodollar deposit. Specifically, each basis-point change is now worth $50 (0.0001 × $1,000,000 × 180/360). As time elapses, the six-month Eurodollar will approach maturity such that in August it will have less than two months to maturity.

EXHIBIT 9.6 Short Hedge Using Eurodollar Futures

Date	Cash Market	Futures Market	Basis
6/21/13	Bank anticipates selling $1 million Eurodollar deposit in 60 days; current cash rate = 0.58%	Bank sells one Sept. 2013 Eurodollar futures contract at 0.33%; price = 99.67	0.33% – 0.58% = –0.25%
8/17/13	Bank sells $1 million Eurodollar deposit at 1.10%	Bank buys one Sept. 2013 Eurodollar futures contract at 1.14%; price = 98.86	1.14% – 1.10% = 0.04%
Net result:	Opportunity loss. 1.10% – 0.58% = 0.52%; 52 basis points worth $25 each = $1,300	Futures profit: 1.14% – 0.33% = 0.81%; 81 basis points worth $25 each = $2,025	Basis change: 0.04% – (–0.25%) = 0.29%

Effective gain = $2,025 – $1,300 = $725

Effective rate at sale of deposit = 1.10% – 0.81% = 0.29% or the effective interest paid for 90 days = 0.011(90/360) $1,000,000 – $2,025 = $725, or [725/1,000,000](360/90) = 0.29%

Exhibit 9.6 summarizes the hedge results, assuming the bank sells one September 2013 Eurodollar futures contract on June 21 at 0.33 percent. With a six-month cash rate of 0.58 percent, the initial basis is –0.25 percent. On August 17, the bank buys back the futures contract when it liquidates its Eurodollar investment. It is assumed in the example that cash rates rise sharply through August, such that the deposit rate equals 1.1 percent at sale and the September futures rate equals 1.14 percent. In this situation, the bank has an (approximate) opportunity loss of $1,300 on its cash position and a futures profit of $2,025 for a net profit of $725.[8] Note that the 52 basis-point increase in the cash rate and 81 basis-point increase in the futures rate coincide with a 29 basis-point increase in the basis. Here, the gain from the futures position exceeds the opportunity loss from the cash position. The hedge again works in the sense that the volatility of return (or cost) is less than with an unhedged position. If unhedged, the bank would not have realized the futures gain and its total cost (loss) at sale of the deposit would have been greater than with the hedge. Of course, the bank would have been in a riskier position without the futures hedge. The important point is that a hedger does not base a futures trade on expected futures profits, but rather on reducing overall risk.

Change in the Basis

Both the long and short hedges worked in the previous examples in the sense that the futures rate moved in line with the cash rate. With the long hedge, the futures rate rose by 42 basis points as Eurodollar rates increased more than expected. Had the cash rate decreased instead of increased, the bank would have invested its funds at a yield below 0.27 percent but would have realized a profit on its futures position as the contract price increased even more. With the short hedge, the futures rate increased by 81 basis points, producing a profit, while the cash rate rose by 52 basis points. The net effect was that the futures profit and cash opportunity loss netted 29 basis points.

The actual risk assumed by a trader in both hedges is not that the level of interest rates will move against the cash position, but that the basis might change adversely

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[8] The calculation assumes that the deposit has exactly 90 days remaining maturity such that a basis point is worth $25. On August 17, however, the deposit would have less than 90 days to maturity, and each basis point would be worth less than $25.

between the time the hedge is initiated and closed. The effective return from Exhibit 9.5 equaled total income from the combined cash and futures positions relative to the investment amount. If we designate the basis (futures rate – cash rate) at time t as B_t, the effective return can be expressed as:

$$\begin{aligned}\text{Effective return} &= \text{Initial cash rate} - \text{Change in basis} \\ &= \text{Initial cash rate} - (B_2 - B_1)\end{aligned} \quad \textbf{(9.1)}$$

where the subscripts refer to the initiation (t = 1) of the hedge or termination (t = 2) of the hedge.

At hedge initiation, only B_1 is unknown. Thus, with the long hedge the effective return is 0.74 percent, equal to 0.27 percent – (–0.47) percent.[9] The change in the basis ($B_2 - B_1$) equals the basis when the hedge is closed (B_2) minus the basis when the hedge is initiated (B_1). Thus, at the time a trade is initiated, the size of change in basis is the only unknown. However, a hedger still faces the risk that futures rates and cash rates will not change coincidentally. This commonly occurs when participants use futures contracts based on one security to hedge a cash position in another security (labeled a cross hedge). In this long hedge example, the basis decreased from 53 to 6 basis points, thereby raising the return by 47 basis points over the initial cash rate. Had the basis increased, the effective return would have decreased. The relationship (Equation 9.1) holds true regardless of whether the level of rates increases or decreases after hedge initiation.

The effective cost of a short hedge is also determined by Equation 9.1. The risk assumed by a hedger is again that the basis might change between the time a hedge is initiated and the time it is offset. However, the short hedger benefits when the basis increases and loses when the basis decreases. This is the opposite of a hedger who takes a long position. Using the data from the example in Exhibit 9.6, the effective cost of the Eurodollar deposit sale was 0.29 percent, equal to the initial cash rate of 0.58 percent – 0.29 percent. This indicates that the bank effectively sold the Eurodollar time deposit at a 29 basis-point lower yield than the rate available in June. Thus, the bank realized a greater net value by 29 basis points, or $725, as compared with an unhedged sale.

Generally, directional movements in the basis are more predictable than movements in the level of cash market rates, and the volatility of cash rates exceeds the volatility of the basis. The risk of hedging is thus normally less than the risk of not hedging. While basis changes can be substantial, most factors that influence cash rates influence futures rates simultaneously. Futures rates are closely tied to cash rates by arbitrage activity so that the two rates move together. If the cash instrument to be hedged is the same as the instrument underlying the futures contract, arbitrageurs will trade the two instruments until the basis equals zero at futures contract expiration. This is what induces the basis to narrow toward zero as expiration approaches, per the diagram in Exhibit 9.3, and helps the hedger to estimate the ex post effective cost or return from a hedged position.

Basis Risk and Cross Hedging

In a perfect hedge, the profit or loss in the cash position is exactly offset by the profit or loss from the futures position. This would occur if the basis change always equaled zero. In practice, it is extremely difficult to obtain a perfect hedge and there are numerous instances when basis risk can be substantial. One such instance involves **cross hedges**. A cross hedge is one in which a participant uses a futures contract based on one security

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[9] Whenever a participant profits in futures, the effective return is actually higher because it could withdraw variation margin funds and invest the proceeds after futures prices moved favorably.

that differs from the security being hedged in the cash market. An example would be using Eurodollar futures to hedge price movements for commercial paper transactions. The risk is potentially greater for cross hedges because futures and cash interest rates may not move closely together, as they are based on different underlying securities. If the basis is volatile and unpredictable, Equation 9.1 suggests that the effective return or cost from a hedge might also be volatile and unpredictable.

Basis risk can also be substantial because futures and cash rates for the same underlying security may move in opposite directions prior to expiration. In fact, the basis change is known with certainty only when the planned cash transactions being hedged coincide with futures expirations. In this case, participants know that the basis will equal zero and thus the basis change will equal the negative of the basis at the time the hedge is initiated. Typically, however, most transactions do not coincide with futures expirations, and changes in futures rates may differ sharply from changes in cash rates. It is generally the case, however, that basis volatility is lowest for the contract that expires immediately after the cash risk expiration. Importantly, futures trades are not riskless and often produce opportunity losses.

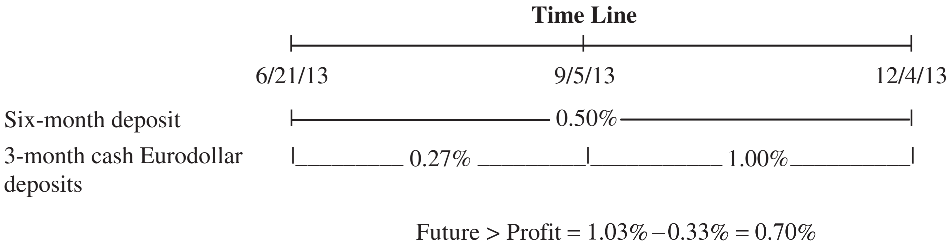
Microhedging Applications

One of the basic decisions that risk managers make is whether to hedge specific individual transactions or the aggregate interest rate risk exposure of the bank. The previous examples of a long hedge and short hedge involved individual transactions. Alternatively, management could choose to hedge aggregate risk exposure evidenced by a nonzero GAP or nonzero duration gap (DGAP) and earnings and EVE sensitivity that are nonzero. **Microhedges** refer to the hedging of a transaction associated with a specific asset, liability, or commitment. **Macrohedges** involve taking futures positions to reduce aggregate portfolio interest rate risk, typically measured by the sensitivity of earnings or EVE.

Banks are generally restricted to using financial futures for hedging purposes under current regulations. In their accounting, banks must recognize futures on a micro basis by linking each futures transaction with a specific cash instrument or commitment in a contemporaneous log of hedge transactions. Yet many analysts feel that such linkages force microhedges that may potentially increase a firm's total risk because these hedges ignore all other portfolio components. Thus, accounting requirements may focus attention on inappropriate risk measures. Macrohedging, in turn, is difficult to implement because of problems in accurately measuring a firm's overall interest rate risk and in monitoring hedging effectiveness. This section analyzes various microhedges and is followed by a section on macrohedging.

Creating a Synthetic Liability with a Short Hedge

Suppose that on June 21, 2013, a large money center bank agreed to finance a $1 million, six-month working capital loan to a corporate customer. Management wanted to match fund the loan by issuing a $1 million, six-month Eurodollar time deposit. On June 21, the six-month cash Eurodollar rate was 0.50 percent, while the corresponding three-month rate was 0.27 percent. The three-month Eurodollar futures rate for September 2013 expiration equaled 0.33 percent. Rather than issue a direct six-month Eurodollar liability at 0.50 percent, the bank created a synthetic six-month liability by shorting futures. The objective was to use the futures market to borrow at a lower rate than the six-month cash Eurodollar rate. It would be achieved by initially issuing a three-month Eurodollar, then issuing another when the first matured. A short futures position reduced the risk of rising interest rates for the second cash Eurodollar borrowing. The following time line indicates the rate comparison. Exhibit 9.7 presents the steps.


Time Line
6/21/13
9/5/13
12/4/13
Six-month deposit
0.50%
3-month cash Eurodollar deposits
0.27%
1.00%
Future > Profit = 1.03% − 0.33% = 0.70%

On June 21, the bank issued a $1 million, 91-day Eurodollar time deposit at 0.27 percent and simultaneously sold one September 2013 Eurodollar futures contract at 0.33 percent. Management expects to roll over its 91-day Eurodollar deposit by issuing another three-month deposit on September 5, 2013, for an effective six-month maturity. At that time, it will offset its futures position by buying a September 2013 futures contract. The short hedge reduces the risk of loss if cash Eurodollar rates increase between June 21 and September 5 when the bank reissues its deposit.

Suppose that when the first three-month deposit matured on September 5, rates had increased substantially, and the bank issued another three-month Eurodollar deposit at one percent. It simultaneously closed out its position by buying one September 2013 futures contract at 1.03 percent. In this example, both cash and futures rates increased with the basis decreasing from 6 basis points to 3 basis points. The $1,750 profit (70 basis points) on the futures trade (1.03% versus 0.33%) lowered the effective interest expense on the second cash Eurodollar deposit such that its effective cost equaled 0.30 percent (1 percent – 0.03 percent). The effective borrowing cost of the synthetic six-month Eurodollar deposit thus equaled 0.29 percent, which was below the 0.50 percent six-month cash rate available on June 21.

EXHIBIT 9.7 Creating a Synthetic Six-Month Eurodollar Liability

Summary of Relevant Eurodollar Rates and Transactions

June 21, 2013

Three-month cash rate = 0.27%; bank issues a $1 million, 91-day Eurodollar deposit

Six-month cash rate = 0.50%

Bank sells one September 2013 Eurodollar futures; futures rate = 0.33%

September 5, 2013

Three-month cash rate = 1%; bank issues a $1 million, 91-day Eurodollar deposit
Buy: One September 2013 Eurodollar futures; futures rate = 1.03%

Date	Cash Market	Futures Market	Basis
6/21/13	Bank issues $1 million, 91-day Eurodollar time deposit at 0.27%; three-month interest expense = $682.50	Bank sells one September 2013 Eurodollar futures contract at 0.33%	0.06%
9/5/13	Bank issues $1 million, 91-day Eurodollar time deposit at 1%; three-month interest expense = $2,527.78 (increase in interest expense over previous period = $1,845.28)	Bank buys one September 2013 Eurodollar futures contract at 1.03%;	0.03%
Net effect:	Six-month interest expense = $3,210.28	Profit on futures = $1,750 (0.70%)	

Effective six-month borrowing cost = [$3.210.28 – $1,750](360/182)/$1,000,000 = 0.29%

In this example, the bank "saved" 21 basis points in interest expense, which represents the difference between interest expense on a six-month Eurodollar and the effective six-month interest on the synthetic Eurodollar. The actual benefit, of course, depends on how cash rates change relative to futures rates. In essence, the bank has substituted basis risk for the risk that cash rates will change adversely. In this example, the bank could lose if cash rates increased substantially more than futures rates increased. Briefly, the true borrowing cost increases as the basis decreases, while the cost falls as the basis increases.

The Mechanics of Applying a Microhedge

A bank should carefully analyze the opportunities and risks associated with hedging. The following discussion demonstrates the type of information required and procedural steps underlying successful hedging programs.[10]

Determine the Bank's Interest Rate Risk Position. To formulate the correct hedge, management must determine the bank's interest rate risk position. With a microhedge, this involves examining the bank's actual and anticipated cash market position and how specific interest rate changes will affect interest income or interest expense, or the value of an underlying asset or liability. The objective is to know in what rate environment the bank loses. Frequently, banks then compare their rate forecast and their potential losses if these rates materialize. Selectively hedging when losses will arise if the forecast is realized is a form of speculation. The key hedging decision involves determining how much risk the bank will accept.

Forecast the Dollar Flows or Value Expected in Cash Market Transactions. To determine how many futures contracts are necessary, management should estimate the dollar magnitude of anticipated cash flows with cash market transactions. This may equal the amount of investable funds, the size of a loan commitment, or the amount of liabilities to be issued or rolled over.

Choose the Appropriate Futures Contract. A bank should select a hedging vehicle that reduces interest rate risk. Because changes in the basis determine hedging risk, the appropriate futures contract is usually one whose rates most highly correlate with those of the cash asset or liability being hedged. Typically, the correlation is highest for like instruments, such as Eurodollar futures relative to cash Eurodollar deposits. If a like futures instrument is unavailable, a bank can examine historical correlations for different futures contracts and choose the contract with the highest correlation coefficient. As described earlier, the use of a futures contract that is not identical to the cash instrument being hedged is referred to as a cross hedge. It is also important to assess the liquidity of different contracts. Only when trading volume is large can a bank easily buy or sell futures at relatively stable basis levels.

Determine the Correct Number of Futures Contracts. Five factors, listed below, determine the correct number of futures contracts. This calculation, or hedge ratio, is expressed numerically as:

$$\mathrm{NF} = \frac{[\mathrm{A} \times \mathrm{Mc}]}{\mathrm{F} \times \mathrm{Mf}}\mathrm{b} \tag{9.2}$$

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[10] This analysis is based on steps outlined by Kawaller (1983).

where

NF = number of futures contracts
A = dollar value of cash flow to be hedged
F = face value of futures contract
Mc = maturity or duration of anticipated cash asset or liability
Mf = maturity or duration of futures contract

$$b = \frac{\text{Expected rate movement on cash instrument}}{\text{Expected rate movement on future contract}}$$

If futures rates are expected to move coincidentally with cash rates, b equals 1. If futures rates are expected to exhibit larger moves relative to cash rates, b is less than 1, and vice versa.[11] Using the information from Exhibit 9.7 and assuming b equals 1 with Eurodollar cash and futures rates, the bank needed one futures contract:

$$\text{NF} = \frac{\$1{,}000{,}000 \times 91 \text{ days}}{\$1{,}000{,}000 \times 90 \text{ days}} \times 1 = 1$$

Determine the Appropriate Time Frame for the Hedge. Typically, a bank matches the length of a hedge with the timing of cash flows for the underlying asset or liability. For example, a bank that knows it will have funds to invest in six months will use a futures contract that expires in six or more months. If consecutive cash flows are expected, such as principal payments on a term loan, a bank will hedge by spreading different futures contracts over the term of the cash flows. This process, labeled **stripping futures**, consists of buying or selling equal amounts of successive futures contracts.[12]

Monitor Hedge Performance. Once a hedge is in place, management should monitor interest rate changes and the bank's cash position to verify the hedge performance. One concern is that the anticipated cash position might vary. Another is that the basis might move against the cash rate, whereby the bank loses in both the cash and futures market. If the bank's risk profile changes, it may want to lift a hedge. In practice, many participants adjust their hedge when the basis moves against them, implicitly extrapolating that the movement is permanent. In doing so, they are speculating.

Macrohedging Applications

Macrohedging focuses on reducing interest rate risk associated with a bank's entire portfolio rather than with individual components or transactions. As suggested in Chapters 7 and 8, macrohedging assumes that interest rate risk is best evidenced by GAP or DGAP measures and by the sensitivity of bank earnings and EVE across different interest rate environments. Banks can subsequently use futures contracts to hedge this net portfolio rate sensitivity.

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[11] In practice, the appropriate factor is determined as the slope of the regression line from running a regression of cash price changes on futures price changes using historical data.

[12] If the term of the cash flows exceeds the time frame for which futures contracts are available, hedgers can "stack" contracts by loading up on the last available contract and systematically switching into new futures contracts as they become available. This involves additional risk and increases transactions costs.

Hedging: Gap or Earnings Sensitivity

When establishing a macrohedge, a bank should initially examine its aggregate interest rate risk position. Banks using GAP and earnings sensitivity analysis focus on the volatility in net interest income. GAP represents the dollar magnitude of rate sensitive assets minus the dollar magnitude of rate sensitive liabilities over different time intervals. If GAP is positive, the bank is said to be asset sensitive, because its net interest income rises when interest rates rise and falls when interest rates fall. If GAP is negative, the bank is liability sensitive, because net interest income falls when rates increase and rises when rates decrease. The magnitude of the potential change in net interest income indicates the sensitivity of earnings to rate changes and the aggregate amount of interest rate risk assumed.

Hedge Implementation

- If a bank loses when interest rates fall, it should use a long hedge.
- If a bank loses when interest rates rise, it should use a short hedge.

Hedging strategies focus on whether a bank is asset or liability sensitive and the extent to which rate changes might alter net interest income. To balance asset sensitivity, a bank will institute a long hedge whereby declining interest rates should generate futures profits that offset the decline in net interest income. To balance liability sensitivity, a bank will institute a short hedge. If rates subsequently increase and the bank's net interest income falls, the sale of futures should produce a profit that at least partially offsets the lost net interest income.

Consider the summary rate sensitivity data for First Savings Bank from Exhibit 7.7 in Chapter 7. This bank has a negative cumulative GAP through one year of \$15.448 million under management's most likely rate scenario. Exhibit 7.9 demonstrates that if rates increase by 1 percent, net interest income will likely fall modestly the next year, but will fall by almost \$750,000 two years out. Suppose that the bank chooses to hedge \$10 million of its \$15.4 million GAP exposure over 180 days. This partial hedge would call for the sale of 20 Eurodollar futures contracts determined by:

$$\text{NF} = \frac{\$10{,}000{,}000}{\$1{,}000{,}000} \times \frac{180 \text{ days}}{90 \text{ days}} \times 1.0 = 20$$

This assumes that the bank uses Eurodollar futures and that the expected movement between the effective interest rate on the rate sensitive liabilities relative to the Eurodollar futures rate equals 1. The bank would likely sell 10 June 2014 and 10 September 2014 contracts that expire more than six months from December 2013. It would liquidate the hedge by periodically buying back futures at selected intervals. The hedge should work because any decline in net interest income due to rising rates should be offset by a gain on the short futures position. Also, any gain in net interest income from falling rates should be offset by a loss on the short futures position.

This type of hedge is clearly a cross hedge, as the cash rate is actually a combination of several rates with each one different from the Eurodollar futures rate. The bank is negatively gapped with the magnitude of change in net interest income associated with changes in short-term liability rates. The bank might alternatively choose Treasury bill futures for the hedge instrument if the correlation was higher with liability rates, because money market deposit accounts pay interest tied to cash Treasury bill rates. Because the hedge matches gains in either the cash or futures market with losses in the other, the transaction essentially fixes a rate or outcome before basis changes. In effect, the short hedge moves both the GAP and earnings sensitivity closer to zero.

Hedging: Duration Gap and Eve Sensitivity

One of the presumed advantages of DGAP analysis is that it lends itself to hedging applications. DGAP is a single-value measure of total interest rate risk in which a bank targets its economic value of equity EVE. DGAP equals the weighted duration of bank assets minus the product of the weighted duration of bank liabilities and the bank's debt-to-asset ratio. A positive DGAP measure indicates that aggregate assets will vary more in value relative to aggregate liabilities when interest rates change equally. If rates increase, the market value of assets falls more than the market value of liabilities, so that EVE declines. A bank with a negative DGAP will see its equity increase in value when rates rise.

To eliminate this risk, a bank could structure its portfolio so that the DGAP equals zero. Alternatively, it can use futures to balance the value sensitivity of the portfolio. Equation 9.3 is listed below:

$$\frac{\Delta \text{EVE}}{\text{Market value of assets}} = -\frac{\text{DGAP} \times \Delta \text{y}}{(1+\text{y})} \tag{9.3}$$

where DGAP equals the DGAP and y equals the average interest rate for a bank's portfolio. If management wants to immunize EVE, it could set the bank's DGAP at zero. This can be done by using futures to create a synthetic DGAP that approximately equals zero. The appropriate size of a futures position can be determined by solving Equation 9.4 for the market value of futures contracts (MVF), where DF is the duration of the futures contract used, DA is the weighted duration of assets, and DL is the weighted duration of liabilities:[13]

$$\frac{\text{DA(MVRSA)}}{(1+\text{i}_\text{a})} - \frac{\text{DL(MVRSL)}}{(1+\text{i}_\text{l})} + \frac{\text{DF} \times (\text{MVF})}{(1+\text{i}_\text{f})} = 0 \tag{9.4}$$

The subscripts on the interest rate measures refer to assets (a), liabilities (l), and futures (f), and all rates are assumed to change by the same amount. MVRSA and MVRSL refer to the market value of rate sensitive assets and rate sensitive liabilities, respectively.

As an illustration, consider the bank balance sheet data provided for the sample bank in Exhibit 8.2 of Chapter 8. Because the bank has a positive DGAP of 1.42 years, it will see its EVE decline if interest rates rise. It thus needs to sell interest rate futures contracts in order to hedge its risk position. The short position indicates that the bank will make a profit if futures rates increase. This should at least partially offset any decline in the EVE caused by corresponding increases in cash rates. Assuming the bank uses a Eurodollar futures contract currently trading at 4.9 percent with a duration of 0.25 years, the target MVF contracts can be obtained by applying Equation 9.4:

$$\frac{2.88(\$900)}{(1.10)} - \frac{1.59(\$920)}{(1.06)} + \frac{0.25(\text{MVF})}{(1.049)} = 0$$

or MVF = −$4,096.82. This suggests that the bank should sell four Eurodollar futures contracts. If all interest rates increased by 1 percent, the profit on the four futures contracts would total $10,000 (4 × 100 × $25), or $2,000 less than the decrease in EVE associated with the increase in cash rates (see Exhibit 8.3). The discrepancy derives from using interest rate averages and a discrete number of futures contracts. The

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[13] Because futures contracts have no fixed price or cash flow, they have no duration. Under certain assumptions, however, it can be shown that the duration of a futures contract equals the duration of the underlying deliverable instrument.

concept, however, is clear. DGAP mismatches can be hedged through the use of futures without dramatic changes in the portfolio.

Accounting Requirements and Tax Implications

Regulators generally limit banks to using futures for hedging purposes. However, if a bank has a dealer operation, it can use futures as part of its trading activities. Regardless of how futures contracts are used, recently imposed accounting standards require that gains and losses on futures and other off-balance sheet positions be marked-to-market as they accrue, thereby affecting current income. Such current recognition of gains or losses clearly increases the volatility of reported earnings over short intervals. For hedging applications, futures contracts must be recognized on a micro basis by linking each contract to a specific cash instrument.

To qualify as a hedge, the use of futures must meet several criteria. A bank must show that a cash transaction exposes it to interest rate risk, a futures contract must lower the bank's risk exposure, and the bank must designate the contract as a hedge. The primary difficulty involves determining whether futures reduce bank risk. Financial Accounting Standards Board statement number 80 states that this condition is met if the correlation between price changes in futures and the hedged instrument is high. Unfortunately, there are no well-defined rules for establishing what time period should be used to calculate the correlation or even what amount of correlation is high enough. If a high correlation does not prevail, a bank must immediately stop deferring futures gains and losses and account for the proceeds as current income.

Using Forward Rate Agreements to Manage Rate Risk

The previous discussion briefly introduced forward contracts and compared their features with financial futures. While there are similarities, forward contracts differ because they are negotiated between counterparties, there is no daily settlement or marking-to-market, and no exchange guarantees performance. In general, the buyer of a forward contract agrees to pay a specific amount at a set date in the future (settlement date) for an agreed-upon asset, currency, and so on, from the counterparty representing the seller. The specified price or rate is labeled the exercise price (rate). The seller of a forward contract agrees to deliver the agreed-upon asset, currency, etc., for the specific amount at a set date when there is physical delivery. When a forward contract is cash-settled, the buyer and seller agree to exchange the difference between the exercise price and cash price at the future settlement date.

A FRA is a type of forward contract based on interest rates. The two counterparties to an FRA agree to a **notional principal** amount that serves as a reference figure in determining cash flows. The term *notional* refers to the condition that the principal does not change hands, but is used only to calculate the value of interest payments. The buyer of the FRA agrees to pay a fixed-rate coupon payment and receive a floating-rate payment against the notional principal at some specified future date, while the seller of the FRA agrees to pay a floating-rate payment and receive the fixed-rate payment against the same notional principal. In most cases, the exercise rate is set equal to the forward rate from the prevailing yield curve reflecting the expected future interest rate. Thus, a buyer or seller of the FRA will receive cash or make cash payment only if the actual interest rate at settlement differs from that initially expected.

FRAs can be used to manage interest rate risk in the same manner as financial futures. The buyer of the FRA will receive (pay) cash when the actual interest rate at contract settlement is greater (less) than the exercise rate set at origination of the contract. The seller of the FRA will receive (pay) cash when the actual interest rate at settlement is less (greater) than the exercise rate. Note that FRAs are cash-settled at the settlement date with no interim cash flows. They are not marked-to-market and there are no margin requirements.

Forward Rate Agreements: An Example

Suppose that Metro Bank as seller enters into a receive fixed-rate/pay floating-rate FRA agreement with County Bank as buyer with a six-month maturity based on a $1 million notional principal amount. The floating rate is three-month LIBOR and the fixed (exercise) rate is 5 percent. Metro Bank would refer to this as a "3 versus 6" FRA at 5 percent on a $1 million notional amount from County Bank. The phrase "3 versus 6" refers to a three-month interest rate observed three months from the present, for a security with a maturity date six months from the present. The only cash flow will be determined in six months at contract maturity by comparing the prevailing three-month LIBOR with 5 percent.

Assume, for example, that in three months, three-month LIBOR equals 6 percent. In this case, County Bank would receive from Metro Bank $2,451. The interest settlement amount is $2,500 determined as:

$$\text{Interest} = (0.06 - 0.05)(90/360)\$1{,}000{,}000 = \$2{,}500$$

Because this represents interest that would be paid three months later at maturity of the instrument, the actual payment is discounted at the prevailing three-month LIBOR:

$$\text{Actual interest} = \$2{,}500/[1 + (90/360)0.06] = \$2{,}463$$

Suppose, instead, that LIBOR equals 3 percent in three months. Here, County Bank would pay Metro Bank:

$$\text{Interest} = (0.05 - 0.03)(90/360)\$1{,}000{,}000 = \$5{,}000$$

or

$$\$5{,}000/[1 + (90/360)0.03] = \$4{,}963$$

In this example, County Bank would pay fixed-rate/receive floating-rate as a hedge if it was exposed to loss in a rising-rate environment. This is analogous to a short futures position. Metro Bank would take its position as a hedge if it were exposed to loss in a falling (relative to forward rate) rate environment. This is analogous to a long futures position.

Potential Problems with FRAs

While FRAs offer some attractive features, there are several problems with using them in practice. First, like all forward contracts, FRAs are essentially credit instruments. This arises from the possibility that you might not be paid when the counterparty owes you cash. There is no clearinghouse to guarantee performance and no daily marking-to-market or collateral that is posted. In the past, some counterparties have reneged on forward contracts, so each participant must gauge carefully the reputation and soundness of its counterparties. Second, it is sometimes difficult to find a specific counterparty that wants to take exactly the opposite position. Because every FRA is negotiated, the parties might want different notional principal amounts or have a different settlement date. Thus, transactions costs can be large. Finally, FRAs are not as liquid as many alternatives. If a party to an FRA wants to exit the position prior to settlement, it might assign the contract to another party. However, this requires that some compensation be paid. If the counterparty agrees, it might directly cancel the agreement for a fee. Alternatively, it might take exactly the opposite position with the counterparty if available, and lose only the change in price between origination of the FRA and the exit date.

Basic Interest Rate Swaps as a Risk Management Tool

Interest rate swaps originated in the Eurobond market in 1980, but have recently been one of the fastest growing off-balance sheet contracts in the world. Basic interest rate swaps are now widely used by financial institutions as hedging tools and as a means of creating synthetic balance sheet positions. This section documents the nature of swap transactions and demonstrates how financial institutions use them as a risk management tool.

Characteristics

A **basic**, or "plain vanilla," interest rate **swap** is an agreement between two parties to exchange a series of cash flows based on a specified notional principal amount. One party makes payments based on a fixed interest rate and receives floating-rate payments, while the other party makes the floating-rate payments and receives the fixed-rate payments. The fixed rate is typically based on prevailing Treasury note and bond rates and is quoted on a semiannual bond equivalent basis assuming a 365-day year. The floating rate is typically quoted on a money market basis assuming a 360-day year. These rates are applied against the notional principal amount that is constant over the life of the swap.[14] Maturities range from six months to 30 years, with most swaps in the 1- to 10-year range. In most swap transactions, a swap dealer makes a market in basic swaps and thus serves as an intermediary. As such, any party that wants to take a position can sign a master agreement with a swap dealer, which indicates the nature of the payment calculations, collateral requirements, and so on. The dealer takes the other side of the position. Thus, all transactions are effected through the dealer, and any risks are manifested via the dealer's operations.

Exhibit 9.8 demonstrates how swap rates are quoted by a swap dealer. These data apply to basic interest rate swaps with three-month LIBOR as the floating rate for all contracts. This means that all swap parties either pay or receive three-month LIBOR versus a fixed rate that differs based on maturity. The first column indicates the term or maturity of the basic swap contract. The second column lists the prevailing U.S. Treasury spot rate with the same maturity as that for the swap. The third column represents the midpoint of the dealer's bid-offer spread as a premium relative to the prevailing Treasury rate. The final two columns provide the fixed rates for the different maturity swaps. The "bid" rates indicate the fixed rate that a swap party will receive if it pays three-month LIBOR. The "offer" rates indicate the fixed rate that a swap party will pay if it receives three-month LIBOR. The difference between the two represents the dealer's spread or profit potential.

This example emphasizes the role of an intermediary in processing swaps. This intermediary may simply serve as an agent with no credit risk exposure, or as a dealer where it is a counterparty to each side of the transaction. As a dealer, the intermediary may enter into contracts without negotiating the other side of the swap and thus accepts the risk of adverse rate changes. If it lays off the exposure to another counterparty, it hopes to earn

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[14] Amortizing and accreting swaps are available where the notional principal amount decreases and increases, respectively, over time.

EXHIBIT 9.8 **Interest Rate Swap Dealer Quotes for Basic Swaps: Fixed-Rate versus Three-Month LIBOR, June 21, 2013**

		Swap Rates (%)	
Term (years)	U.S. Treasuries (%)	Bid	Offer
2	0.38	0.54	0.56
3	0.71	0.85	0.88
4	1.02	1.23	1.26
5	1.43	1.60	1.63
7	1.97	2.16	2.19
10	2.54	2.69	2.72
20	2.90	3.31	3.35
30	3.59	3.42	3.46

the bid-offer spread. The intermediary's continuing role is to collect the interest payments and pay the interest owed to either party, depending on the contractual terms and the applicable interest rates. Practically, each counterparty in a swap will pay or receive the net difference between LIBOR and the relevant fixed rate. Today, many large commercial banks, investment banks, and Federal Home Loan Banks serve as intermediaries.

Conceptually, a basic interest rate swap is a package of FRAs. As with FRAs, swap payments are netted and the notional principal never changes hands. Consider the following example using data for a two-year swap from Exhibit 9.8 based on three-month LIBOR as the floating rate. This swap involves eight quarterly payments. Party FIX agrees to pay a fixed rate, and Party FLT agrees to receive a fixed rate with cash flows calculated against a $10 million notional principal amount. The following rates apply:

Party FIX : Pay: 0.56% Receive: three-month LIBOR
Party FLT : Pay : three-month LIBOR Receive : 0.54%

Exhibit 9.9 presents a time line with the expected cash flows from these two positions. Note that there are eight valuation dates representing the eight successive three-month periods. Suppose that three-month LIBOR for the first pricing interval equals 0.27 percent, and there are 91 days in the three-month period. The fixed payment for Party FIX is $13,962, and the floating rate receipt is $6,825 as calculated at the bottom of the exhibit. With netting and the swap dealer as the counterparty, Party FIX will have to pay the dealer the difference of $7,137 at the first pricing. Assuming that Party FLT took the other side of this swap through the dealer, its initial floating-rate payment is $6,825 while its fixed-rate receipt is $13,463. Thus, Party FLT will receive the difference of $6,638 from the swap dealer. Of course, the dealer will net $499 from the spread (initially $7,137 − $6,638), which will be constant across all floating-rate changes as long as the two parties meet the swap terms. At the second and subsequent pricing intervals, only the applicable three-month LIBOR is unknown. As LIBOR changes, the amount that both Party FIX and Party FLT either pay or receive will change. We will discuss more about swap pricing later, but note for now that Party FIX will only receive cash at any pricing interval if three-month LIBOR exceeds 0.56 percent. Party FLT will similarly receive cash as long as three-month LIBOR is less than 0.54 percent. This emphasizes that the swap is a series of FRAs with each valuation date representing a distinct FRA with a different maturity.

EXHIBIT 9.9 Cash Flows Associated with Basic Interest Rate Swap Positions

Two-Year Maturity, $10 Million Notional Principal
with Eight Quarterly Swap Payments

FIX: Pay 0.56 Percent, Receive LIBOR
FLT: Pay LIBOR, Receive 0.54 Percent

		0	1	2	3	4	5	6	7	8
Party FIX	Pay		$13,962	13,962	13,962	13,962	13,962	13,962	13,962	13,962
	Rec.		$6,825	LIB$_2$	LIB$_3$	LIB$_4$	LIB$_5$	LIB$_6$	LIB$_7$	LIB$_8$
Net	Pay		$7,137	?	?	?	?	?	?	?
Party FLT	Pay		$6,825	LIB$_2$	LIB$_3$	LIB$_4$	LIB$_5$	LIB$_6$	LIB$_7$	LIB$_8$
	Rec.		$13,423	13,423	13,423	13,423	13,423	13,423	13,423	13,423
Net	Rec.		$6,638	?	?	?	?	?	?	?
Dealer			$499							

Party FIX: Period 1

Pay: 0.0056 (91/365) $10,000,000 = $13,962
Rec: 0.0027 (91/360) $10,000,000 = $6,825
Net Payment = $7,137

Party FLT: Period 1

Pay: 0.0027 (91/360) $10,000,000 = $6,825
Rec: 0.0054 (91/365) $10,000,000 = $13,463
Net Receipt = $6,638

Note: The notation LIB refers to three-month LIBOR, with the subscript denoting the period for which the applicable floating LIBOR applies.

Swaps represent another means for firms facing mismatched assets and liabilities to microhedge or macrohedge, or for firms that want to increase risk to adjust their earnings sensitivity in the desired way. Initially, only firms involved in the international money and capital markets used swaps, and virtually all transactions were priced in terms of LIBOR. More recently, medium-sized firms with only domestic operations have begun using swaps with many different rates—Wall Street prime, the federal funds rate, commercial paper rate, and T-bill rate—used to determine the underlying floating-rate payment obligations.

In its classic form, a plain vanilla swap arose when two firms faced substantially different interest rate risk over the same period. One firm was a high-quality borrower, while the other exhibited greater perceived default risk. An interest rate swap was structured to take advantage of the perceived credit-quality differences by using the high-quality borrower's reputation to lower each firm's borrowing cost and provide the preferred type of fixed-rate or floating-rate financing. In today's environment, these quality spread differentials have largely disappeared with the enormous growth in swap usage.

Adjust the Rate Sensitivity of an Asset or Liability. The most common use of basic swaps is to adjust the rate sensitivity of a specific asset or liability. This may involve making a fixed-rate loan or a floating-rate loan, converting a floating-rate liability to a fixed-rate liability, and so forth.

Convert a Floating-Rate Liability to a Fixed-Rate Liability. Consider a bank that makes a $1 million, three-year fixed-rate loan with quarterly interest at 8 percent. It finances the loan by issuing a three-month Eurodollar deposit priced at three-month LIBOR. The following T-account demonstrates the transaction.

Asset	**Liability**
Loan: $1 million, three-year maturity	Three-month Eurodollar deposit: $1 million
Rate: 5% fixed	Rate: three-month LIBOR floating

By itself, this transaction exhibits considerable interest rate risk because the bank will see its net interest income shrink if it continues to roll over the three-month deposit at each maturity date and LIBOR increases. The bank is liability sensitive and loses (gains) if LIBOR rises (falls). The bank can, however, use a basic swap to microhedge this transaction. Using the data from Exhibit 9.8 for a basic three-year swap, the bank could agree to pay 0.88 percent and receive three-month LIBOR against $1 million for the three years. By matching this with its continuous issuance of three-month Eurodollars after earlier ones mature, it locks in a borrowing cost of 0.88 percent because it will both receive and pay LIBOR every quarter.[15]

Net Effect of Balance Sheet Transaction + Swap

Receive:	5.00% from loan + three-month LIBOR from swap
Pay:	three-month LIBOR from Eurodollar deposit + 0.88% from swap
Net spread:	4.12%

The use of the swap enables the bank to reduce risk and lock in a spread of 4.12 percent (5 percent – 0.88 percent) on this transaction. The swap effectively fixed the borrowing cost at 0.88 percent for three years.

Convert a Fixed-Rate Asset to a Floating-Rate Asset. Consider another example where a bank has a commercial customer who demands a fixed-rate loan. The bank has a policy of making only floating-rate loan because it is liability sensitive and will lose if interest rates rise. Management does not want to take on additional interest rate risk. Ideally, the bank wants to price the loan based on prime. Suppose that the bank makes the same $1 million, three-year fixed-rate loan as in the above case. It could enter into a three-year basic swap involving the prime rate as the floating rate versus a fixed rate. Assume that it enters into such a swap with a $1 million notional principal amount, agreeing to pay a 0.88 percent fixed rate and receive prime minus 2.50 percent with quarterly payments. As indicated below, the effective interest rate received is now a floating rate equal to prime plus 162 basis points:

	Loan	**Basic Swap**
Receive:	5.00%	Prime – 2.50%
Pay:		0.88%
Net receipt:	Prime + (5.00% – 2.50% – 0.88%) or Prime + 1.62%	

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[15] The bank is accepting credit risk in the sense that if the market perceives that it is riskier over time and demands a risk premium on its future Eurodollar borrowings, it may pay more than three-month LIBOR for the subsequent deposits.

This swap effectively converts a fixed-rate loan into a loan with a rate that floats with the prime rate. With prime equal to 3.25 percent, the initial floating rate equals 4.87 percent.

Create a Synthetic Security. Some financial institutions view basic interest rate swaps as synthetic securities. As such, they enter into a swap contract that essentially replicates the net cash flows from a balance sheet transaction. For example, suppose that a bank on June 21, 2013, buys a three-year Treasury yielding 0.71 percent (from Exhibit 9.8), which it finances by issuing a three-month deposit. This bank is liability sensitive in that it will see its net interest income from this combined trade fall if the cost of reissuing a three-month deposit rises over time. Many banks effectively finance securities with such deposits.

Consider, as an alternative, simply entering into a three-month swap agreeing to pay three-month LIBOR and receive a fixed rate. Per the data in Exhibit 9.8, the fixed swap rate is 0.85 percent or 14 basis points above the three-year Treasury rate. Interestingly, the swap produces a larger spread than the balance sheet transaction, yet has essentially the same interest rate risk profile. Why would management consider the balance sheet transaction as lower risk than the off-balance sheet swap? It does have to hold capital against the swap, albeit at a low percentage, and does not have to hold capital against the balance sheet position because it owns a zero-risk class asset.[16] If it no longer wanted to assume the risk, it also has the flexibility to alter its debt financing on-balance sheet at any time, and could reduce risk by issuing a longer-term deposit that matched the remaining maturity of the Treasury. Of course, the spread it earned afterward could be far different from that initially available. By contrast, it would have to exit the swap by selling its position, which might involve taking a loss. Management must determine whether the yield advantage of the swap outweighs these risks and costs.

Macrohedge. Banks can also use interest rate swaps to hedge their aggregate risk exposure measured by earnings and EVE sensitivity. The analysis is analogous to that with financial futures. Specifically, a bank that is liability sensitive or has a positive DGAP will take a basic swap position that potentially produces profits when rates increase. With a basic swap, this means paying a fixed rate and receiving a floating rate. Any profits can be used to offset losses from lost net interest income or declining EVE. This would have as comparable an impact as shorting financial futures. In terms of GAP analysis, a liability sensitive bank has more rate sensitive liabilities than rate sensitive assets (GAP < 0 indicates RSAs < RSLs). To hedge, the bank needs the equivalent of more RSAs. A swap that pays fixed and receives floating is comparable to increasing RSAs relative to RSLs because the receipt floats (reprices) with rate changes.

Similarly, any bank that is asset sensitive or has a negative DGAP and wants to hedge will take a swap position that potentially produces profits when rates fall. With a basic swap, this means paying a floating rate and receiving a fixed rate. If rates fall, net interest income and EVE will fall, but the swap would likely produce a gain to offset at least part of the loss. This would have the same impact as going long on financial futures. In terms of GAP analysis, an asset sensitive bank has more rate sensitive assets than rate sensitive liabilities (RSAs > RSLs). To hedge, the bank needs the equivalent of more RSLs. A swap that pays a floating rate and receives a fixed rate is comparable in impact to increasing RSLs relative to RSAs.

Many banks report their aggregate use of interest rate swaps in their rate sensitivity reports, and thus the aggregate impact on the banks' overall interest rate sensitivity.

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[16] Risk-based capital requirements for banks are introduced in Chapter 12. Generally, banks are not required to hold capital against cash and Treasury securities that have no default risk.

Such treatment allows the analyst to assess, in general, whether management uses swaps to increase or decrease overall risk. Consider the data for First Savings Bank from Exhibit 7.7 in Chapter 7, which presents the rate sensitivity report for year-end 2013. Note the data in the third row from the bottom of the exhibit titled "Swaps: Pay Fixed/ Receive Floating." These data are summary figures that indicate the aggregate impact of FSB's use of swaps across different time intervals. Under the column of rate sensitive assets and liabilities for three months or less, the figure is $50,000. To determine what this figure represents, note that the bank's periodic GAP for this interval prior to the swaps' impact would have equaled –$70,252 ($278,748 – $349,000). After the swaps, the periodic GAP was –$20,252. Thus, the swaps had the equivalent effect of adding $50,000 in rate sensitive assets within this time interval. Conceptually, FSB paid a fixed rate and received a floating rate on a $50,000 notional principal to move the periodic GAP over this interval closer to zero so that the use of swaps represented a macrohedge. The corresponding impact from one to three years and three to five years also represented a hedge.

Pricing Basic Swaps

The pricing of basic interest rate swaps is straightforward. Consider the time line in Exhibit 9.9. The floating rate, such as three-month LIBOR in the example, is based on some predetermined money market rate or index. The payment frequency is coincidentally set at every six months, three months, or one month, and is generally matched with the money market rate. The fixed rate is set at a spread above the comparable maturity Treasury note rate. For swap maturities out to five years, the swap or dealer spread is priced based on the implied yields on a strip of Eurodollar futures contracts for the same maturities. Beyond five years, the swap or dealer spread is priced based on risk premiums associated with matched maturity/duration corporate notes and bonds. These conventions are widely recognized, which makes the valuation of swaps straightforward.

For example, the earlier discussion assumed that the applicable LIBOR for the first pricing date three months from the present in Exhibit 9.9 was 0.27 percent, which equals the current three-month LIBOR rate. The implied three-month LIBOR yield for the second pricing date, six months from the present (LIB_2), would be the futures rate on a three-month Eurodollar futures contract that expires three months from the present. The other implied three-month LIBOR rates (LIB_3, LIB_4, etc.) are similarly assumed to be the subsequent three-month Eurodollar futures rates that represent successive futures expiration dates. In terms of Exhibit 9.9, Party FIX and Party FLT presumably did not know what LIBOR would be on these valuation dates. Neither would enter into the contract if it expected, a priori, to lose on the transaction.

Basic swaps are priced as a zero net present value transaction. This means that after substituting an expected value for LIBOR at each of the eight valuation dates in Exhibit 9.9, the present value of the net cash flows (netted payments and receipts) must equal zero. *In essence, the fixed rate that is quoted to each party (actually, the midpoint of the two fixed rates), represents the rate that produces a zero net present value for the assumed net cash flows.* Given the expected values for LIBOR read off the matched maturity Eurodollar futures contracts, the spreads over Treasury rates are determined as the markups necessary to make a swap's net present value equal zero.

Comparing Financial Futures, FRAs, and Basic Swaps

There are many similarities among interest rate swaps, financial futures, and FRAs. Each different contract enables a party to enter an agreement, which provides for cash receipts or cash payments depending on how interest rates move. Each allows managers to alter a bank's interest rate risk exposure. None requires much of an initial cash commitment to take a position. The following table compares the positions with specific objectives:

	Position	
Objective	**Financial Futures**	**FRAs & Basic Swaps**
Profit if rates rise	Sell futures	Pay fixed, receive floating
Profit if rates fall	Buy futures	Pay floating, receive fixed

There are also several key differences. First, financial futures are standardized contracts based on fixed principal amounts. Parties negotiate the notional principal amount with FRAs and interest rate swaps. Financial futures require daily marking-to-market, which is not required with FRAs and swaps. This exposes futures participants to some risk and liquidity requirements that FRAs and swaps avoid. Many futures contracts cannot be traded out more than three to four years, while interest rate swaps often extend 10 years to 30 years. The market for FRAs is not that liquid and most contracts are short term. Historically, trading activity was much deeper with futures such that liquidity, especially for the nearby contracts, was far greater. Swap activity has recently grown to where participants can readily buy and sell swaps in a secondary market and thus exit a position when needed. This is especially true because of the consensus on how to value basic swaps using Eurodollar futures rates. Finally, swap documentation is quite standardized, and participating firms can negotiate master agreements with partners that enhance the development of long-term business relationships.

The Risk with Swaps

While interest swaps are an alternative to futures and FRAs, they also entail risks. The recent experience of savings and loans is an example. When interest rates increased sharply during the early 1980s, many thrifts took advantage of interest rate swaps to obtain fixed-rate financing. When mortgage rates averaged 13 percent to 14 percent, it seemed reasonable to fix borrowing costs at 11 percent. Unfortunately for these swap players, the level of interest rates moved dramatically lower in the mid-1980s. Had thrifts waited, they could have paid much lower rates on both fixed-rate and floating-rate debt. Thus, they locked in much higher fixed interest expense for the benefit of risk reduction. The problems were compounded as homeowners took advantage of the lower rates to refinance their mortgages. In many instances, thrifts lost their high yielding, fixed-rate assets via prepayments but kept their fixed-rate interest obligations. Selling the swap obligations to a third party prior to expiration would have produced a direct income statement loss.

Similar problems arose with Long-Term Capital Management's use of swaps in 1998. This hedge fund made speculative bets that different interest rates would converge (equal the same value) over time. Because they were confident in their bet, management used swaps to increase the leverage of their positions. When interest rates subsequently moved in different directions, losses on the swaps and other positions virtually depleted the firm's capital, and it had to be bailed out by a consortium of financial institutions. More recently, many municipalities, such as Jefferson County, Alabama, and Detroit, Michigan, used interest rate swaps to fix their borrowing costs in the mid-2000s when they believed that interest rates would likely rise farther. This required them to issue floating-rate debt and then enter a swap agreeing to pay a fixed rate and receive a floating rate. With the sharp decline in rates after 2006 and subsequent lengthy period of low rates, these entities have been paying large amount to their swap counterparties. While the swaps did fix their borrowing costs, they would have been better off ex post not doing the swaps and thereby having their borrowing costs fall. Both Jefferson County and Detroit have negotiated with their swap counterparties to exit the swaps without having to pay large fees.

Market participants have developed a secondary market for swaps to reduce a firm's exposure to swap positions that it might want to exit. Straightforward, plain vanilla swaps follow a standardized format stipulated by terms of the International Swap Dealers Agreement such that positions can be entered and exited quickly. The standardized features have made it easy to trade these swaps in the secondary market. Unfortunately, the more complicated a swap is, the more difficult it is to trade the swap in the secondary market. Each swap is a negotiated contract between two parties. When the terms are unusual, the attractiveness decreases in the secondary market because the buyer must carefully analyze and price the unusual features of the underlying swap. Without guarantees or easily identifiable default risk, the liquidity of swaps diminishes. Such swaps, particularly those with options and other non-standardized terms, are not as readily marketable.

There is some credit risk with swaps as well, but this is not as great for a single contract as it originally seems. Remember that swap parties exchange only net interest payments. The notional principal amount never changes hands, such that a party will not lose that amount. Credit risk exists because the counterparty to a swap contract may default. This is a problem when interest rates have moved against the counterparty and you are owed money. Suppose that you have agreed to pay LIBOR and receive 3 percent with semiannual payments for three years. If LIBOR is above 3 percent, you must pay the counterparty while the counterparty owes you nothing due to netting. The counterparty is concerned with your ability to pay. You accept counterparty risk when LIBOR is below 3 percent. This risk is generally associated with the swap dealer's credit standing. When either counterparty perceives that there is a meaningful probability that the other counterparty may not perform under a swap, it will require collateral in support of the swap position. The existence and value of the collateral, in turn, affect the prices that intermediaries charge for making a market in swaps. These collateral arrangements are commonly part of bilateral collateral agreements that counterparties sign when they enter the swap market. The value of the required collateral, in turn, often rises and falls with changes in the ongoing (mark-to-market) value of the swap position.

Counterparty risk is extremely important to swap participants. Firms that are actively engaged in swap transactions often limit the amount of swap business they will do with any single counterparty to limit their risk exposure. Banks should have such policy limits approved by the board of directors before entering into swap contracts.

Interest Rate Caps and Floors

In addition to futures, FRAs and swaps, banks can hedge interest rate exposure through the use of caps and floors on interest rates. Caps and floors are options on interest rates such that participants either buy the option or sell the option. The appropriate position depends on the nature of the risk exposure the bank wants to hedge, or its speculative bet on future interest rate movements.

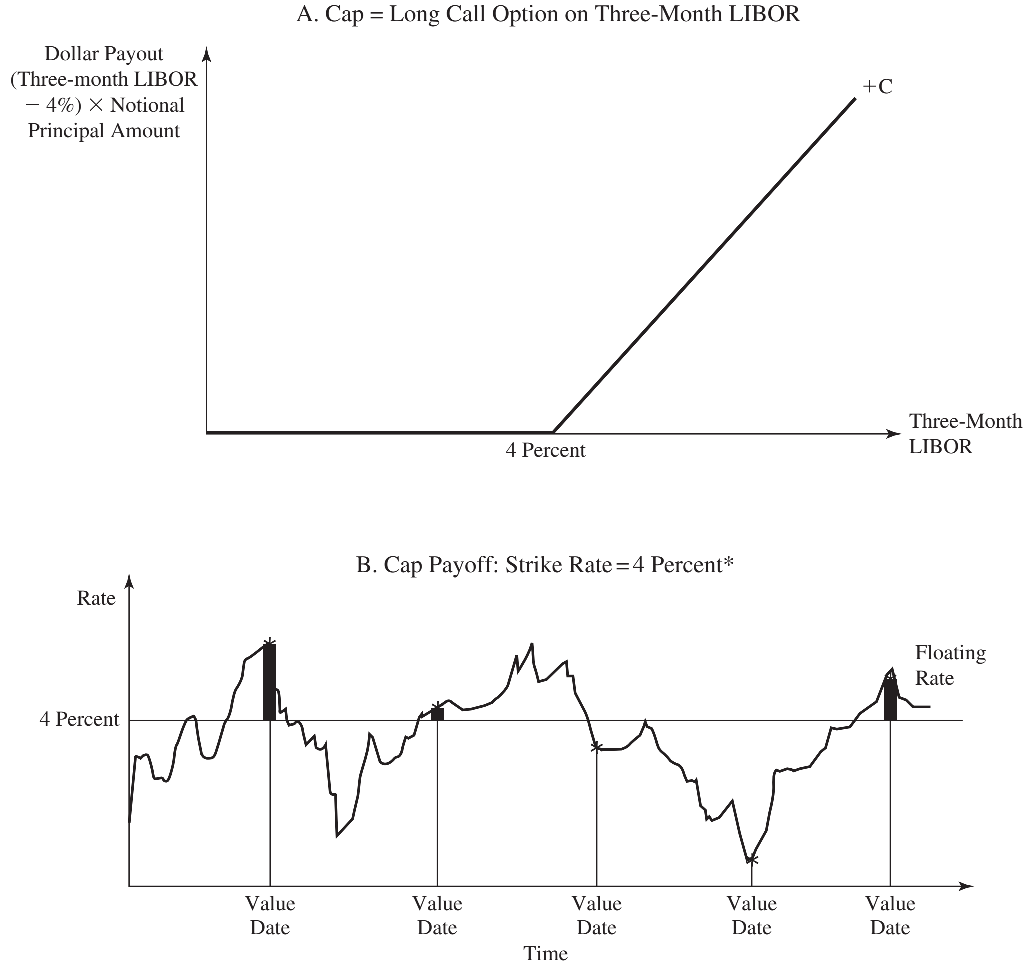
Buying an Interest Rate Cap

An **interest rate cap** is an agreement between two counterparties that limits the buyer's interest rate exposure to a maximum rate. An **interest rate floor** is an agreement between two counterparties that limits the buyer's interest rate exposure to a minimum rate. Buying a cap is actually the purchase of a call option on an interest rate. Buying a floor is actually the purchase of a put option on an interest rate.

When trading interest rate caps or floors, a participant selects a floating-rate index, a term to maturity, a strike (exercise) rate, the frequency of value dates when cash payments are made, and a notional principal amount. Depending on prevailing economic conditions these choices determine the price (premium) at which the option trades.

Consider the two diagrams in Exhibit 9.10. Section A characterizes the payoff diagram for the purchase of a 4 percent cap on three-month LIBOR. It is the same as a long call option position.[17] An interest rate cap has a maturity and periodic valuation dates, a notional principal amount, and a strike rate that is based on some reference interest rate. The buyer of a cap pays a one-time up-front premium and receives a cash payment from the seller of the cap equal to three-month LIBOR minus 4 percent multiplied by some notional principal amount on each valuation date, with no payment made

EXHIBIT 9.10 **Buying a Cap on Three-Month LIBOR at 4 Percent**



*Payoff at Value Date equals prevailing (LIBOR – 4 percent) × Notional Principal Amount.

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[17] Formally, a single call option on an interest rate is referred to as a caplet. An interest rate cap is actually a series of caplets at the same strike rate.

if LIBOR is below 4 percent. Formally, the payoff is the maximum of zero or three-month LIBOR minus 4 percent times the notional principal amount. Thus, if three-month LIBOR exceeds 4 percent, the buyer receives cash from the seller, and nothing otherwise. At maturity, the cap expires. These payoffs are indicated in Section B of Exhibit 9.10.

Consider a cap on three-month LIBOR at 4 percent based on a $100 million notional principal amount. If LIBOR equals 4.63 percent on the first valuation date, the buyer would receive $157,500 (0.0063/4 × $100 million) from the cap seller (ignoring compounding). If LIBOR equals 3.95 percent on the second valuation date, the buyer would receive zero. The obligated payment is a rate differential times the notional principal amount, or zero.

An **interest rate cap** is a series of consecutive long call options (caplets) on a specific interest rate at the same strike rate. The buyer selects an interest rate index, such as three-month LIBOR the prime rate, the one-month commercial paper rate, the T-bill rate or the federal funds rate; a maturity over which the contract will be in place; a strike (exercise) rate that represents the cap rate; and a notional principal amount. By paying an up-front premium, the buyer then locks in this cap on the underlying interest rate.

The benefits of buying a cap are similar to those of buying any option. The bank as buyer of a cap can set a maximum (cap) rate on its borrowing costs. It can also convert a fixed-rate loan to a floating-rate loan. In this context, it gets protection from increasing rates and retains the benefits if rates fall. The primary negative to the buyer is that a cap requires an up-front premium payment. If the buyer wants a cap that is at-the-money or in-the-money in a rising-rate environment, the premium can be high.

Buying an Interest Rate Floor

A buyer can also establish a minimum interest rate by buying a floor on an interest rate index. Consider the diagrams in Exhibit 9.11. Section A presents the payoff diagram for buying a 4 percent floor on three-month LIBOR.[18] Note that the diagram is similar to that for a long put option position. As indicated, the buyer of the floor receives a cash payment equal to the greater of zero or the product of 4 percent minus three-month LIBOR and a notional principal amount. Thus, if three-month LIBOR exceeds 4 percent, the buyer of a floor at 4 percent receives nothing. The buyer is paid only if three-month LIBOR is less than 4 percent. This payoff pattern is indicated in Section B of Exhibit 9.11.

An interest rate floor is a series of consecutive floorlets at the same strike rate. The buyer of an interest rate floor selects an index (with LIBOR, the prime rate, the commercial paper rate, the T-bill rate, and the federal funds rate again being the most popular), a maturity for the agreement, a strike rate, and a notional principal amount. By paying a premium, the buyer of the floor, or of the series of floorlets, has established a minimum rate on its interest rate exposure. The benefits are again those of any long option. A floor protects against falling interest rates while retaining the benefits of rising rates. The primary negative is that the premium may be high on an at-the-money or in-the-money floor, especially if the consensus forecast is that interest rates will fall in the future.

Interest Rate Collar and Reverse Collar

In some cases, banks buy interest rate collars or reverse collars. The purchase of an **interest rate collar** is actually the simultaneous purchase of an interest rate cap and sale of an interest rate floor on the same index for the same maturity and notional principal amount. The cap rate is set above the floor rate. The objective of the buyer of a collar is to protect against rising interest rates. The purchase of the cap protects against

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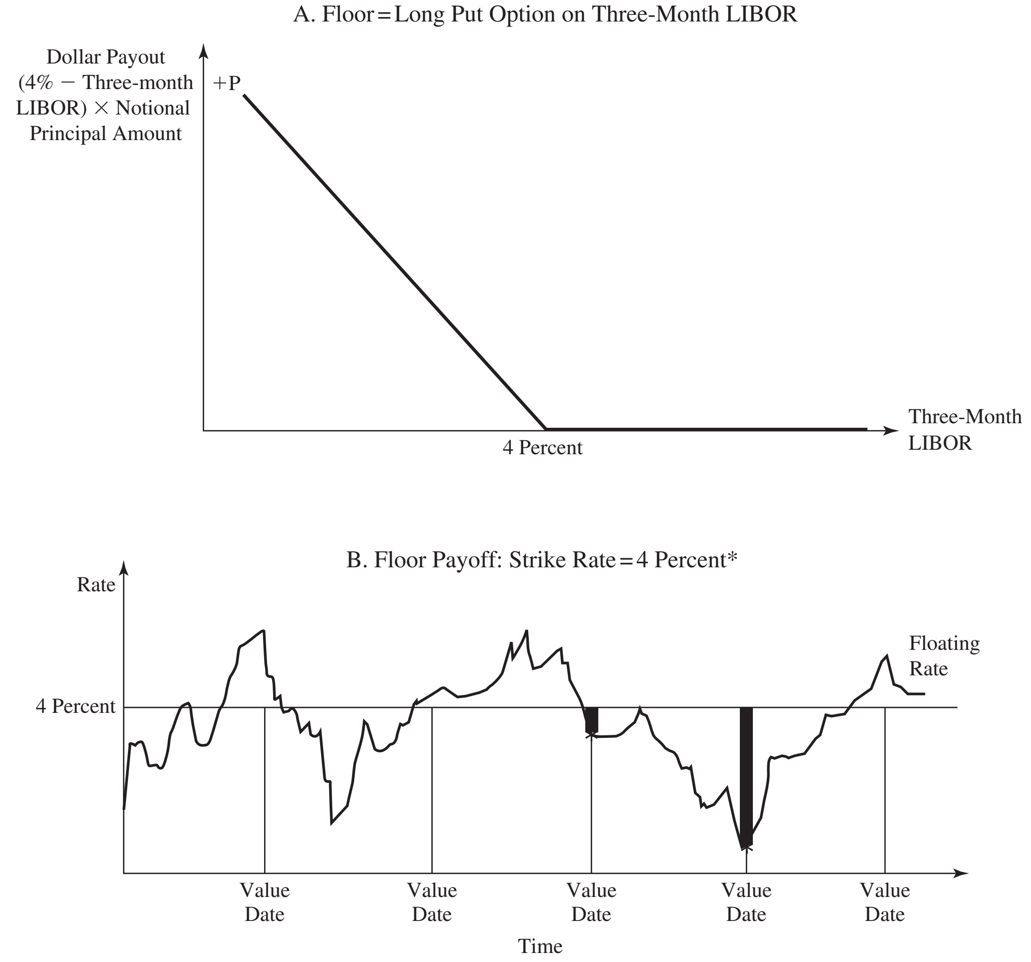
[18] Formally, a single floor option on an interest rate is referred to as a floorlet. An interest rate floor is actually a series of floorlets at the same strike rate.

EXHIBIT 9.11 **Buying a Floor on Three-Month LIBOR at 4 Percent**



*Payoff at Value Date equals prevailing (4 percent – LIBOR) × Notional Principal Amount.

rising rates, while the sale of the floor generates premium income. The motivation for selling the floor is typically to provide income that reduces the cost of the cap. If the index rate rises above the cap, the buyer receives cash from the counterparty equal to the difference between the index rate and the cap (strike) rate. Of course, if the index rate falls below the floor, the collar buyer pays the counterparty the difference between the floor (strike) rate and the reference rate. With falling rates, the buyer of a collar gives up any potential gain from the position.

A collar creates a band within which the buyer's effective interest rate fluctuates. The buyer is willing to accept a minimum floor rate to reduce the cost of the cap protection or because of a strong belief that rates will rise and the view that the floor will be out of the money. A *zero cost collar* is designed to establish a collar where the buyer has no net premium payment. This requires choosing different cap and floor rates such that the premiums are equal. The benefit is the same as any collar with zero up-front cost. The negative is that the band within which the index rate fluctuates is typically small, and the buyer gives up any real gain from falling rates.

A bank can also buy a **reverse collar**. This refers to buying an interest rate floor and simultaneously selling an interest rate cap. The objective is to protect the bank from falling interest rates. The buyer selects the index rate and matches the maturity and notional principal amounts for the floor and cap. The strike rates differ. If the index rate falls below the floor, the buyer of a reverse collar receives cash from the counterparty. If the index rate rises above the cap, the buyer makes a cash payment to the counterparty. The motivation for selling the cap is typically to reduce the cost of buying a floor. The net result is that the buyer's interest rate fluctuates within a band. The buyer is willing to accept a maximum rate to reduce the cost of the floor or because it has a strong belief that rates will fall and the cap will be out of the money. Buyers can again construct zero cost reverse collars when it is possible to find floor and cap rates with the same premiums that provide an acceptable band.

One of the most important considerations when evaluating whether to buy caps and floors is the premium cost. Exhibit 9.12 provides summary information for the premiums on various caps and floors on three-month LIBOR in June 2013.

The top part of the exhibit provides the bid and ask premiums for caps at three different strike rates, 0.50 percent, 1 percent and 1.5 percent, respectively. The bottom part provides the bid and ask premiums for floors at a 0.25 percent strike rate. With three-month LIBOR at 0.27 percent, it can only fall by a small amount. The first column of data in each section indicates the term or maturity for the underlying caps and floors with subsequent columns indicating the premiums. The bid premium represents what the option seller receives, while the ask premium represents what the option buyer pays. The three-month Eurodollar futures rates in Exhibit 9.1 indicate the consensus forecast that three-month LIBOR will consistently rise over time to almost 4.4 percent after 8 years.

EXHIBIT 9.12 Premiums for Interest Rate Caps and Floors on Three-Month LIBOR (June 2013)

Term	Bid	Ask	Bid	Ask	Bid	Ask
Caps	**0.50%**		**1.00%**		**1.50%**	
1 year	18	20	11	13	4	6
2 years	66	68	53	55	32	34
3 years	201	203	185	187	158	160
5 years	326	330	231	235	180	184
7 years	488	493	395	400	297	302
10 years	701	710	614	624	490	505
Floors	**0.25%**					
1 year	31	33				
2 years	35	37				
3 years	44	46				
5 years	59	63				
7 years	82	88				
10 years	143	153				

Note: Caps/Floors are based on three-month LIBOR; up-front costs in basis points. Percentages in bold print represent strike rates. On Jund 21, 2013 three-month LIBOR equaled 0.27 percent.

Cap and floor premiums are determined by a wide range of factors. First, the relationship between the strike rate and the prevailing three-month LIBOR indicates how much LIBOR has to move before the cap or floor is in-the-money. Specifically, the premiums are highest for in-the-money and at-the-money options and lower for out-of-the-money options. With the prevailing LIBOR at 0.27 percent in June 2013, a cap at 0.50 percent is out of the money, while a floor at 0.50 percent is in-the-money. All the caps and floors listed in Exhibit 9.12 are out of the money. As such, their intrinsic values all equal zero. Thus, the entire premiums listed represent thetime value of the option, that is, the potential that LIBOR might change before expiration, such that the option is in-the-money.

The premiums for the 0.50 percent strike rate will be the highest among the caps, because if LIBOR increases by just 23 basis points, this cap will be in-the-money and increase the expected cash receipts to the buyer of the floor. LIBOR must rise more than 73 basis points and 123 basis points, respectively, for the 1 percent cap and 1.50 percent cap to be in-the-money. In contrast, LIBOR must fall just three basis points before the 0.25 percent floor is in-the-money. Not surprisingly, the premiums for both caps and floors increase with maturity. This reflects the fact that an option seller must be compensated more for committing to a fixed-rate cap or floor for a longer period of time.

Finally, prevailing economic conditions influence premiums via the shape of the associated yield curve and the volatility of interest rates. If the yield curve for Eurodollars is upward-sloping such that the consensus is that LIBOR will rise in the future, caps will be more expensive than floors. The steeper the slope of the yield curve, ceteris paribus, the greater the cap premiums. If the yield curve is flat or inverted, caps will be relatively inexpensive. Floor premiums, in contrast, reveal the opposite relationship. The steeper the yield curve, the cheaper the floor premiums. If the yield curve is inverted, floor premiums will be relatively expensive. Like all options, the greater the volatility of rates, the higher the premiums will be because there is a greater likelihood that the options may move in-the-money. Finally, regardless of intrinsic value, maturity, and yield curve shape, a dealer in caps and floors will typically charge a higher premium for substantial positions in large notional principal amounts.

Protecting against Falling Interest Rates

Assume that your bank is asset sensitive such that the bank's net interest income will decrease if interest rates fall. For example, the bank holds loans priced at prime plus 1 percent and funds the loans with a three-year fixed-rate deposit at 3.75 percent. In this example,

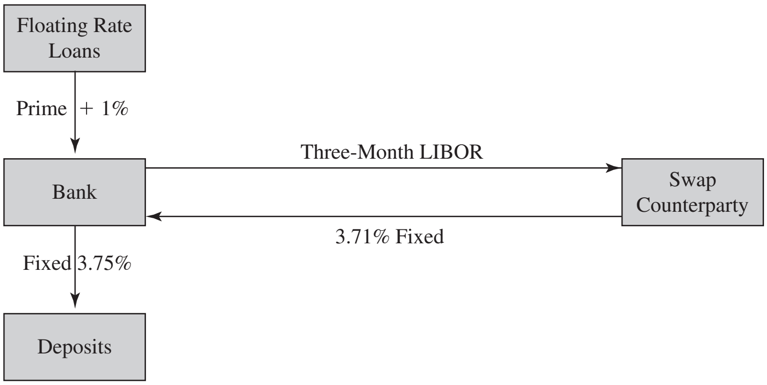
- The current prime rate is assumed to be 5%.
- Three-month LIBOR is assumed to initially equal 2.68%.
- Movements in the prime rate and LIBOR are assumed to be perfectly correlated.
- Option premiums differ from those in Exhibit 9.12 because they reflect the higher assumed rates.

These assumptions enable a detailed analysis of the impact of both rising and falling rates and simplify the discussion.

The management team has a strong belief that interest rates will fall over the next three years. It is considering three alternative approaches to reduce risk associated with falling rates: (1) entering into a basic interest rate swap to pay three-month LIBOR and receive a fixed rate; (2) buying an interest rate floor; and (3) buying a reverse collar.

EXHIBIT 9.13 Using a Basic Swap to Hedge Aggregate Balance Sheet Risk of Loss from Falling Rates

Bank Swap Terms: Pay LIBOR, Receive 3.71 Percent*



	Current Rates Constant	Rates Fall 100 Basis Points	Rates Rise 100 Basis Points
	Prime 5.00% LIBOR 2.68%	Prime 4.00% LIBOR 1.68%	Prime 6.00% LIBOR 1.68%
Balance Sheet Flows:			
Loan	6.00%	5.00%	7.00%
Deposit	(3.75%)	(3.75%)	(3.75%)
Spread	2.25%	1.25%	3.25%
Interest Rate Swap Flows:			
Fixed	3.71%	3.71%	3.71%
Floating	(2.68%)	(1.68%)	(3.68%)
Spread	1.03%	2.03%	0.03%
Margin	3.28%	3.28%	3.28%

*Assume swap term is three years and perfect correlation between Prime and LIBOR.

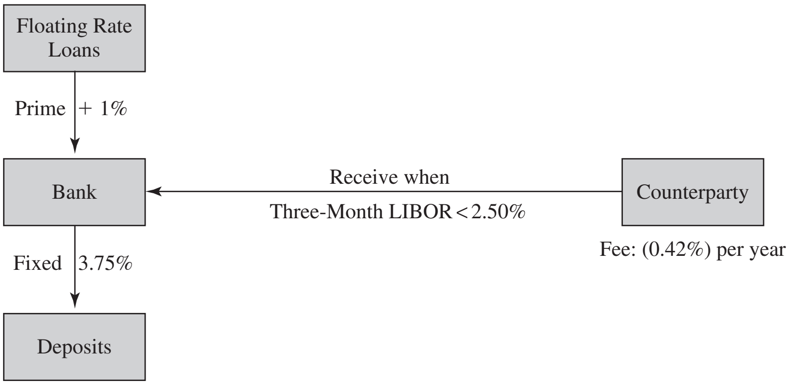
Exhibits Exhibits 9.5, 9.14, and 9.15 summarize the net results of each position when rates alternatively fall and rise relative to the current environment. Note that, initially, the bank holds assets priced based on prime and deposits priced based on a fixed 3.75 percent rate. For this example, the LIBOR and the prime rate are assumed to be perfectly correlated.

Strategy: Use a Basic Interest Rate Swap; Pay Floating and Receive Fixed

Exhibit 9.13 compares the results using a basic interest rate swap where the bank agrees to pay three-month LIBOR and receive 3.71 percent for a three-year term. There are three interest rate scenarios where rates are constant and rise or fall by 1 percent. Initially, the prime rate equals 5 percent and LIBOR equals 2.68 percent, which generates

EXHIBIT 9.14 **Buying a Floor on Three-Month LIBOR to Hedge Aggregate Balance Sheet Risk of Loss from Falling Rates**

Floor Terms: Buy a 2.50 Percent Floor on Three-Month LIBOR*



	Current Rates Constant	**Rates Fall 100 Basis Points**	**Rates Rise 100 Basis Points**
	Prime 5.00% LIBOR 3.00%	Prime 4.00% LIBOR 2.00%	Prime 6.00% LIBOR 4.00%
Balance Sheet Flows:			
Loan	6.50%	5.50%	7.50%
Deposit	(3.75%)	(3.75%)	(3.75%)
Spread	2.25%	1.25%	3.25%
Floor Flows:			
Payout	0.00%	0.82%	0.00%
Fee Amort.	(0.42%)	(0.42%)	(0.42%)
Spread	(0.42%)	+0.40%	(0.42%)
Margin	1.83%	1.65%	2.83%

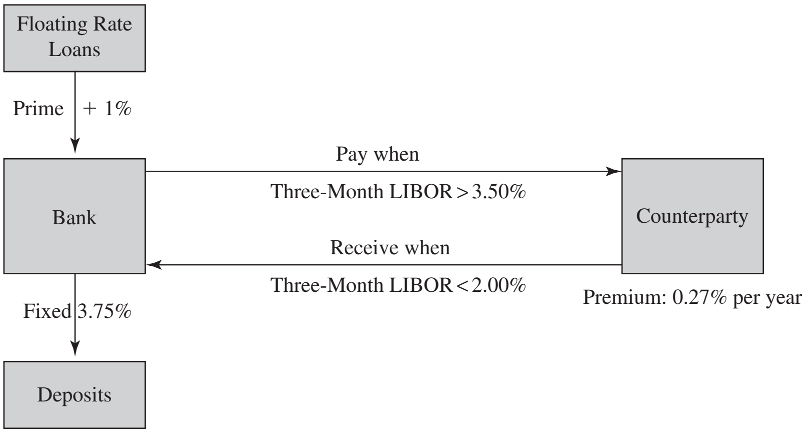
*Assume floor term is three years and perfect correlation between Prime and LIBOR.

a spread of 2.25 percent for the loans versus the fixed-rate deposits. With rates constant at these levels, the net cash flow from the swap produces an inflow of 103 basis points for a net interest margin of 3.28 percent, as indicated in the first column of data. Examine the second and third columns of data where floating rates are assumed to fall and rise, respectively, from initial levels. Given the assumed perfect correlation between prime and LIBOR, this margin is constant at 3.28 percent whether rates either fall or rise by 1 percent. This occurs because the 1 percent reduction in the spread when prime falls to 4 percent is offset by the 1 percent greater gain on the swap as LIBOR falls to 1.68 percent. Similarly, any gain in spread as prime rises to 6 percent is offset by a reduction in the swap receipt as LIBOR rises to 3.68 percent. The use of the swap effectively fixes the spread near the current level, except for basis risk.

Hedge Outcome with Swap: fix the spread at current levels

EXHIBIT 9.15 **Buying a Reverse Collar to Hedge Aggregate Balance Sheet Risk of Loss from Falling Rates**

Strategy: Buy a Floor on Three-Month LIBOR at 2.00 Percent, and Sell a Cap on Three-Month LIBOR at 3.00 Percent*



	Current Rates Constant	Rates Fall 100 Basis Points	Rates Rise 100 Basis Points
	Prime 5.00% LIBOR 2.68%	Prime 4.00% LIBOR 1.68%	Prime 6.00% LIBOR 3.68%
Balance Sheet Flows:			
Loan	6.00%	5.00%	7.00%
Deposit	(3.75%)	(3.75%)	(3.75%)
Spread	2.25%	1.25%	3.25%
Reverse Collar Flows:			
Payout	0.00%	0.32%	(0.68%)
Fee Amort.	0.27%	0.27%	0.27%
Spread	0.27%	0.59%	(0.41%)
Margin	2.52%	1.84%	2.84%

*Assume collar term is three years and perfect correlation between Prime and LIBOR.

Strategy: Buy a Floor on the Floating Rate

Exhibit 9.14 summarizes the outcomes from hedging by buying a floor with a three-year maturity on three-month LIBOR at a 2.50 strike rate. The up-front premium is 120 basis points represented by a 42 basis-point annual amortization. At current interest rates indicated in the first column of data, the balance sheet interest spread is 2.25 percent, which produces a net interest margin of 1.83 percent after subtracting the 42 basis point cost of the floor premium. If rates fall 1 percent as noted in the second column of data, the spread falls to 1.25 percent, but the floor on LIBOR generates a cash receipt of 82 basis points. Thus, the net interest margin is 1.65 percent. Note that the profit from the floor of 82 basis points falls short of the 1 percent reduction in spread such that the margin falls. If instead rates rise 1 percent as in the third column of data, the spread widens to 3.25 percent, and the floor falls out of the money such that the margin increases to 2.83 percent. This demonstrates the impact of options on hedge results. If rates fall and the floor is in-the-money, the increase in option value offsets at least part of the loss in the spread position. If rates rise, the option expires worthless, but the value of the cash spread increases. With rising rates, the bank retains benefits from the increased spread due to rising rates. The bank realizes the best outcome if cash market rates move favorably and the floor expires worthless. The floor buyer is protected when bad things happen (rate declines), but retains the benefit of favorable (rate increases) rate movements. A key point is that the hedger who buys a floor does not want to collect on the insurance. Note that the more rates increase, the higher the margin is for the bank. As such, there is no limit to the upside gain from this hedged position, unlike the swap hedge that fixed the outcome. If rates fall, the margin will vary little around its initial value.

Hedge Outcome with Buying a Floor: protect against loss from falling rates while retaining the benefits from rising rates.

Strategy: Buy a Reverse Collar; Sell a Cap and Buy a Floor on the Floating Rate

Exhibit 9.15 documents the outcomes from simultaneously buying a floor on three-month LIBOR at 2 percent and selling a cap on three-month LIBOR at 3 percent. This reverse collar protects the bank from falling rates but provides a band within which the effective interest margin will fluctuate. The sale of the cap generates a net premium receipt of 73 basis points up front, represented by an annual 27 basis-point amortization of premium. At prevailing rates indicated in the first column of data, the net interest margin is expected to be 2.52 percent characterized by the 2.25 percent spread plus the 27 basis-point premium amortization on the reverse collar. The 1 percent drop in rates summarized in the second column of data produces a net margin of 1.84 percent. In this case, the 32 basis-point receipt from the floor does not offset the 1 percent decline in interest spread. When rates rise 1 percent (third column of data), the spread widens to 3.25 percent, but the bank gives back part of the gain by paying 68 basis points on the cap that it sold. After recognizing the amortized premium receipt, the margin equals 2.84 percent. The margin is greatest in this case because the increased spread is only partially offset by the payment on the cap.

Given the variation in rates, the bank's realized margin will fluctuate between 1.84 percent and 2.84 percent. The collar differs from a pure floor by eliminating some of the potential benefits in a rising-rate environment. The bank actually receives a net premium up front, however, rather than having to pay a premium from the outright purchase of a floor in this example. While this is attractive up front, if rates increase sufficiently, the bank does not benefit.

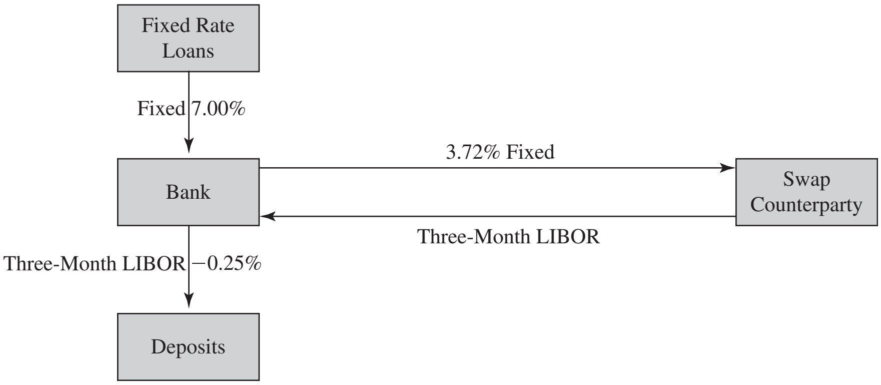
Hedge Outcome: spread will vary within a band.

Protecting against Rising Interest Rates

Assume that a bank has made three-year fixed-rate term loans at 7 percent, funded via three-month Eurodollar deposits for which it pays the prevailing LIBOR minus 0.25 percent. The bank is liability sensitive because it is exposed to loss from rising interest rates. Exhibits 9.16, 9.17, and 9.18 describe the results from three strategies for hedging this risk: (1) enter a basic swap to pay 3.72 percent fixed rate and receive three-month LIBOR; (2) buy a cap on three-month LIBOR with a 3 percent strike rate; and (3) buy a collar on three-month LIBOR.

EXHIBIT 9.16 **Using a Basic Swap to Hedge Aggregate Balance Sheet Risk of Loss from Rising Rates**

Strategy: Pay 3.72 Percent, Receive Three-Month LIBOR*



	Current Rates Constant	Rates Fall 100 Basis Points	Rates Rise 100 Basis Points
	LIBOR 2.68%	LIBOR 1.68%	LIBOR 3.68%
Balance Sheet Flows:			
Loan	7.00%	7.00%	7.00%
Deposit	(2.43%)	(1.43%)	(3.43%)
Spread	4.57%	5.57%	3.57%
Interest Rate Swap Flows:			
Fixed	(3.72%)	(3.72%)	(3.72%)
Floating	2.68%	1.68%	3.68%
Spread	(1.04%)	(2.04%)	(0.04%)
Margin	3.53%	3.53%	3.53%

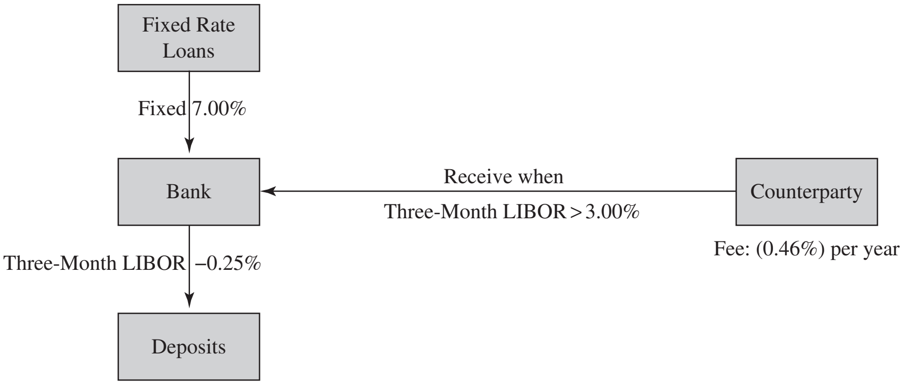
*Assume swap term is three years.

Strategy: Use a Basic Interest Rate Swap; Pay Fixed and Receive Floating

The use of the basic swap involves entering a contract to pay a fixed rate and receive a floating rate. The fixed payment effectively converts the floating-rate liability to a fixed-rate liability. The swap again effectively fixes a net interest margin. As demonstrated in the first column of data in Exhibit 9.16, the initial interest spread is 4.57 percent and the bank pays 104 basis points on the swap at prevailing rates. This produces a net spread of 3.53 percent. If LIBOR falls 1 percent to 1.68 percent, as noted in the second column of data, the interest spread widens to 5.57 percent, but the bank pays out 2.04 percent on the swap. If LIBOR rises 1 percent as characterized in the third column of data, the

EXHIBIT 9.17 **Buy a Cap on Three-Month LIBOR to Hedge Balance Sheet Rate Risk of Loss from Rising Rates**

Strategy: Buy a Cap on Three-Month LIBOR at 3.00 Percent*



	Current Rates Constant	Rates Fall 100 Basis Points	Rates Rise 100 Basis Points
	LIBOR 2.68%	LIBOR 1.68%	LIBOR 3.68%
Balance Sheet Flows:			
Loan	7.00%	7.00%	7.00%
Deposit	(2.43%)	(1.43%)	(3.43%)
Spread	4.57%	5.57%	3.57%
Cap Flows:			
Payout	0.00%	0.00%	0.68%
Fee Amort.	(0.46%)	(0.46%)	(0.46%)
Spread	(0.46%)	(0.46%)	0.22%
Margin	4.11%	5.11%	3.79%

*Assume cap term is three years.

spread narrows, but the bank pays just 4 basis points on the swap. The net spread or margin is the same—3.53 percent—in all cases. Obviously, the consensus forecast is for LIBOR to rise, as participants would otherwise refuse to enter this swap with such a large payout if rates remained constant.

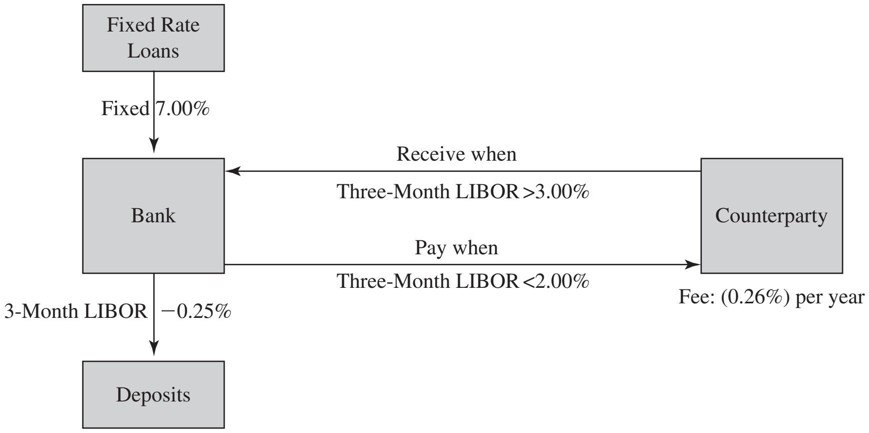
Hedge Outcome: swap fixes the margin at current levels.

Strategy: Buy a Cap on the Floating Rate

Buying a 3 percent cap allows the bank to potentially benefit if rates fall, but still protect against loss if rates rise. This is demonstrated in Exhibit 9.17. Assume that the bank buys a three-year cap on three-month LIBOR for 131 basis points or an amortized premium cost of 46 basis points. If rates remain at prevailing levels, the initial net interest margin equals 4.11 percent. This is summarized in the first column of data. The subsequent

EXHIBIT 9.18 Using a Collar on Three-Month LIBOR to Hedge Balance Sheet Risk of Loss from Rising Rates

Strategy: Buy a Cap at 3.00 Percent, and Sell a Floor at 2.00 Percent*



	Current Rates Constant	**Rates Fall 100 Basis Points**	**Rates Rise 100 Basis Points**
	LIBOR 2.68%	LIBOR 1.68%	LIBOR 3.68%
Balance Sheet Flows:			
Loan	7.00%	7.00%	7.00%
Deposit	(2.43%)	(1.43%)	(3.43%)
Spread	4.57%	5.57%	3.57%
Collar Flows:			
Payout	0.00%	(0.32%)	0.68%
Fee Amort.	(0.26%)	(0.26%)	(0.26%)
Spread	(0.26%)	(0.58%)	0.42%
Margin	4.31%	4.99%	3.99%

*Assume collar term is three years.

columns indicate the impact if rates vary from initial levels. If rates fall by 1 percent, the net margin increases to 5.11 percent, because the interest spread widens and the cap cost remains fixed at 46 basis points. Each subsequent decline in LIBOR will be matched by an increase in the margin. Thus, the bank has unlimited upside in a falling-rate environment. If LIBOR rises 1 percent to 3.68 percent (third column), the cap goes in-the-money. The interest spread declines consistent with the bank's risk exposure, but the cap position generates a payoff of 68 basis points, which more than offsets the premium cost. The net margin falls to 3.79 percent. Any subsequent increase in LIBOR will reduce the balance sheet spread but increase the net receipt on the cap dollar for dollar.

Hedge Outcome: protect against loss from rising rates while retaining the benefits from falling rates

Strategy: Buy a Collar

Exhibit 9.18 presents the outcomes from buying a collar on three-month LIBOR. The combined positions consist of buying a cap at 3 percent and simultaneously selling a floor at 2 percent. The net cash outlay is 73 basis points, representing the 131 basis-point cost of the cap net of the 58 basis-point receipt on the floor. The amortized premium equals 26 basis points per year. The bank thus receives cash if LIBOR rises above 3 percent, but must pay on the floor if LIBOR falls below 2 percent.

The collar effectively creates a band within which the bank's margin will fluctuate. As noted in the three data columns of Exhibit 9.18, the band for the net spread is between 3.99 percent and 4.99 percent with these rate assumptions. The collar provides similar protection to the straight purchase of a cap, but gives up the potential benefits from falling rates because of the sale of a floor. If rates remain constant, the margin will equal 4.31 percent as the balance sheet spread is reduced by the 26 basis-point cost of the collar. If LIBOR falls one percent, the spread widens to 5.57 percent, but the bank must pay 32 basis points on the floor. The final margin is the highest because the floor payment is less than the spread gain. For each additional decline in LIBOR, the gain in spread will be offset by the floor payment such that the maximum margin is 4.99 percent. The bank is worse off when rates rise and the spread narrows, but the cap generates a cash receipt. The spread narrows until the cap is in-the-money. Thus, the margin falls until the cap receipt offsets the loss on the spread.

These examples demonstrate the different outcomes of three basic approaches to hedging. Which strategy is best ex post depends on how much rates move. Obviously, managers do not know how much rates will change when they implement the hedge. Most managers will choose the appropriate hedge based on their expectations of future rate moves or based on their tolerance for risk.

Credit Default Swaps

The popularity and use of CDSs grew dramatically during the financial crisis. The appeal was the ability to use these derivatives to hedge credit risk, or alternately, to speculate on the possibility that certain types of financial instruments were mispriced by market participants. There were many abuses that bank regulators did not recognize or simply overlooked.

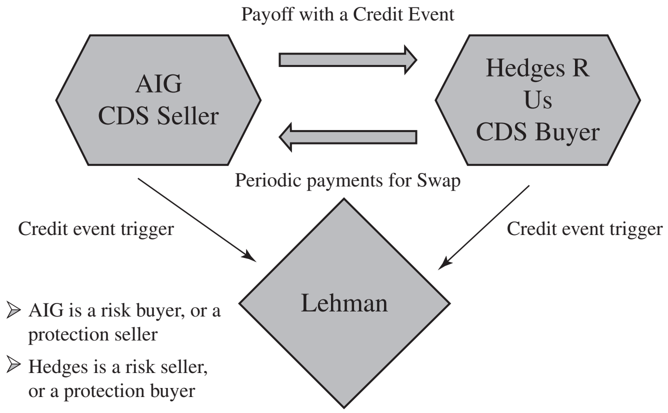
A credit default swap is a contract between two entities labeled counterparties. It is designed to transfer the credit risk in a fixed income instrument from one counterparty to another. Because the value of the swap is based on the value of the underlying instrument, a CDS is a credit derivative. The buyer of the swap makes periodic payments to the seller of the swap. If a specific default event associated with the fixed income security issuer occurs during the time horizon of the swap, the seller of the swap makes a payment—or payoff—to the buyer. The buyer of the swap gets some protection against a decline in value of the underlying instrument. The seller of the swap essentially guarantees the performance of the underlying instrument. The credit event may be that a firm files for bankruptcy or a security is downgraded or goes into default. Importantly, the counterparties do not need to own the underlying instrument to trade the CDS.

CDSs are often labeled a form of insurance. While the nature of the derivative is consistent with insurance coverage and payments, what type of insurance allows anyone to place a bet on the value of the insured? Imagine if you could buy an insurance policy (buy a CDS) on the value of your friend's car. You would pay insurance premiums but would get a payoff when the car was damaged. If anyone could buy insurance on the car, the insurance company could potentially be overwhelmed by the payoffs. For this reason, a car insurance buyer must have an insurable interest for the insurance policy to be effective. This is not the case with CDSs! AIG, in fact, sold large volumes of CDSs without fully understanding the risks it assumed and the aggregate costs of an adverse credit event. AIG's CDS activities were largely unregulated, and the U.S. government ultimately bailed out AIG by putting the firm into conservatorship and paying off its CDS counterparties when AIG was obligated to make payments. The bailout exceeded $180 billion in 2008 and involved large payments to counterparties, including U.S.-based firms such as Goldman Sachs, Merrill Lynch International, and Bank of America, plus firms based outside the United States such as Deutsche Bank, Credit Agricole, UBS, Barclays, and the Bank of Montreal.[19]

Exhibit 9.19 presents a simplified example of a CDS. In the example, certain subprime mortgages underwritten by Lehman Brothers are the underlying instruments against which the counterparties bet on whether the principal and interest payments will be made on a timely basis. AIG is the CDS seller, that is, the seller of protection against default, while Hedges R Us is the CDS buyer, or the buyer of protection against default. Hedges R Us makes quarterly payments to AIG. If default risk of the Lehman bonds is perceived to increase, the value of the CDS will increase. If the bonds default, AIG will make a payment to Hedges R Us. In practice, the CDS seller is required to post collateral against its position. When the value of the position declines, and/or when the credit rating of the CDS seller declines, the protection seller must post additional collateral. It was this type of collateral call that ultimately drove AIG into the Treasury's arms.

So, what steps can be taken to prevent future abuses with CDSs? First, there must be constraints on how much protection a CDS seller can sell. In AIG's case, regulators did not impose any reasonable capital requirements against their positions, which eventually grew to extraordinary levels. Regulators must collect and evaluate information about CDSs in a more timely fashion so that they can provide reasonable guidelines within which parties manage CDS risks. Second, collateral requirements should be strictly enforced. Third, there must be transparency in the pricing of CDSs. Many analysts and regulators would like CDSs and other derivatives to be traded on organized exchanges rather than over the counter. The largest institutions generally oppose the use of formal

EXHIBIT 9.19 CDS Example


Payoff with a Credit Event
AIG
CDS Seller
Hedges R
Us
CDS Buyer
Periodic payments for Swap
Credit event trigger
Credit event trigger
Lehman
AIG is a risk buyer, or a protection seller
Hedges is a risk seller, or a protection buyer

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[19] The Treasury department was widely criticized by members of Congress and the public for making these payments to counterparties using U.S. taxpayer funds. Treasury argued that it made the payments to avert a global disaster arising from a domino effect of one failed firm causing others to fail. The bailed-out firms clearly did not understand the risk that AIG posed as a counterparty, but were still made whole. This is more evidence of a Too Big to Fail mindset among government officials. Xinqi (2013) for a summary of AIG's role in CDSs.

exchanges due to concerns about the potential impact on liquidity in CDSs, but also due to the large profits that derivatives trading brings to the bottom line. Unregulated derivatives trading is much more profitable than regulated trading would be. On the positive side, CDSs do allow institutions to hedge credit risk in their portfolios.

Summary

Bank managers are paid to manage risk. In many cases, it is appropriate to reduce a bank's exposure to potentially adverse changes in interest rates. Hedging with financial futures contracts, FRAs, basic interest rate swap agreements, and interest rate caps and floors are different methods banks can use to reduce interest rate risk. The concept underlying hedging with futures is that a bank trades financial futures such that losses or gains on its actual cash transactions due to interest rate changes are at least partially offset by gains or losses on its futures position. Risk reduction occurs because the net loss or gain is typically less with a hedge than if no futures position is taken. The same applies with FRAs and interest rate swaps. A basic interest rate swap is, in fact, a package of FRAs. A bank exposed to loss on-balance sheet when rates rise or fall can trade fixed interest payments or receipts for floating interest payments or receipts that similarly offset the change in net interest income from balance sheet positions. Thus, when net interest income declines, the FRA and swap produce a net cash receipt. When net interest income increases, the FRA and swap require a net cash payment.

Banks also manage risk through the use of interest rate caps and floors. Such contracts are options on interest rates. If the bank buys a cap or floor, it pays an up-front premium but gets insurance to protect against rising rates with caps and falling rates with floors. The primary negative with caps and floors is the explicit premium cost that must be paid up front to enter a position. Both caps and floors, however, allow a bank to benefit from favorable interest rate moves and their impact on balance sheet exposures.

Managers must determine whether they want to hedge or, alternatively, use these derivatives speculatively to increase their risk exposure. For example, some banks view swaps as synthetic securities complete with interest rate risk. When hedging, managers must decide whether to microhedge individual transactions or macrohedge a bank's aggregate interest rate risk measured by GAP and earnings sensitivity or DGAP and EVE sensitivity. The fundamental conclusion is that portfolio managers can use derivatives to alter a bank's interest rate risk position rather than using traditional cash transactions.

Finally, the use of CDSs increased sharply prior to the financial crisis, but many market participants recognize that certain abuses worsened the crisis. In particular, firms like AIG effectively wrote credit default swap contracts where they agreed to pay buyers of the contracts large amounts when certain securities underlying the contracts fell into default. The U.S. Treasury ultimately bailed out AIG and made payments to large, institutional counterparties to AIG using U.S. taxpayer funds. Abuses in the credit default swap arena benefited select individuals and firms and penalized taxpayers, inappropriately harming the reputation of derivatives in general. Measures must be taken to prevent these abuses.

Questions

1. How does a futures contract differ from a forward contract?
2. It is said that a microhedge does not totally eliminate risk. Assume that a bank uses financial futures contracts to reduce the risk of rising rates on new borrowings. Identify what type of position the bank should take to hedge. Once a hedge is in place, what risks remain?

3. Some analysts compare the initial margin on a futures contract to a down payment. Some label it a performance bond. What is the difference between these interpretations?
4. Suppose that you are a speculator who trades three-month Eurodollar futures. On November 5, you sell two December three-month Eurodollar futures contracts at 96.81. The subsequent weekly quotes for the closing December Eurodollar futures price are as follows:

Date:	11/12	11/19	11/26	12/3
Price:	96.92	97.08	96.77	96.63

   Calculate the weekly values in your margin account. The initial margin is $650 per contract and the maintenance margin is $400. Calculate your realized return for the entire period. Assume that you offset your futures position on December 3 at the price indicated.
5. Suppose that you are a speculator who tries to time interest rate movements on three-month Eurodollar futures contracts. To answer the following questions, use the data in Exhibits 9.1 and 9.2, and assume that it is February 18, 2014.
   a. What is the three-month Eurodollar rate in the cash market? (Approximate it from the yield curve.) How does it differ from the June 21, 2013 Eurodollar futures rate?
   b. Use the data from the Treasury yield curve for three-month and six-month maturities to calculate the three-month forward rate (three months as of June 21, 2013).
   c. Compare the forward rate you calculated from Part b with the September 2013 Eurodollar futures rate. Do they provide similar information? Should they provide similar information?
   d. As a speculator, you expect cash Eurodollar rates to rise through December 2014.
      1. Explain precisely what expectations are consistent with selling the December 2014 Eurodollar futures contract to make a profit.
      2. Explain precisely what rate expectations are consistent with buying the December 2014 Eurodollar futures contract to make a profit.
6. Explain why cross hedges generally exhibit greater risk than hedges using a futures contract based on the underlying cash instrument hedged.
7. In each of the following cases, conduct the analysis for Step 1 and Step 2 (page 339 in this chapter) in evaluating a hedge. Specifically assess cash market risk and determine whether the bank should buy or sell financial futures as a hedge. Explain how the hedge should work.
   a. The bank expects to receive a large, past-due principal payment on a loan in 45 days.
   b. A deposit customer notifies the bank that she will be withdrawing $5 million in 60 days. The bank will sell a Treasury security from its investment portfolio at that time to cover the withdrawal.
   c. The bank has agreed to make a one-year fixed-rate loan at 6.5 percent. It will fund the loan by issuing four consecutive three-month Eurodollar time deposits. It would like to lock in its borrowing costs on the Eurodollar time deposits.

   d. The bank just won a $10 million court settlement against a supplier and will receive the payment in three months.
   e. In order to improve the bank's capital position, management decides to issue 15-year subordinated debentures (bonds). Unfortunately, this debt offering cannot be ready for another five months.

8. A bank plans to hedge using three-month Eurodollar futures contracts based on $1 million in principal. Determine how many contracts the bank should trade (its hedge ratio) in the following situations:
   a. The bank will roll over $125 million in six-month CDs in four months. The Eurodollar futures rate moves 1.5 times as much as the CD rate.
   b. In three months, the bank will roll over $50 million in one-month loans. The loan rates move 1-to-1 with Eurodollar futures rates.
   c. In six months, the bank will extend $5 million in floating-rate loans tied to the Eurodollar cash rate. The futures and cash rates move 1-to-1.
9. A bank that hedges with financial futures cannot completely eliminate interest rate risk. Explain what basis risk is and why it exists. Is it ever possible to eliminate basis risk?
10. Explain how macrohedging differs from microhedging.
11. A bank has assets of $10 million earning an average yield of 5 percent with a weighted duration of 1.5 years. It has liabilities of $9 million paying an average rate of 1.5 percent with a weighted duration of 3.5 years. The bank wants to construct a macrohedge to reduce interest rate risk as much as possible, and plans to trade three-month Eurodollar futures currently trading at 2 percent.
    a. Should the bank buy or sell Eurodollar futures?
    b. How many futures contracts should the bank trade?
    c. If cash interest rates rise an average of 1 percent and the Eurodollar futures rate rises by 1.10 percent, calculate how much the bank's market value of equity will change and how much the bank would earn or lose on its futures position. Was this a successful hedge?
12. What are the risks in a FRA if you are the buyer?
13. Assume that you want to speculate on how six-month cash market LIBOR now equal to 1.95% will move over the next year. You believe that consensus forecasts of future rates are too high. You can enter into an FRA and agree either to pay 2.25 percent and receive six-month LIBOR, or pay six-month LIBOR and receive 2.25 percent for delivery in one year. Explain which position you would take and why you expect to profit.
14. It is January 1. Your firm expects to issue (borrow) three-month Eurodollar time deposits at the beginning of February, May, August, and November in the next year. Explain what position(s) you would take today with FRAs based on three-month LIBOR if you wanted to fully hedge your future borrowings. Why should the hedge work? What risks do you take?
15. Discuss the role of a third-party intermediary in an interest rate swap agreement. Describe the risks assumed by the intermediary. How does the intermediary potentially profit from this activity?
16. What features of interest rate swaps make them more or less attractive than financial futures as a risk management tool?

17. Is there credit risk in an interest rate swap with an intermediary bank serving as the swap dealer? Describe when default losses might arise and which party is at risk. Explain how credit risk can be reduced.
18. A basic interest rate swap is priced as a zero net present value transaction. Explain what this means. Use the two-year swap data from Exhibit 9.8 to demonstrate your arguments.
19. Your firm just made a three-year, fixed-rate loan at 6.25 percent. You would like to convert this to a floating-rate loan that is priced based on three-month LIBOR as the base rate. Explain how you could use a basic interest rate swap to accomplish this. Using the data from Exhibit 9.8, choose swap terms that convert this fixed-rate loan to a floating-rate loan and demonstrate the resulting rate you would earn on the loan from adding the swap to the loan position.
20. Your bank is looking for the lowest cost two-year, fixed-rate financing. It has decided to issue four consecutive three-month Eurodollar time deposits on-balance sheet and hedge the future borrowing costs by taking positions in the market for basic interest rate swaps. What positions are appropriate? Use the data from Exhibit 9.8 to demonstrate how swaps might be used to fix the bank's borrowing cost over two years.
21. Use the data from Exhibit 9.12 to answer the following questions:
    a. When will the buyer of a five-year cap on three-month LIBOR with a 1 percent strike rate expect to receive cash? What is the cap premium?
    b. When will the buyer of a two-year floor on three-month LIBOR with a 0.25 percent strike rate expect to receive cash? What is the floor premium?
22. Explain how the outcome from using a basic interest rate swap to hedge borrowing costs will generally differ from using an interest rate cap and an interest rate collar as hedges. Why is there a difference?
23. In each of the following cases, indicate whether an interest rate cap, floor, collar, or reverse collar is an appropriate position for a hedge. Recommend a specific position.
    a. A bank loan customer wants to borrow at a fixed 8 percent rate and the bank only lends at floating rates.
    b. A bank has agreed to pay a large depositor a fixed 1.5 percent on balances over the next three years regardless of rate moves. The bank expects rates to fall on similar deposits over this period.
    c. Your bank owns adjustable-rate mortgages (ARMs) that are priced at three-month LIBOR plus 1 percent. There is an annual cap on the allowable rate increase equal to a maximum of 1 percent a year. Thus, if LIBOR rises by 3 percent, the bank can raise the ARM rate just 1 percent. How can the bank effectively remove this cap?
24. Suppose that the yield curve on Eurodollars is sharply upward-sloping.
    a. Will premiums on interest rate floors on three-month LIBOR be high or low? Explain.
    b. Will premiums on interest rate caps on three-month LIBOR be high or low? Explain.
25. Assume that you bought an interest rate cap on three-month LIBOR with a 2.50 percent strike rate. The current rate for three-month LIBOR is 2.28 percent.
    a. What will happen to the premium (value) on this cap if LIBOR rises to 3.16 percent? Explain.
    b. What will happen to the premium (value) on this cap if LIBOR falls to 2.10 percent? Explain.

26. Your bank is asset sensitive, and management wants to protect against loss from interest rate changes.
    a. Would an interest rate cap or floor serve as a better hedge? Explain.
    b. Would a collar or reverse collar serve as a better hedge? Explain.
    c. Why would the bank choose a collar or reverse collar over a cap or floor, respectively? Explain.
27. Suppose that you buy an interest rate cap on three-month LIBOR with a two-year maturity and simultaneously sell a floor on three-month LIBOR with a two-year maturity. Ignore the premiums. Draw a profit diagram that indicates when you will gain and lose on the combined positions. Compare this with different basic interest rate swap and futures positions.
28. Are there margin requirements for the following positions? Explain why or why not.
    a. Buy an interest rate cap
    b. Sell a put option on Eurodollar futures
    c. Sell an interest rate floor
    d. Sell a Eurodollar futures contract

Activities

I. Hedging Borrowing Costs. Your bank is a regular borrower in the Eurodollar market. On August 9, 2014, the head of the funds management division decides to hedge the bank's interest cost on a $10 million three-month Eurodollar issue scheduled for November 2013. On August 9, the bank could issue $10 million in three-month Eurodollars at 1.61 percent. The corresponding futures rates for three-month Eurodollar futures contracts are 1.83 percent (December 2014), 2.01 percent (March 2015), and 2.38 (June 2015).

1. What is the bank's specific cash market risk on August 9, 2013? Should the bank buy or sell Eurodollar futures to hedge its borrowing costs? Explain how the hedge should work.
2. Which Eurodollar futures contract should the bank use? Explain why it is best. Assume that the bank takes the futures position that you recommend in Question 1 above at the rate available on August 9, 2013. On November 6, 2013, the bank issues $10 million in Eurodollars at 3.25 percent. Coincidentally, it closes out (reverses) its futures position when the futures rate on the contract you chose equals 3.33 percent. Calculate the profit or loss on the futures trades, the opportunity gain or loss in the cash market, and the effective return or cost to the bank on its Eurodollar issue.
3. Suppose instead that interest rates declined after August 9 and the bank actually issued Eurodollars at 1.47 percent. Assuming it closed out its futures position at 1.59 percent, calculate the same profit/loss and return/cost components as above.
4. It is important to note that the prevailing futures rate at the time a hedge is initiated reflects consensus information regarding the future level of cash market rates. Explain conceptually why the effectiveness of hedging is influenced by the accuracy of the futures rate.

II. The Basis. Assume that your bank expects to receive $5 million in funds that it will invest in Eurodollars in four months. It plans to buy five Eurodollar futures contracts as a hedge. The current three-month Eurodollar rate equals 3.05 percent in the cash market, and the Eurodollar futures rate for the contract purchased equals 3.39 percent. The futures contract expires one week after the bank expects to receive and invest the $5 million. Given that a hedge still encompasses basis risk, compare the basis today with what the basis will likely equal when the bank offsets its futures position as part of closing the hedge. Provide a specific forecast of the basis in four months and explain why you chose this basis. The bank should incorporate this expected basis change when estimating the effective return from the hedge. What is this expected effective return in your analysis? When will the actual return differ from what you expect?

III. Basic Interest Rate Swaps

1. Management at your firm is considering one of the following:
   a. Balance Sheet Transaction: Issue a six-month CD at 3.5 percent and use the proceeds to buy a three-year Treasury security that carries a 5.2 percent fixed rate. It will roll over (issue new six-month CDs) when the old one matures until funding the Treasury security is no longer needed.
   b. Interest Rate Swap Transaction: Enter into a three-year basic interest rate swap where it agrees to pay six-month LIBOR and receive a fixed 5.58 percent rate.
      1. List the advantages and disadvantages of the two alternatives versus each other.
      2. Identify the specific risks associated with each alternative.
      3. Are they both speculative?

2. Two institutions plan to issue $10 million in debt and are negotiating an interest rate swap that will help them lower their borrowing costs and obtain the preferred type (fixed rate or floating rate) of financing. Both are comparing their balance sheet alternatives with combined balance sheet and swap opportunities. Internet Bank has a negative GAP through three years, is liability sensitive, and would like to use the debt proceeds to invest in short-term assets to reduce its interest rate risk. Brick & Mortar Bank has a positive GAP through three years, is asset sensitive, and would like to use its debt proceeds to invest in fixed-rate assets to reduce its interest rate risk. Internet Bank can borrow at a 4.7 percent fixed rate for three years or pay the prevailing six-month LIBOR plus 1 percent on floating-rate debt. Brick & Mortar Bank can borrow at a 4.15 percent fixed rate for three years or the prevailing six-month LIBOR rate plus 0.50 percent.
   a. Explain whether and why Internet Bank needs fixed-rate or floating-rate funding to meet its objectives. Do the same for Brick & Mortar Bank.
   b. Assume that both banks issue either three-year fixed-rate debt or six-month floating-rate debt on-balance sheet. They want to combine this with a basic swap to obtain the cheapest form of funding that helps reduce interest rate risk. Using the following basic swap terms, indicate what position each bank should take. Explain how and why it should meet the bank's objectives. Calculate the effective cost of borrowing that each bank ends up with.

Basic Swap Terms	
A. Pay 5.10%	Receive six-month LIBOR
B. Pay six-month LIBOR	Receive 5.06%

3. A regional bank holding company recently bought a $100 million package of mortgages that carry an average 5.5 percent yield. The holding company has established a subsidiary to manage this package. The subsidiary will finance the mortgages by selling 90-day commercial paper for which the current rate is 2.25 percent. The interest rate risk assumed by the subsidiary is evidenced by the difference in duration of the mortgages at six years and the duration of the commercial paper at 72 days. The holding company thus decides to arrange an interest rate swap through an intermediary bank to hedge the subsidiary's interest rate risk.
   a. Should the subsidiary make floating-rate or fixed-rate payments in the swap market? Specifically, should the subsidiary pay fixed and receive floating, or pay floating and receive fixed? Use the following data to select specific swap terms. Explain why this swap should reduce the subsidiary's interest rate risk.
      Pay 5.37 percent and receive floating at three-month LIBOR
      Pay three-month LIBOR and receive 5.24 percent
   b. At the first pricing of the swap when the subsidiary exchanges payments with the intermediary, LIBOR equals 4.95 percent. The notional principal amount is $100 million. Calculate the subsidiary's net cash payment or receipt with the intermediary. At the second pricing, LIBOR equals 5.66 percent. Calculate the subsidiary's net cash payment or receipt with the intermediary at this pricing.
   c. What specific credit risk does the subsidiary assume in the swap you arranged? What specific credit risk does the intermediary assume? Discuss the interest rate environment when each party is at risk and will lose if the counterparty defaults.

IV. Converting Fixed-Rate Loans to Floating-Rate Loans. Your bank made a three-year fixed-rate loan to Fresh Corporation at 6.50 percent. The ALCO wants only to accept floating-rate loans so that it can reduce its liability sensitivity. Using the following information, indicate what position the bank should take to convert this fixed-rate loan to a floating-rate loan in the best possible manner. The current prime rate is 5.25 percent and three-month LIBOR is 2.50 percent.

Three-Year Basic Interest Rate Swap:	Pay 6.22%; receive three-month LIBOR		
Pay three-month LIBOR	Receive 6.17%		
	Bid/Offer Premium		
Three-year interest rate cap on prime rate	6.25% Cap	6.50% Cap	7.00% Cap
Premium	0.71/0.68	0.52/0.47	0.20/0.15
Three-year interest rate cap on three-month LIBOR	2.50% Cap	2.75% Cap	3.00% Cap
Premium	0.95/0.90	0.70/0.64	0.47/0.42

1. Describe what position you would take with a basic interest rate swap to reduce the bank's risk. Assume that the bank takes this position. What will its risk/return profile be?
   a. Suppose that three-month LIBOR rises by 1 percent after one year and remains at this higher level the next two years. What will the effective loan yield equal?
   b. Suppose that three-month LIBOR falls by 0.75 percent after one year and remains at this lower level the next two years. What will the effective loan yield equal?

2. Describe what position you would take with an interest rate cap. Which index (prime or LIBOR) would you use? Explain why. Which strike rate would you use? Explain why. Assume that the bank takes this position.
   a. Suppose that LIBOR and the prime rate rise by 1 percent after one year and remain at these higher levels the next two years. What will the effective loan yield equal?
   b. Suppose that LIBOR and the prime rate fall by 0.75 percent after one year and remain at these lower levels the next two years. What will the effective loan yield equal?

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10

Funding the Bank

Perhaps the single most important lesson of the financial crisis is that financial markets and institutions will collapse when liquidity disappears. Witness the immediate fallout when Lehman Brothers failed on September 15, 2008. Global markets immediately started to crumble as stock prices fell sharply and trading in many securities ground to a halt. The U.S. government seized control of AIG because the firm could not meet its collateral requirements and payment obligations on credit default swaps. The Primary Reserve money market fund "broke the buck" when the unit value of a share fell below $1 because the fund owned many securities issued by Lehman Brothers that were suddenly worth very little. Bank of America paid $50 billion to acquire Merrill Lynch in a stock-for-stock deal. Goldman Sachs and Morgan Stanley applied to become bank holding companies, with the Federal Reserve approving the applications during the weekend. With holding company status, these investment banks gained access to borrowings from the Federal Reserve's discount window. Berkshire Hathaway invested $5 billion in preferred stock issued by Goldman Sachs, helping to recapitalize the firm. Washington Mutual became the largest bank failure, with its banking operations purchased by JPMorgan Chase. By October 3, 2008, Congress had approved a $700 billion bailout that came to be known as the Troubled Asset Relief Program (TARP). In November 2008, the U.S. government once again bailed out Citigroup by injecting capital into the bank and agreeing to take over problem assets.

All of these actions were driven by a lack of liquidity and disappearing confidence in the ability of these large financial institutions to survive on their own. Firms could not borrow because lenders could not value many of the assets that these problem firms owned. They could not sell assets for prices close to the values listed on the balance sheets for the same reason and would not sell them a extremely low prices because they couldn't take the hit to capital. Healthy firms, such as Berkshire Hathaway and JPMorgan Chase, which earlier had acquired Bear Stearns, stepped in to provide financing and thereby control even more valuable franchises and assets. Ultimately, the Federal Reserve and U.S. Treasury provided extraordinary financing to strengthen these firms' balance sheets and stabilize financial markets. Without liquidity and market-driven transactions, business stopped.

How banks fund their operations plays an important role in determining profitability and risk. Funding decisions affect profitability by determining interest expense on borrowed funds, noninterest expense associated with check-handling costs, personnel costs, and noninterest income from fees and deposit service charges. They affect interest rate risk and liquidity risk by determining the rate sensitivity of liabilities, the stability of deposits toward preventing unanticipated deposit outflows, and the ease of access to purchased funds.

This chapter examines issues related to how banks fund their operations. It identifies different funding sources and critiques the strengths and weaknesses of each in terms of how they affect a bank's liquidity risk and profitability. It initially examines the nature of liquidity needs and the risk-return characteristics of alternative funding sources. It then explores the costs of various sources of funds, as well as the relationship between financing events and a bank's liquidity, credit, and interest rate risk position.

The Relationship between Liquidity Requirements, Cash, and Funding Sources

Liquidity needs arise when customers withdraw funds from the bank. The effect of withdrawals is a net deposit outflow when balances the bank holds with Federal Reserve Banks or correspondent banks decline. Most withdrawals are predictable because they are either contractually based or follow well-defined patterns. For example, transactions accounts normally exhibit weekly or monthly patterns that follow the payroll and billing activities of large commercial customers. Banks that purchase securities typically pay for them by drawing down immediately available funds, while maturing investments are similarly credited to their deposit balances held at the Federal Reserve. The timing and amount of security purchases and maturing investments are known, so the cash flows are predictable. Still, some outflows are totally unexpected. Often, management does not know whether customers will reinvest maturing CDs and keep the funds with the bank or withdraw them. Management also cannot predict when loan customers will borrow against open credit lines. This uncertainty increases the risk that a bank may not have adequate sources of funds available to meet payment requirements. This risk, in turn, forces management to structure its portfolio to access liquid funds easily, which lowers potential profits.

The amount of cash that management chooses to hold is heavily influenced by the bank's liquidity requirements. The potential size and volatility of cash requirements, in turn, affect the liquidity position of the bank. Transactions that reduce cash holdings normally force a bank to replenish cash assets by issuing new debt or selling assets. Transactions that increase cash holdings provide new investable funds. From the opposite perspective, banks with ready access to borrowed funds can enter into more transactions because they can borrow quickly and at low cost to meet cash requirements.

Exhibit 10.1 portrays the effects of customer deposit withdrawals and loan usage on a bank's deposit balances at the Federal Reserve. The first part demonstrates that a maturing CD that is not rolled over immediately reduces a bank's reserves. Here the CD holder directs the Federal Reserve to transfer the funds by wire to another institution, which directly lowers the bank's outstanding CDs as well as its deposit balances held at the Federal Reserve. Loan usage produces the same result. In the second part, a loan customer borrows $250,000 against an outstanding credit line by requesting a wire transfer to cover the purchase of some good or service. The bank authorizes the payment, lowering its deposit balance at the Federal Reserve by $250,000 while simultaneously booking the loan. In the last part of the exhibit, the bank first allocates $500,000 in loan proceeds to the borrower's account. The bank's deposit at the Federal Reserve falls when the

EXHIBIT 10.1 **Effect of Maturing Certificates of Deposit and Loan Use on a Bank's Deposit Balances at the Federal Reserve**

Maturing Certificate of Deposit Not Rolled Over

Commercial Bank

Δ***ASSETS***	Δ***LIABILITIES***	
Demand deposit at Federal Reserve −$100,000	Certificate of deposit −$100,000	CD not rolled over; CD holder directs the Federal Reserve to wire funds to another institution.

Loan Customer Borrows against a Credit Line

Commercial Bank

Δ***ASSETS***	Δ***LIABILITIES***	
Commercial loan +$250,000		Customer borrows against outstanding credit line.
Demand deposit at Federal Reserve −$250,000		Wire transfer to cover purchase of goods or services.

Borrowing against a New Term Loan

Commercial Bank

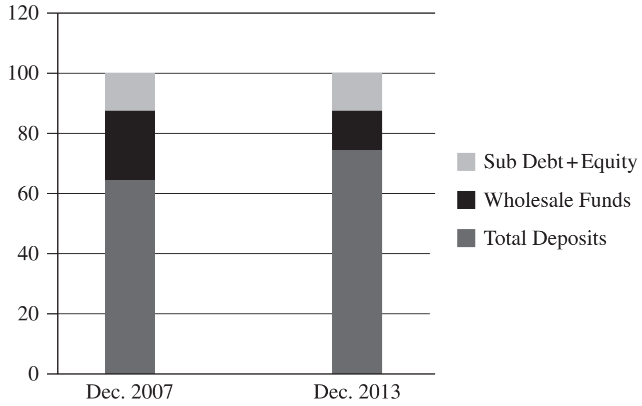
Δ***ASSETS***	Δ***LIABILITIES***	
Commercial loan +$500,000	Demand deposit +$500,000	Bank grants loan and deposits proceeds in customer's account.
Demand deposit at Federal Reserve −$500,000	Demand deposit −$500,000	Customer spends full amount of loan proceeds by writing check.

customer writes a check against the proceeds and the check clears after being deposited in another bank. Each transaction reduces immediately available funds, creating the possibility that the bank is short of balances needed to cover future deposit outflows and required reserves.

Recent Trends in Bank Funding Sources

One of the most difficult problem bank managers face is how to determine the optimal mix of funding. While banks obtain funding from a variety of sources, it is useful to differentiate between retail funding, borrowed or wholesale funding, and equity-related funding. Although the precise definition of **retail funding** varies by institution, it is widely considered funding the bank receives from consumers and noninstitutional depositors. Retail funding generally consists of deposit accounts such as transactions accounts, money market demand accounts (MMDAs), savings accounts, and small time deposits. **Borrowed or wholesale funding** consists of federal funds purchased, repurchase agreements (RPs), Federal Home Loan Bank (FHLB) borrowings and other borrowings such as institutional CDs in amounts over $250,000. Remember that the FDIC insures deposits up to $250,000 per account. **Equity-related funding** consists largely of subordinated debt, common and preferred stock, and retained earnings.

EXHIBIT 10.2 **Total Deposits, Wholesale Funds Subordinated Debt + Equity December 2007 vs. June 2013***



*Funding by source as a percentage of total assets
Source: FDIC Statistics on Banking, www4.fdic.gov.

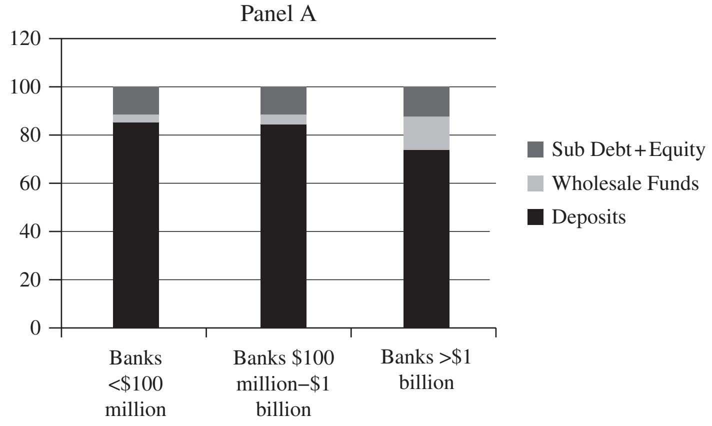
Exhibit 10.2 compares the composition of bank funding for December 2007 (pre-financial crisis) versus December 2013 (post-financial crisis). During the six intervening years, deposit funding increased from 65 percent of assets to 76 percent of assets, while wholesale funding fell from 24 percent of assets to just 12 percent of assets. Subordinated debt plus equity funding remained constant at 12 percent of assets. These changes demonstrate the efforts of banks to increase core deposits while paying down wholesale funding. The net result is a more stable funding base.

The data in Exhibit 10.2 mask some of the differences in the composition of bank funding for different-sized institutions. Exhibit 10.3 examines funding by source in 2013 for groups of commercial banks and savings institutions on the basis of asset size. Each column represents the percentage of total assets financed by the specific funding source. Comparisons reveal key differences in operating style. As noted in Panel A, the smallest commercial banks with less than $100 million in total assets rely much more on deposits and much less on wholesale funds. In contrast, banks with more than $1 billion in assets rely proportionately more on wholesale funds. Finally, while the funding from subordinated debt plus equity appears to be comparable across all size banks, subordinated debt comprises almost 8 percent of the funding in this form at the largest banks and is negligible at smaller banks.

The data in Exhibit 10.3, Panel B, indicate the same general relationships for different-sized savings institutions. However, even the largest savings institutions do not finance operations with subordinated debt. In comparison with commercial banks, savings institutions generally operate with proportionately fewer deposits and more wholesale funds. This reflects the heavier concentration in real estate assets and subsequent greater use of the FHLB in financing. Equity financing is comparable, except the smallest savings institutions have the highest equity to asset ratios.

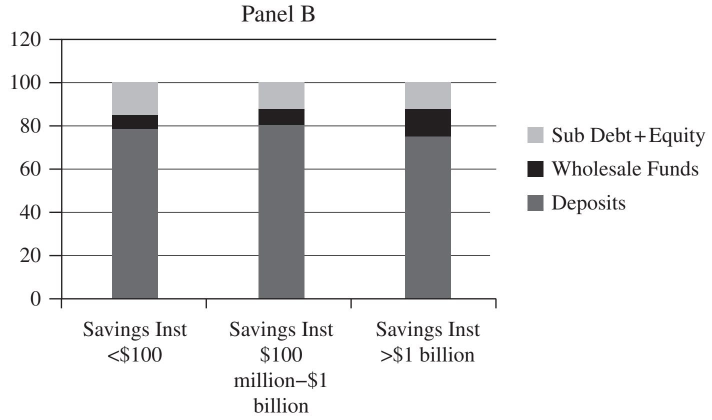
Bankers and regulators use the term **volatile liabilities** and **purchased liabilities** to describe funds obtained from interest-sensitive investors. The types of instruments include federal funds purchased, RPs, jumbo CDs, Internet and brokered CDs, Eurodollar time deposits, foreign deposits, and any other large-denomination purchased liability. The bulk of these funds do not carry FDIC insurance. Investors in these instruments will

EXHIBIT 10.3 (PANEL A): Composition of Funding at Different-Sized Commercial Banks; December 2013



Source: Statistics on Deposits, FDIC at www.fdic.gov.

EXHIBIT 10.3 (PANEL B): Composition of Funding at Different-Sized Savings Institutions; December 2013



* Funding as a percentage of total assets.

Source: FDIC Statistics on Depository Institutions, www4.fdic.gov/SDI/rpt_Financial.asp.

move their funds if other institutions pay higher rates, or if they hear rumors that the issuing bank has financial difficulties. Even the FHLB, which requires that borrowing banks post collateral against FHLB advances, will increase collateral requirements for problem institutions. As such, a bank with FHLB advance funding will be required to pledge greater amounts of real estate loans, bonds, and other collateral for the same amount of dollar funding. These actions reduce the bank's liquidity and ultimately force them to reduce the FHLB advance funding if they can. Greater collateral requirements during the recent financial crisis created real frictions between many banks and the FHLB.

The fact that the largest institutions rely more on wholesale funds suggests that their size forces them to buy funding at the margin. The net effect is that larger banks are paying market rates on a greater proportion of their liabilities, with less customer loyalty and ultimately greater liquidity risk. Under Basel III, large institutions are thus required to meet more stringent liquidity tests with their funding and liquid asset holdings.

Most banks prefer to obtain as much funding from core deposits as possible. In economic terms, **core deposits** are stable deposits that customers are less likely to withdraw when interest rates on competing investments rise. They exhibit low interest elasticity. Core deposits, which include transactions accounts, MMDAs, savings accounts, and smaller CDs, are not as sensitive as large-denomination, volatile liabilities are to changing interest rates. Customers typically choose which bank to maintain their primary relationship with on the basis of convenience determined by location of branches and ATMs, availability, the price of services, and personal relationships with bank personnel. The extensive use of electronic banking, however, is changing this model—in large part because of demographic phenomena. Younger customers are generally more comfortable handling banking transactions with debit and credit cards and electronically via the Internet and mobile apps. Many banks offer attractive pricing of services if customers agree to do more of their banking electronically and not enter the bank's branches.

Characteristics of Retail-Type Deposits

Retail deposits, or small-denomination (under $250,000) liabilities, are fundamentally different from those of wholesale, or large-denomination liabilities. Instruments under $250,000 are normally held by individual investors and are not actively traded in the secondary market. Large-balance instruments typically carry denominations in multiples of $1 million and can be readily sold in the secondary market. Individuals traditionally have had few alternatives to banks when selecting interest-bearing deposits. Today, however, commercial banks, savings and loans, credit unions, money market mutual funds, investment banks, and insurance companies offer deposit products with similar features. While they all pay market interest rates, the principal advantage of banks, savings and loans, and credit unions is that deposits are insured up to $250,000 per account by the federal government.[1]

Transactions Accounts

Individuals and businesses own checking accounts for transactions purposes. Most banks offer three different transactions accounts: demand deposit accounts (DDAs), interest-checking accounts and automatic tranfers from savings (ATSs). Even though money market deposit accounts (MMDAs) offer check-writing privileges, the number of transactions is limited such that MMDAs are not technically considered *transactions accounts*. Banks differentiate between accounts by the number of transactions permitted, the minimum denomination required to open an account, the average or minimum balance maintained monthly in the account, and the interest rate paid. All carry FDIC insurance up to $250,000 per account:

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[1] In 2008, the federal government temporarily increased FDIC deposit insurance to $250,000 per account in light of liquidity problems faced by depository institutions. The Dodd–Frank Act of 2010 made the move to $250,000 insurance permanent. The FDIC also temporarily guaranteed short-term debt of financial institutions that were willing to pay a small fee. Many large firms, such as Goldman Sachs, GE, Morgan Stanley, and Citibank, immediately issued large amounts of such insured bonds, under this Temporary Liquidity Guarantee Program (TLGP). The TLGP expired at the end of 2010.

CONTEMPORARY ISSUES

The Extent of Deposit Insurance Coverage

It pays to understand deposit insurance. Do you? As a test, answer the following questions. Both banks carry deposit insurance.

1. You have $250,000 in a CD at First National Bank and another $250,000 in a CD at First State Bank. Are both deposits fully insured?
2. Your parents are concerned about their health and ability to manage their resources if one becomes incapacitated. They own two $175,000 CDs at First National Bank jointly. Are both deposits fully insured?
3. Your grandfather has a joint account with your father for $150,000, another joint account with your sister for $125,000, and another joint account with you for $125,000, all at First State Bank. Are all deposits fully insured?
4. You own a $250,000 CD from First State Bank, and your grandmother opened a trust account in your name for another $250,000. Are both accounts fully insured?
5. You own a $244,000 CD at First National Bank. At the time the bank fails, you are owed the $244,000 plus $9,000 in interest. How much is insured by FDIC deposit insurance?

Account balances held by the same individual in his or her name are insured up to $250,000, including both principal and interest, per institution. The $250,000 coverage extends to total deposit balances summing across all types.

Joint accounts held by the same individuals are combined to determine insurance coverage, with $250,000 maximum coverage. It does not matter whether the underlying deposit accounts differ in form or if the individuals list their names in different orders. The insurance funds assume equal ownership among joint owners. Suppose that two parents own a $450,000 account jointly, another $150,000 jointly with a daughter, and another $150,000 jointly with a son. With equal ownership, the father and mother own $325,000 each for insurance purposes so that $75,000 is not insured for each. Each child's $50,000 balance is fully insured.

IRAs and trust accounts also qualify for insurance coverage beyond coverage for a single individual. The FDIC adds the value of all retirement accounts at the same bank for an individual and insures up to $250,000 of the total. Insurance coverage for trust accounts can be greater depending on the number of owners and beneficiaries of the trust.

- **Demand deposit accounts (DDAs)** are noninterest-bearing checking accounts held by individuals, businesses, and governmental units. Although explicit interest payments are prohibited, there are no regulatory restrictions on the number of transactions or minimum balances. Today, commercial customers own most DDAs, which they use for operational purposes in their businesses. Individuals with sufficiently large balances prefer interest-bearing accounts that provide transactions privileges. Funds are typically added to these accounts either by direct deposit from the payer (city pays employees by directing the bank to add the appropriate balance to the individual's account directly–without a check being made out to the individual) or when the account holder deposits cash or checks held in-hand. Funds are typically paid out via electronic transfers, checks, or debits. In the latter case, customers have a debit card that provides for electronic payment (debit) when the customer makes a purchase.

- Interest-bearing checking accounts (or "interest-checking") and ATS accounts are simply checking accounts that pay interest.[2] However, with ATS accounts, the customer has both a DDA and savings account, but the bank forces a zero balance in the DDA at the close of each day after transferring just enough funds from savings to cover checks presented for payment. These accounts often are labeled **sweep accounts** because the bank sweeps all funds from the DDA to the savings account daily. Every bank prices interest-checking and savings accounts based on competitive conditions without restriction. Some banks limit the number of checks that can be written without fees and impose minimum balance requirements before paying interest. Some pay tiered interest rates that increase with the size of the deposit. The rationale is to encourage individuals to consolidate accounts. Depositors are better off if they centralize their accounts because they can earn higher yields and pay lower service charges.

CONTEMPORARY ISSUES

Truth in Savings Act

Since passage of the Federal Deposit Insurance Corporate Improvement Act (FDICIA) in 1992, often referred to as the "Truth in Savings Act," banks have been required to report interest rates on deposits in a clear and consistent manner. The intent is to eliminate confusion regarding how interest is calculated and establish uniform rules for the reporting of true yields. Banks also must disclose more fees and provide more information in their advertising.

Banks must report the interest rates they pay on deposits in terms of an annual percentage yield (APY). The APY can be used to calculate what your deposit will be worth if you left it at the bank for one year. For example, an APY of 4.45 percent means that a customer who deposits $10,000 will find the deposit worth $10,445 after one year. In each case, the year-end interest balance equals the amount on deposit times the APY ($10,000 × 0.0445 in the above case).

The Truth in Savings Act also requires that banks pay interest on the full customer deposit rather than some fraction of the total. Many banks historically paid interest on investable deposits, defined as the amount that appears on the books minus float and minus required reserves the bank must hold against the deposit. With Truth in Savings, the APY is applied against the ledger balance amount that appears on the books. In addition, if a bank plans to change any terms of a time deposit that will adversely affect the depositor, such as offering a lower interest rate, it must give the customer 30 days' notice. Many banks believe that this will eliminate the fixed-rate time deposit because notification costs will be high.

Finally, it is illegal for banks to structure a deposit that requires a minimum balance to earn interest, then not pay any interest if your balance falls below the minimum even for just one day. Banks may not pay interest for the period the balance falls below the minimum, but cannot cancel interest on the actual balance for days it exceeds the minimum.

With respect to fees and advertising, banks must reveal more information. When an account is opened, a bank is required to provide a list of fees associated with normal account activity. Also, a bank may not use terms such as "free" or "no cost" when some minimum balance is required or if any maintenance or activity fee may be charged.

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[2] Transactions accounts differ from savings accounts in terms of how account holders access their funds and the rates paid. Savings accounts reserve the right to require seven days prior notice of withdrawals or transfers from the account. Although banks do not do this, they must "reserve" the right if these accounts are to be classified as savings.

The onset of the financial crisis in 2008 brought about significant changes in how individuals manage their financial resources. As stock prices fell and the Federal Reserve drove interest rates lower, individuals initially moved from equities to lower-risk bonds and bank deposits. From 2008 through 2014, banks were flooded with new insured deposits as individuals sought safety for their investments. With declining loan demand during the crisis, banks struggled with what interest rates to pay on the deposits and how to invest the proceeds. Over time, most bankers realized that these deposits were being parked at their institutions because the alternatives were not reasonable. Not surprisingly, banks dropped the rates they paid on such deposits and still found balances growing over time. Check into the rate that you are currently receiving on your interest-checking account. Bankers recognize that a good portion of these deposits are "surge" deposits representing a temporary flight to safety. When interest rates finally move higher, many of these deposits will flow out of banks.

Although the interest cost of transactions accounts is very low, noninterest costs can be quite high. In fact, low-balance checking accounts can be one of the most expensive forms of funding the bank, because a bank has to clear checks, debit card transactions, and credit card transactions and handle occasional deposits. For example, a college student might deposit $1,500 in his or her account at the beginning of the month but quickly spend most of those funds, lowering the average balance over the month. If the student's average account balance is $250 a month, for example, and the student writes 15 checks, the average monthly cost to the bank would be around $10, or 53 percent per year![3] The use of debit cards rather than checks lowers this cost, but it is still substantive based on the number of transactions.

Low-balance transactions accounts are typically not profitable for a bank unless they generate other fees. Many critics contend that bank pricing of transactions accounts drives low-income individuals to use check-cashing outlets to obtain cash and pay bills via money orders or prepaid cards.

Nontransactional Accounts

Nontransactional accounts are interest-bearing accounts with limited or no check-writing privileges. The accounts generally pay competitive rates of interest and are fully FDIC insured up to $250,000 per individual. Nontransactional accounts consist of MMDAs, savings accounts, small time deposits, and jumbo CDs:

- **Money market deposit accounts (MMDAs)** are time deposits with limited checking privileges.[4] They were introduced to provide banks an instrument for competing with money market mutual funds offered by large brokerage firms. These accounts differ from interest-checking accounts in that depositors are limited to six transactions per month, of which only three can be checks. The average size of each MMDA check is thus much larger than for transactions accounts. Banks find MMDAs attractive because required reserves against them are zero—whereas the bank must hold 10 percent reserves against DDAs and interest-checking (net transactions) account balances. (Chapter 11 demonstrates calculations for legal reserve requirements.) Limited check processing and zero required reserves reduce their effective cost to the bank. Hence, banks can afford to pay higher rates to attract MMDA funds.

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[3] With the Fed funds rate at 0.25 percent and a 10% reserve requirement, the annual cost, after investment income, is $\{[\$10 - (0.0025/12) \times (250 \times 0.9)]/(250 \times 0.9)\} * 12 = 53.1\%$ per year.

[4] MMDAs are classified as time deposits, not transactions accounts, when calculating required reserves.

- **Savings accounts** and **small time deposits** are small-denomination accounts (under $250,000). Savings accounts have no fixed maturity, while small time deposits have specified maturities ranging from seven days to any longer negotiated term, with interest penalties for early withdrawal. Banks can pay market rates on any account regardless of deposit size. Savings accounts are not as prevalent in banks today, as MMDAs and small time deposits have generally replaced them. Average interest expense is higher on MMDAs, but operating costs are lower. In today's environment, there is also an economic difference between time deposits with balances below $100,000 and time deposits with balances between $100,000 and $250,000, as these larger deposits act more like jumbo CDs. They are very interest rate sensitive and typically are held by high-income individuals, small companies, and even other financial institutions.
- **Large time deposits** generally are referred to as large CDs or **jumbo CDs** when they are negotiable. This means that their value will change over time as interest rates on comparable CDs change. In many cases, the common maturity is $1 million, and holders trade them prior to maturity when the CDs pay the promised principal plus interest. They are issued primarily by the largest banks and purchased by businesses and governmental units. Therefore, they are not considered retail deposits. Smaller banks also issue jumbo CDs, but even though they are negotiable, they rarely trade in the secondary market. Often, smaller banks sell these to their best customers, with whom they have a long-time relationship. As such, they might be considered retail deposits for smaller banks because the customers hold them to maturity. Larger banks generally pay higher rates such that these CDs are considered wholesale funding. Many banks also rely on large CDs in the form of brokered CDs and Internet CDs. These forms of jumbo CDs are discussed in more detail later in the chapter along with other wholesale funding sources.

Estimating the Cost of Deposit Accounts

Estimating the cost of liabilities involves more than just examining the interest cost of various accounts. Interest expense on transactions accounts may be as low as zero or a small fraction of 1 percent. Interest costs alone, however, dramatically understate the effective cost of transactions accounts for several reasons. First, transactions accounts are subject to legal reserve requirements equal to as much as 10 percent of the outstanding balance. Such requirements mandate that a bank hold deposits in proportion to the amount of outstanding balances. Because they are generally invested in nonearning or low rate assets (Federal Reserve deposits or vault cash), these required reserves increase the cost of transactions accounts, because only a fraction of the balances can be invested. Nontransactional accounts have no reserve requirements and are cheaper, ceteris paribus, because 100 percent of the funds may be invested. Second, when deposit customers have a large number of transactions, there are substantial processing costs. For example, think how costly it would be to manage the account of a local grocery store that accepts all forms of payment. Finally, certain fees are charged on some accounts to offset noninterest expenses and this reduces the cost of these funds to the bank.

The cost of transactions accounts can be substantial. Most cost analysis data, however, indicate that demand deposits are the least expensive source of funds, although the profitability of these accounts depends heavily on the average balance, as well as the number of transactions and fees collected. The average percentage cost of low-balance checking accounts is high before any additional fees are collected, such as overdraft protection or "not sufficient funds" (NSF) fees. Low-balance accounts can be very expensive for the bank, and most banks know that such customers tend to overdraw their balances more often. Hence, overdraft fees charged by the bank not only represent fees for the services provided but also represent a *risk charge*. Customers who overdraw their accounts on a regular basis are more likely to be low-balance customers who do not always have the funds needed to cover the overdraft. Overdrafts actually represent extension of credit by the bank, but the bank has less control over the credit terms. When the bank's fees are recognized, these accounts may represent very low-cost funds.

Estimating the noninterest cost of transactions accounts can be quite challenging. In order to estimate the cost and profitability of customers and/or products, management must have detailed data on the costs of various departments, products, and customer relationships. While the data can be expensive and time consuming to collect, evaluate, and manage, it is extremely valuable. Using cost analysis data enables management to determine which accounts and branches are profitable, and thus quickly identify, attack, and resolve weak areas.

Unfortunately, there are few public sources for comparable cost data in banking. The Federal Reserve previously published data in *Functional Cost and Profit Analysis,* but it ended this program in 1999. Today, this type of information must be obtained from private sources or the bank's own cost accounting system.[5] We use FirstBank as an example in Exhibits 10.4 and 10.5 to demonstrate the use of such data.

Transactions account cost analysis generally classifies check-processing activities as either deposits (electronic and nonelectronic), withdrawals (electronic and nonelectronic), transit checks deposited, transit checks cashed, account opened or closed, "on-us" checks cashed, or general account maintenance (truncated and nontruncated). **Electronic transactions** are those that occur through automatic deposits, Internet and telephone bill payment, ATMs, and ACH transactions. **Nonelectronic transactions** are those handled in person or by mail. **Transit checks deposited** are checks drawn on any bank other than the subject bank where deposits are simply deposits from checks drawn on the subject bank. **"On-us" checks cashed** are checks drawn on the bank's customer's account. Deposits represent checks or currency directly deposited in the customer's account. **Account maintenance** refers to general record maintenance along with preparing and mailing a periodic statement. A **truncated account** is a checking account in which the physical check is "truncated" at the bank; that is, checks are not returned to the customer. An **official check issued** would be for certified funds. Finally, **net indirect costs** are costs not directly related to the product—such as salaries for managing the bank or general overhead.

Exhibit 10.4 summarizes average revenue and cost information for various deposit accounts at FirstBank. The first column contains average account and unit cost data for demand (checking) accounts. The next two columns of data are for savings accounts, which are small personal savings accounts with no maturity, and time deposit data, which are generally for larger accounts such as CDs with a fixed term to mature. The data in each column indicate the average cost per item for each activity. Examining the data under the category "Income" indicates that interest income, or an earnings credit, is lowest for demand and highest for time accounts. This is not surprising as transactions accounts are more volatile and generally invested for shorter periods than savings or time deposits. Average noninterest income from service charges and fees, however, is highest for demand accounts and lowest for time deposit accounts. Clearly, transaction expenses associated with checking accounts are much greater than those for savings

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[5] Establishing an effective cost accounting system requires capturing all income, expenses, and portfolios by department and product. The more critical process is identifying all departments, both profit centers and cost centers, and developing logical cost-allocation bases for the cost centers; developing and computing transfer costs of funds from internal funds suppliers to internal funds users; and designing summary report formats that consolidate and present all pertinent data for senior management in a logical and informative manner. Because there are many shared costs, the accuracy of the final analysis will be heavily dependent on the time and effort put into identifying the various subjective cost allocations.

EXHIBIT 10.4 **Cost and Revenue Accounting Data for Deposit Accounts at FirstBank**

	Unit Cost		
	Demand	**Savings**	**Time**
Income			
Interest income (estimated earnings credit)	**1.2%**	**1.2%**	**1.8%**
Noninterest income (monthly estimates per account)			
Service charges	$3.10	$0.62	$0.17
Penalty fees	$2.52	$0.33	$0.27
Other	$0.75	$0.16	$0.05
Total noninterest Income	**$6.37**	**$1.11**	**$0.49**
Expenses			
Activity charges (unit costs per transaction)			
Deposit—electronic	$0.0149	$0.0580	$0.1631
Deposit—nonelectronic	$0.2634	$0.8064	$3.5525
Withdrawal—electronic	$0.1722	$0.4904	$0.6110
Withdrawal—nonelectronic	$0.2663	$0.7180	$1.4933
Transit check deposited	$0.2350	$0.6433	
Transit check cashed	$0.3072		
On-us check cashed	$0.2778		
Official check issued	$1.35		
Monthly overhead expense costs			
Monthly account maintenance (truncated)	$2.96	$4.35	$2.16
Monthly account maintenance (nontruncated)	$8.11		
Net indirect expense	$4.70	$2.31	$21.12
Miscellaneous expenses			
Account opened	$9.10	$37.55	$6.95
Account closed	$6.33	$22.48	$3.86

accounts or time deposits. Transaction activity in savings accounts is also somewhat greater than in time accounts (adjusted for account size), hence the slightly higher fees collected on these types of accounts.

The second group of data under "Expenses" indicates that unit transaction costs are lowest for demand accounts, due primarily to the volume of activity in these accounts, and highest for time accounts. Typically, time accounts have very few transactions. Finally, note that the cost of electronic transactions is a fraction of the cost of nonelectronic transactions. In fact, if banks could significantly increase the use of electronic transactions by their customers, they would dramatically reduce the cost of servicing these types of accounts. This is one reason why some larger banks have begun to charge a $3–$4 fee for live teller transactions.

Whether these accounts are profitable depends on how much the bank earns from investing deposit balances (net of required reserves and float) and service charges and fees. Exhibit 10.5 presents FirstBank's estimates of these average monthly revenues and expenses for three different DDAs. Interest (investment) income is calculated by

EXHIBIT 10.5 Cost and Revenue Account Analysis for Various Demand Deposit Accounts at FirstBank

	Low Balance, Low Activity, Truncated		Medium Balance, High Activity, Nontruncated		High Balance	
	Activity $	**Monthly Income/ Expenses $**	**Activity $**	**Monthly Income/ Expenses $**	**Activity $**	**Monthly Income/ Expenses $**
Income						
Interest income on average monthly balance (after float)	**500**	**0.51**	**8,750**	**8.90**	**15,800**	**23.70**
Noninterest income (average monthly estimates)						
Service charges		3.10		3.10		3.10
Penalty fees (estimated for account)		7.56		6.30		1.26
Other		0.75		0.75		0.75
Total noninterest income		11.41		10.15		5.11
Total revenue		11.92		19.05		28.81
Expenses						
Activity charges						
Deposit—electronic	1	0.02	2	0.03	2	0.03
Deposit—nonelectronic	1	0.26	3	0.78	3	0.78
Withdrawal—electronic	10	1.72	8	1.38	6	1.03
Withdrawal—nonelectronic	5	1.33	10	2.63	5	1.33
Transit check deposited	1	0.24	2	0.47	2	0.47
Transit check cashed	1	0.31	1	0.31	2	0.62
On-us checks cashed	1	0.28	1	0.28	1	0.28
Total activity expense		4.16		5.88		4.54
Monthly expenses						
Monthly account maintenance (truncated)	1	2.96				
Monthly account maintenance (nontruncated)			1	8.11	1	8.11
Net indirect expense		4.70		4.70		4.70
Total reoccurring monthly expenses		7.66		12.81		12.81
Interest expense						
Total expense		11.82		18.69		17.35
Net revenue per month		**0.10**		**0.36**		**11.46**

multiplying the earnings credit on balances in excess of float and required reserves. Not surprisingly, net revenue varies directly with the average size and level of activity of the account as well as the fees associated with the account. Total revenue per month is greatest for the high-balance account, which comprises mostly interest income from the higher balance. Noninterest revenue is highest for the low-balance account, due primarily to penalty fees from NSF charges. Net monthly revenue is highest for the high-balance account, but net monthly revenue is actually lower for the medium-balance, high-activity account relative to the low-balance, low-activity account. The fact that this account is nontruncated (checks are returned) lowers the profitability relative to the low-balance account with lower activity and higher fees. These data clearly indicate that the average balance, amount of activity, and type of account establish the profitability of the account. The data also make it clear why many banks encourage their customers to make payments electronically and to accept a truncated account in which the bank does not return checks but instead may provide check images.

Because banks now pay market rates on deposits, they want all customers to pay at least what the services cost. This has brought about relationship pricing, in which service charges decline and interest rates increase with larger deposit balances. Many banks have unbundled services and price each separately. Some charge for services once considered simple courtesies, such as check cashing and balance inquiries, and there are even banks that charge a fee to conduct banking in person. For most customers, service charges and fees for banking services have increased substantially in recent years.

Such pricing schemes have essentially created a caste system of banking. Large depositors receive the highest rates, pay the lowest fees, and often get free checking. They do not wait in long teller lines and they receive more attention from their personal banker. When they call a bank representative, they often quickly get a live person on the line. Small depositors, by contrast, earn lower rates, if any, on their small balances and pay higher fees, with less personal service. When these customers call their banker—particularly at large, transactions-based organizations—they will be routinely routed from one electronic response to another and will wait long periods to visit with an actual person.

Calculating the Average Net Cost of Deposit Accounts

The **average historical cost of funds** is a measure of average unit borrowing costs for existing funds. Average *interest cost* for the total portfolio is calculated by dividing total interest expense by the average dollar amount of liabilities outstanding; it measures the average percentage cost of a single dollar of debt. Average historical costs for a single source of funds can be calculated as the ratio of interest expense by source to the average outstanding debt for that source during the period. The interest cost rates presented in Chapter 3 represent such costs.

To estimate the annual historical net cost of bank liabilities, simply add historical interest expense to on earning assets: noninterest expense (net of noninterest income) and divide by the investable amount of funds to determine the minimum return required on earning assets:

$$\textit{Average net cost of bank liabilities} = \frac{\text{Interest expense} + \text{noninterest expense} - \text{noninterest income}}{\text{Average balance net of float} \times (1 - \text{reserve requirement ratio})} \times 12 \qquad \textbf{(10.1)}$$

The average net cost of the medium-balance, high-activity account from Exhibit 10.5, assuming 5 percent float and 10 percent reserve requirements, would be:

$$\text{Average (annual) net cost of medium–balance account} = \frac{(\$0 + \$18.69 - \$10.15)}{\$8{,}750 \times 0.95 \times 0.90} \times 12 = 1.37\%^{6}$$

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[6] We multiply by 12 because the cost figures given in Exhibit 10.5 are monthly costs.

Characteristics of Large Wholesale Liabilities

In addition to small-denomination deposits, banks purchase funds in the money markets. Large institutions effect most transactions over the telephone or via the Internet, either directly with trading partners or through brokers. Most trades are denominated in $1 million multiples. Small banks generally deal directly with customers and have limited access to national and international markets. Some types of liabilities, such as jumbo CDs sold directly by a bank, are viewed as permanent sources of funds, while others are used infrequently. Banks must pay market rates on all sources and can normally attract additional funds by paying a small premium over the current quoted market rate. Because customers move their investments on the basis of small rate differentials, these funds are labeled "hot money," volatile liabilities, or short-term noncore funding and include large or jumbo CDs, federal funds purchased, RPs, Eurodollar time deposits, foreign deposits, and any other large-denomination purchased liability.

Jumbo CDs (CDs)

Large, negotiable certificates of $100,000 or more are referred to as jumbo CDs. These instruments are issued primarily by the largest banks and purchased by businesses and governmental units. Although CDs come in many varieties, they all possess similar characteristics:

1. Minimum maturity of seven days. The most common maturities are 30 and 90 days, but recent issues of zero coupon CDs extend the maturity out as long as 10 years.
2. CD interest rates are quoted on the basis of a 360-day year. Except for zero coupon instruments, CDs are issued at face value and trade as interest-bearing instruments. Thus, trades are settled at market value of the principal plus interest accrued from the original purchase.
3. CDs are insured up to $250,000 per investor, per institution. Any balances in excess of $250,000 are at risk to the holder.[7]

Jumbo CDs are considered risky instruments and are traded accordingly. When an issuing bank has financial difficulties, it must pay a stiff premium over current yields, often 2 to 3 percent, to attract funds. When traders perceive that all large banks are experiencing difficulties, as with the Asian financial crisis in 1998, they bid CD rates higher relative to comparable maturity Treasury bill rates.

Banks issue jumbo CDs either directly to investors or indirectly through dealers and brokers. Whenever they use an intermediary, banks pay approximately one-eighth of 1 percent, or 12.5 basis points, for the service. Deposits obtained in this manner are labeled **brokered deposits**. The broker essentially places a bank's CDs with investors who demand insured deposits. The advantage is that brokers provide small banks access to purchased funds. They package CDs in $250,000 increments so that all deposits are fully insured, and market them to interested investors. In essence, the broker is selling deposit insurance because the buyer assumes the risk that the government will not pay off insured depositors, which has never happened. Thus, a bank or savings and loan might request that a broker obtain $50 million in CDs, which could be handled by selling 200 fully insured CDs of $250,000 each.

Not surprisingly, bank regulators argue that brokered CDs are often abused. They point to a link between brokered deposits and problem/failed banks. Banks and thrifts

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[7] For example, investors in CDs issued by Penn Square Bank of Oklahoma City, which failed in 1983, received only 65 cents on the dollar for the uninsured portion of their CDs.

can use CD funds to speculate on high-risk assets. If the investments deteriorate and the bank fails, it is the FDIC, not the bank owners, that must pay insured depositors. In fact, many banks that failed during the 2007–2010 financial crisis grew too rapidly making speculative real estate loans financed by CDs. Loan losses subsequently followed. For example, when ANB Financial in Bentonville, Arkansas, failed in May 2008, the $2.1 billion asset bank had $1.6 billion in brokered deposits outstanding. The loss to the FDIC insurance fund exceeded $200 million in its payout to insured depositors. For this reason, bank regulators restrict the use of brokered deposits to healthy banks with high amounts of equity capital that are less likely to fail. Importantly, it is the problem assets and not the CDs that produce losses for the bank.

In recent years, community banks have come to rely on CDARS ("cedars") as a form of extended deposit insurance. Formally, CDARS stands for "Certificate of Deposit Account Registry Service."[8] The service effectively allows a bank to offer full deposit insurance on virtually any size deposit from a single customer—even in excess of the $250,000 limit per account. It works because a bank transfers the amount in excess of the $250,000 limit to other banks in exchange for deposits from the other banks in equal amounts with all transfers under the $250,000 insurance limit. As such, each transferred deposit is fully insured. In effect, banks are swapping uninsured deposits for insured deposits for which they pay the service organization a fee. Regulators classify CDARS as brokered deposits, but they do not carry the same risk features as deposits obtained through brokerages.

CDs come in many forms with the terms determined by customer preferences and strategic initiatives pursued by banks to manage interest rate risk. When bank managers expect rates to systematically rise, they will try to lengthen CD maturities prior to the rate moves. The opposite occurs when they expect rates to fall. Of course, deposit customers may have the same expectations. The following list describes different types of CDs:

- **Fixed-rate CDs.** Traditionally, CDs were fixed-rate contracts that were renegotiated at one-, three-, and six-month maturities. Today, fixed-rate maturities of up to five years are quite common.
- **Variable-rate CDs.** Many banks issue variable-rate contracts for longer periods, with rates renegotiated at specified intervals such as every three months. The rate paid at each interval equals the average of three-month CD rates quoted by securities dealers. These variable-rate CDs appeal to investors who expect rising rates or want the added rate sensitivity. A recent variant is the **jump-rate CD** (or **bump-up CD**) in which the depositor has a one-time option until maturity to change the rate to the prevailing market rate.[9] These CDs attract funds when rates are expected to rise. Interestingly, most data show that only a few individuals exercise the option.
- **CD specials.** Many banks want to pay higher rates to attract new funds without cannibalizing funds currently on deposit. Why pay Mary, who currently has $95,000 in a time deposit with the bank, a higher rate than she's earning today if you don't have to pay it? The fear of cannibalization produces CD specials, or CDs offered with special terms that are targeted at new deposits. CD specials typically carry high initial rates for an odd number of months (8 months, 13 months) so that they mature at a time when other bank deposits are not maturing. At maturity, these CDs revert to a traditional 6-month or 12-month CD at the bank's lower rates, and the depositor has to notify the bank to move the funds out of these traditional deposits. They are an attempt to attract new funds with a high, but temporary, initial interest cost.

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[8] CDARS is a service provided by Promontory Interfinancial Network that was initiated in 2003.

[9] Because this option transfers all interest rate risk to the issuing bank, a customer should be willing to accept a lower initial yield.

- **Callable CDs.** During the late 1990s interest rates increased, bank loan demand was high, and banks were having difficulty funding asset growth. Large CD rates were as high as 8 percent on two- to five-year CDs, much higher than rates on Treasury securities with comparable maturities. The need for long-term funding, combined with the concern that rates would fall, led some banks to begin issuing callable 5- and 10-year CDs. These CDs typically carried a two-year deferment period, meaning they could not be called for two years after issue. Afterward, the bank could call the CDs, meaning that it could repay the depositor's principal, at its discretion. These CDs offered attractive rates but provided the bank with lower borrowing costs risk if rates were to fall over the life of the CDs.
- **Zero coupon CDs.** Like zero coupon bonds, zero coupon CDs are sold at a steep discount from par and appreciate to face value at maturity. They carry fixed rates and fixed maturities. For example, a bank might issue a CD with a current price of $750,000 that pays $1 million in five years. The investor receives a fixed 5.92 percent annual return and knows with certainty what the value of the investment is after five years. The primary disadvantage is that the amortized portion of the original discount ($250,000) is subject to federal income taxes each year, even though the investor does not actually receive current income. For this reason, many banks market the zeros to individual retirement accounts (IRAs). Whenever the maturity value is below $250,000, the CD is fully insured. The attraction to issuing banks is in getting longer-term funds. In this case, the bank obtains $750,000 immediately with no corresponding cash outflow for five years. This deposit's effective duration is five years.
- **Rate boards.** Rate boards represent venues for selling nonbrokered CDs via the Internet to institutional investors. They are essentially listing services that collect information regarding CD rates that different FDIC-insured banks currently offer to institutional investors. If the services charge a subscription fee that is not based on either the number of CDs or dollar value of CDs placed, and if the services do not directly assist in placing the deposits with investors, the FDIC classifies CDs obtained in this manner as nonbrokered deposits. Thus, a bank pays a subscription fee to list the rates it will pay for CDs with different maturities (under $250,000). Rate boards help raise funds quickly and represent a virtual branch for a bank. During the financial crisis, many problem banks that ultimately failed borrowed extensively via rate boards paying rates well above those paid by healthy banks. At failure, the FDIC advised the CD holders that they could accept a lower rate or receive an immediate payout of their investment. Interestingly, credit unions represent a major group of investors and have exhibited a propensity to roll over their investments at maturity, thereby creating a relatively stable source of funds.

Individual Retirement Accounts

IRAs are savings plans for wage earners and their spouses. The plans encompass many types of savings vehicles with varied maturities, interest rates, and other earnings features. Individuals can choose between different financial services companies and many different products. Commercial banks, thrift institutions, brokerage houses, and insurance companies dominate IRA investments. Investor options range from small time deposits and MMDAs at banks and savings and loans to common stocks, zero coupon Treasury securities, and shares in limited real estate partnerships offered by brokerages. Although IRA accounts are listed as wholesale funds, in many cases the bank's core customers also hold IRA accounts.

The primary attraction of IRAs is their tax benefits. Each wage earner can make a tax-deferred investment of earned income annually in an IRA, subject to IRS retirement plan and maximum income rules.[10] Funds withdrawn before age 59½ are subject to a 10 percent IRS penalty. Investors can change investments prior to this age but must pay another penalty if the change does not occur when the underlying savings vehicle matures. These features make IRAs an attractive source of long-term funds for commercial banks that can be used to balance the rate sensitivity of longer-term assets. Customers opening accounts are less likely to move them as long as the bank pays competitive rates.

These traditional IRAs are attractive because funds contributed to the IRA are tax deductible. Taxes are paid when the funds are withdrawn, hence investors will earn interest on what they would have had to pay in taxes. A Roth IRA is similarly attractive but has different tax treatment. With a Roth IRA, contributions are made from after-tax dollars, but income accumulates tax free. When the individual eventually withdraws Roth IRA proceeds, the entire amount is not taxed.

Commercial banks and thrifts offer IRA products related to small time deposits with fixed maturities and MMDAs. These deposits are federally insured, which appeals to many individuals. MMDAs are the most rate sensitive, as banks change rates at least every 30 days. Banks can typically induce customers to lengthen deposit maturities by paying higher rates on longer-term instruments. Small CDs carrying variable rates tied to external indexes have become increasingly popular with the greater uncertainty over future interest rate movements.

Foreign Office Deposits

Most large U.S. commercial banks compete aggressively in international markets. They borrow from and extend credit to foreign-based individuals, corporations, and governments. In recent years, international financial markets and multinational businesses have become increasingly sophisticated to the point where bank customers go overseas for cheaper financing and feel unfettered by national boundaries. Savings transactions in short-term international markets often take place in the Eurocurrency market. The term **Eurocurrency** refers to a financial claim denominated in a currency other than that of the country where the issuing institution is located. The most important Eurocurrency is the **Eurodollar**, a dollar-denominated financial claim at a bank outside the United States. The banks may be foreign-owned or foreign branches of U.S. banks. The Eurodollar market comprises both loans and deposits, each with different characteristics and participants.

Eurodollar deposits are dollar-denominated deposits in banks outside the United States. They are virtually identical to time deposits issued directly by domestic banks, except for the country of issue. In all cases, dollar deposits at U.S. banks support the creation of a Eurodollar deposit. These deposits never physically leave the U.S.; only the ownership does. Maturities range from call to five years, and most deposits are traded in denominations of $1 million or more. Eurodollar CDs, the counterpart of domestic CDs, are the most popular Eurodollar deposit. They carry short-term maturities, typically three to six months, and can be traded in the secondary market prior to maturity. Although most Eurodollar CDs pay fixed rates, floating-rate instruments are becoming increasingly popular. Eurodollar rates are quoted on an interest-bearing basis, assuming a 360-day year. Eurodollar deposit rates must be competitive with rates on comparable maturity instruments, such as federal funds and jumbo CDs.[11] Otherwise, the deposits would not attract funds away from U.S.-based instruments.

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[10] The allowable annual contribution is determined by the employee's income and filing status (single versus married filing jointly).

[11] Goodfriend (1998) discusses these relationships and general Eurodollar characteristics in detail.

EXHIBIT 10.6 **The Origin and Expansion of Eurodollar Deposits**

Stage I: U.S. manufacturer opens $10 million Eurodollar account at Bank of England, London (BE-L) with deposits held at a Money Center Bank-NY (MCB-NY).

Stage II: Bank of England, London, opens Eurodollar account at U.S. Money Center Bank, London (MCB-L).

Stage III: U.S. Money Center Bank, London, extends $10 million Eurodollar loan to British corporation in London.

U.S. Manufacturer, New York		**U.S. Money Center Bank, New York**		**U.S. Money Center Bank, London**		**Bank of England, London**	
△ASSETS	***△LIABILITIES***	***△ASSETS***	***△LIABILITIES***	***△ASSETS***	***△LIABILITIES***	***△ASSETS***	***△LIABILITIES***
Stage I:							
Demand deposits due from MCB-NY −$10 million Eurodollar deposit due from BE-L +$10 million			Demand deposits due to U.S. manuf.-NY −$10 million Demand deposit due to BE-L +$10 million			Demand deposit due from MCB-NY +$10 million	Eurodollar deposit due to U.S. manuf.-NY +$10 million
Stage II:			Demand deposit due to BE-L −$10 million Demand deposit due to MCB-L +$10 million	Demand deposit due from MCB-NY +$10 million	Eurodollar deposit due to BE-L +$10 million	Demand deposit due from MCB-NY −$10 million Eurodollar deposit due from MCB-L +$10 million	
Stage III:							
British Corp., London							
△ASSETS	***△LIABILITIES***						
Demand deposit due from MCB-NY +$10 million	Eurodollar loan from MCB-L +$10 million		Demand deposit due to MCB-L −$10 million Demand deposit due to British corp. +$10 million	Demand deposit due from MCB-NY −$10 million Eurodollar loan to British corp +$10 million			

Eurodollar depositors include individuals, businesses, and governments from around the world. Many transactions, in fact, are merely interbank deposits. Exhibit 10.6 characterizes the origination of Eurodollar deposits and the eventual path to a Eurodollar loan. It summarizes activities of four groups and encompasses three stages of transactions. In the first stage, a U.S. manufacturing corporation based in New York opens a Eurodollar deposit at the Bank of England in London and effectively transfers ownership of a demand balance held at a U.S. Money Center Bank in New York. The terms of the Eurodollar deposit are negotiated as discussed previously. At the end of this transaction, $10 million in Eurodollar deposits has been created. The amount of demand deposits at U.S. banks, however, is unchanged. Only the ownership has changed, from the U.S. manufacturer to the Bank of England.

During Stage II, the Bank of England redeposits the dollars with the U.S. Money Center Bank's London office. Ownership of the original demand balance at the New York bank again changes, but the deposit does not physically leave the United States. Another $10 million in Eurodollar deposits has been created with no change in total demand deposits at U.S. banks.

Stage III documents a Eurodollar loan made to a British corporation such that the foreign firm ultimately owns the original demand deposit. This intermediation among banks permits the multiple expansion of Eurodollar deposits based on a fixed demand deposit at a U.S. bank. There are no reserve requirements on Eurodollar deposits, and a bank will move the entire balance as long as it can earn a profitable spread. The base rate paid on interbank deposits (Stage II) is termed the London Interbank Offer Rate (LIBOR). Additional interbank deposits are typically made at spreads of 0.125 to 0.25 percent. Thus, if the initial deposit at the Bank of England paid 3 percent, the Bank of England would require at least 3.125 percent on its redeposit. The spread on a Eurodollar loan to the ultimate borrower is considerably greater.

Borrowing Immediately Available Funds

As the name suggests, immediately available funds are balances that are accepted as a means of payment within one business day on demand. Two types of balances are immediately available: deposit liabilities of Federal Reserve Banks and certain "collected" liabilities of commercial banks that may be transferred or withdrawn during a business day on order of account holders.[12] Through its wire transfer facilities, the Federal Reserve System can electronically move deposits anywhere throughout the United States within 24 hours. Collected balances of banks are ledger balances appearing on a bank's books minus float. All checks written against such accounts, but not yet cleared, have been deducted, and the remaining balances are transferable within one day. Most large transactions are settled in immediately available funds, including maturing CDs, federal funds, and security RPs.

Federal Funds Purchased. The term *federal funds* is often used to refer to excess reserve balances that are traded between banks. This is grossly inaccurate, given reserves averaging as a method of computing reserves, different nonbank players in the market, and the motivation behind many trades. In some instances, nonbank participants, such as securities dealers and state governments, trade federal funds. In other cases, bank reserve balances at Federal Reserve Banks do not change ownership. The formal definition of **federal funds** is unsecured short-term loans that are settled in immediately available funds. They encompass transactions outside the arena of bank reserve trading by including any participant that holds large balances at Federal Reserve Banks or collected liabilities at depository institutions. Thus, thrift institutions, foreign governments, and the U.S. Treasury can trade federal funds.

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[12] Immediately available funds are discussed by Lucas, Jones, and Thurston (1977). Deposit liabilities of Federal Reserve Banks to financial institutions constitute the major portion of the banking system's legal required reserves.

Most transactions are overnight loans, although maturities are negotiated and can extend up to several weeks. Interest rates are negotiated between trading partners and are quoted on a 360-day basis. The absence of collateral suggests that participants are well known by their trading partners because lenders accept default risk. Large transactions are denominated in multiples of $1 million and are typically handled by brokers. On the other side of the spectrum, small banks frequently buy and sell federal funds in amounts as low as $100,000. When a bank purchases federal funds, its cost of borrowing equals the interest rate plus the brokerage fee because the bank does not have to hold required reserves against this liability.

The federal funds market is important to monetary policy because the federal funds rate is a key target variable for the Federal Reserve System. Federal Reserve policies, particularly Federal Open Market Committee (FOMC) purchases and sales of securities, directly alter the bank reserves component of immediately available funds, increasing or decreasing the federal funds rate. Increases in bank reserves reduce borrowing pressure relative to desired lending of immediately available funds, and the federal funds rate declines over the near term. The opposite occurs with decreases in bank reserves.

Security Repurchase Agreements. Security RPs or repos are short-term loans secured by government securities that are settled in immediately available funds. They are virtually identical to federal funds in function and form except they are collateralized. Technically, the loans embody a sale of securities with a simultaneous agreement to buy them back later at a fixed price plus accrued interest. The later date is normally the next day, as most RPs have 24-hour maturities. Some loans are for longer periods, with maturity and rate negotiated. Although securities dealers dominate the market, any institution can trade RPs as long as it meets collateral and balance requirements.

For example, if City National Bank used an RP to acquire immediately available funds, it would have to post securities as collateral against the borrowing. Whenever the collateral is U.S. government or agency securities, the funds obtained are free of reserves. In market terminology, the lender's transaction is a reverse RP. Banks participate both as borrowers and lenders directly or as securities dealers.

In most cases, the market value of the collateral is set above the loan amount when the contract is negotiated. This difference is labeled the *margin*. If, for example, City National pledged $1.1 million of U.S. government securities against its $1 million borrowing, the margin equals $100,000. Positive margin protects the lender from potential decreases in collateral value if interest rates increase. This protection makes RPs less risky compared with unsecured federal funds transactions, and thus RP rates are less than federal funds rates for similar-maturity contracts. Such collateral proved inadequate in 1982, when two government securities dealers, Drysdale Government Securities and Lombard-Wall, were forced into bankruptcy when they could not pay accrued interest owed on heavy borrowings via RPs when the loans came due. As a result, Chase Manhattan Bank and Manufacturers Hanover took losses from Drysdale alone equal to $285 million and $21 million, respectively. Although both banks initially disclaimed liability, they eventually made good on losses their customers otherwise would have incurred because the banks arranged the RP transactions.

In 1985 E.S.M. Group similarly collapsed after suffering losses trading RPs, bringing about the failure of Home State Savings in Ohio and the closing of more than 70 thrifts that faced losses from a massive run on deposits. Deposits at Home State and the thrifts were privately insured, but the insurance pool was insufficient to meet payment obligations. The closed thrifts ultimately reopened with federal deposit insurance coverage.[13]

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[13] Stephen Lumpkin (1993) summarizes key features of the RP market and factors influencing credit and interest rate risk.

These failures increased regulatory scrutiny of the RP market and focused attention on the true legal status of a repo. In particular, creditors of Drysdale and Lombard-Wall who held RP collateral sold the securities. If, in fact, RPs are secured loans, bankruptcy law prohibits creditors from selling any assets owned by the failed firms. If RPs are separate contracts to sell and repurchase securities, creditors can liquidate the securities. Technically, the securities are the lenders because the borrower failed to repurchase them. Court rulings appear to side with the creditors, allowing them to liquidate security holdings. These same issues arose in 2008 with the financial stress tied to Bear Stearns and Lehman Brothers—a situation in which many market participants demanded payment from Bear Stearns and Lehman on their RPs rather than roll them over.

Structured Repurchase Agreements. Normal repos are essentially bullet repos with a fixed rate over a set maturity with no options. More recently, structured repo agreements have become popular. A structured repo embeds an option (call, put, swap, cap, floor, etc.) in the instrument to either lower its initial cost to the borrower or better help the borrower match the risk and return profile of an investment. For example, a callable repo allows the deposit holder to terminate (call) the CD prior to maturity. The issuer will do this when rates rise and the funds can be reinvested at a higher rate.

Borrowing from the Federal Reserve

Federal Reserve Banks typically make loans to depository institutions to help them meet reserve requirements. Before 1980, only commercial banks that were members of the Federal Reserve System could borrow under normal circumstances. The Depository Institutions Deregulation and Monetary Control Act (DIDMCA) of 1980 opened borrowing to any depository institution that offers transactions accounts that are subject to reserve requirements. The borrowing facility is called the **discount window**. All Federal Reserve Banks charge a fixed rate, known as the **discount rate**, which is formally set by the district Federal Reserve Banks and approved by the Board of Governors. In practice, the board determines when rate changes are necessary and requests approval from district representatives.

Borrowing directly from the Federal Reserve was traditionally restricted to commercial banks and was directly supervised by the Fed. However, the Fed's bailout of large financial institutions during the financial crisis broke new ground as the Fed made discount loans to many troubled firms. In a short period of time, Bear Stearns, Goldman Sachs, American Express, Morgan Stanley, MetLife, and other firms that were not even members of the Federal Reserve System all converted to bank holding companies so that they could be bailed out (access discount window loans) by the Fed. Bloomberg reported that on December 5, 2008, the Fed extended $1.2 trillion in discount window loans and guarantees to a wide range of large firms.[14] As of March 2009, the Fed had committed $7.7 trillion in loans and guarantees. In addition to direct discount window loans, the Fed created several other formal borrowing facilities in order to provide liquidity to the largest commercial and investment banks, finance companies, and other financial institutions that were floundering in the liquidity crisis.

When Congress established the Federal Reserve System in 1913, the lending of reserve funds through the discount window was intended as the principal instrument of central banking operations, because discount window loans directly increase a member bank's reserve assets. Long ago, however, open market operations became the most important tool of monetary policy, and today the discount window functions as a safety valve for

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[14] See Ivry, Keoun, and Kuntz, "Secret Fed Loans Gave Banks $13 Billion Undisclosed to Congress," *Bloomberg Markets Magazine*, November 27, 2011.

relieving liquidity strains at depository institutions and the banking system as a whole. The discount window also helps ensure stability of the payment system by supplying liquidity during times of systemic stress. For example, before the tragic events of September 11, 2001, banks held approximately $13 billion in the Federal Reserve accounts. In the days following September 11, these balances ballooned to more than $120 billion because some banks could not move funds out of these accounts. The additional funds in some bank accounts meant that a number of other banks were running huge negative positions in their Federal Reserve accounts. The number of Fedwire transfers fell from about $1.6 trillion to only $1.2 trillion, again creating a serious liquidity crisis for the payment systems. On September 12, the Fed's discount window lending to banks totaled $46 billion, more than 200 times the daily average for the previous month.

In October 2002, the Federal Reserve established a new discount rate policy in which the Fed would lend to most financial institutions under its primary and secondary credit programs at 1 percent and 1.5 percent over the current federal funds target rate. Previously, the Fed generally discouraged borrowing directly from the Fed and established the discount rate well below the current federal funds rate. Under the old policy, changes in the discount rate were infrequent and served primarily to signal future policy toward monetary ease or tightness rather than to change bank borrowing activity. Under the new policy, the Fed does not "discourage" borrowing as it did in the previous policy. The Federal Reserve expects that, given the above-market pricing of primary credit, institutions will use the discount window as a backup rather than a regular source of funding.

Qualifying institutions can borrow deposit balances, or required reserves, directly from Federal Reserve Banks in their role as lender of last resort, with the discount rate representing the interest rate that banks pay. The Federal Reserve has four distinct lending programs: primary credit, secondary credit, seasonal credit, and emergency credit:

- **Primary credit** is available to sound depository institutions on a short-term basis to meet short-term funding needs. In March 2008, the Board of Governors extended the allowable maturity to 90 days and lowered the rate to the FOMC's target rate for federal funds plus 25 basis points. The primary credit program is the principal safety valve for ensuring adequate liquidity in the banking system. Most depository institutions qualify for primary credit. Depository institutions are not required to seek alternative sources of funds before requesting occasional advances of primary credit. Importantly, the Board noted that "bank examiners should view occasional use of primary credit as appropriate and unexceptional."
- **Secondary credit** is available to depository institutions that are not eligible for primary credit. It is extended on a short-term basis, typically overnight, at a rate that is above the primary credit rate. Secondary credit is available to meet backup liquidity needs when its use is consistent with a timely return to a reliance on market sources of funding or the orderly resolution of a troubled institution. Secondary credit may not be used to fund an expansion of the borrower's assets. The secondary credit program entails a higher level of Federal Reserve Bank administration and oversight than does the primary credit program. In many ways, the Fed's loans to investment banks in 2008 represent secondary credit.
- **Seasonal credit** is designed to assist small depository institutions in managing significant seasonal swings in their loans and deposits. Seasonal credit is available to depository institutions that can demonstrate a clear pattern of recurring intrayear swings in funding needs. Eligible institutions are usually located in agricultural or tourist areas. The interest rate applied to seasonal credit is a floating rate based on market rates.

- **Emergency credit** may be authorized in unusual and exigent circumstances by the Board of Governors to individuals, partnerships, and corporations that are not depository institutions. Federal Reserve Banks currently do not establish an interest rate for emergency credit, but *Regulation A* specifies that such a rate would be above the highest rate in effect for advances to depository institutions. Such lending may occur only when, in the judgment of the Federal Reserve Bank, credit is not available from other sources and failure to provide credit would adversely affect the economy.
- The Federal Reserve establishes conditions and procedures for borrowing. Banks must apply and provide acceptable collateral before a loan is granted. Eligible collateral includes U.S. government securities, bankers acceptances, and qualifying short-term commercial or government paper. Frequent borrowers typically use U.S. Treasury securities already held in bookkeeping form at Federal Reserve Banks. Advances are loans secured by qualifying collateral. Discounts refer to member banks temporarily selling eligible loans to the Federal Reserve. The Federal Reserve agrees to return the loans to the bank at maturity. The discount rate charged determines the interest payment in both cases and is set by the Federal Reserve in light of current economic conditions.

Other Borrowing from the Federal Reserve

In response to the liquidity crisis faced by many global and domestic financial institutions in 2008, the Federal Reserve created several new borrowing facilities for banks and investment banks. While all facilities are designed to provide additional funding, they have different impacts on the money supply and thus macroeconomic conditions. Note that direct borrowing from the discount window increases the banking system's reserves, thereby adding to the nation's money supply.

Term Auction Facility. In December 2007, the Board of Governors introduced a term auction facility (TAF) that allows banks to bid for an advance from its local Federal Reserve Bank. The advance will generally have a 28-day maturity and will stipulate a minimum bid rate and maximum amount available. Banks must post collateral against the borrowings and cannot prepay the loan. Much like primary credit, advances obtained under the TAF increase the monetary base.

Term Securities Lending Facility. In 2008, the Board of Governors authorized a term securities lending facility (TSLF) in which the Open Market Trading Desk of the Federal Reserve Bank of New York makes loans to primary securities dealers. The formal process involves conducting periodic auctions of Treasury securities for loans against presumably high-quality mortgage-backed securities and other asset-backed securities. This substitution of securities does not affect the banking system's reserves and thus the money supply. TSLF allows dealers to trade relatively illiquid mortgage-backed securities for Treasury securities that they can then readily pledge as collateral against borrowings. It thus creates liquidity by enhancing the borrowing powers of primary securities dealers.

Commercial Paper Funding Facility (CPFF). In 2008, the Board of Governors created the CPFF to provide liquidity in the commercial paper market. The failure of Lehman Brothers produced a virtual freeze in transactions for many money and capital market instruments. The Reserve Fund, a money market mutual fund, actually "broke the buck" by announcing that the value of units held by investors in the Fund were worth less than the sacred $1 due primarily to losses on its holdings of Lehman Brothers' debt. Investors in commercial paper, which represents unsecured promissory notes, withdrew from the market such that many issuers could not replace (roll-over) their maturing commercial paper. The CPFF effectively provided a framework for the Fed to buy the commercial paper issued by large firms in need of financing. It served the same function as discount window lending. The program was terminated in 2010 when the markets improved.

Federal Home Loan Bank Advances

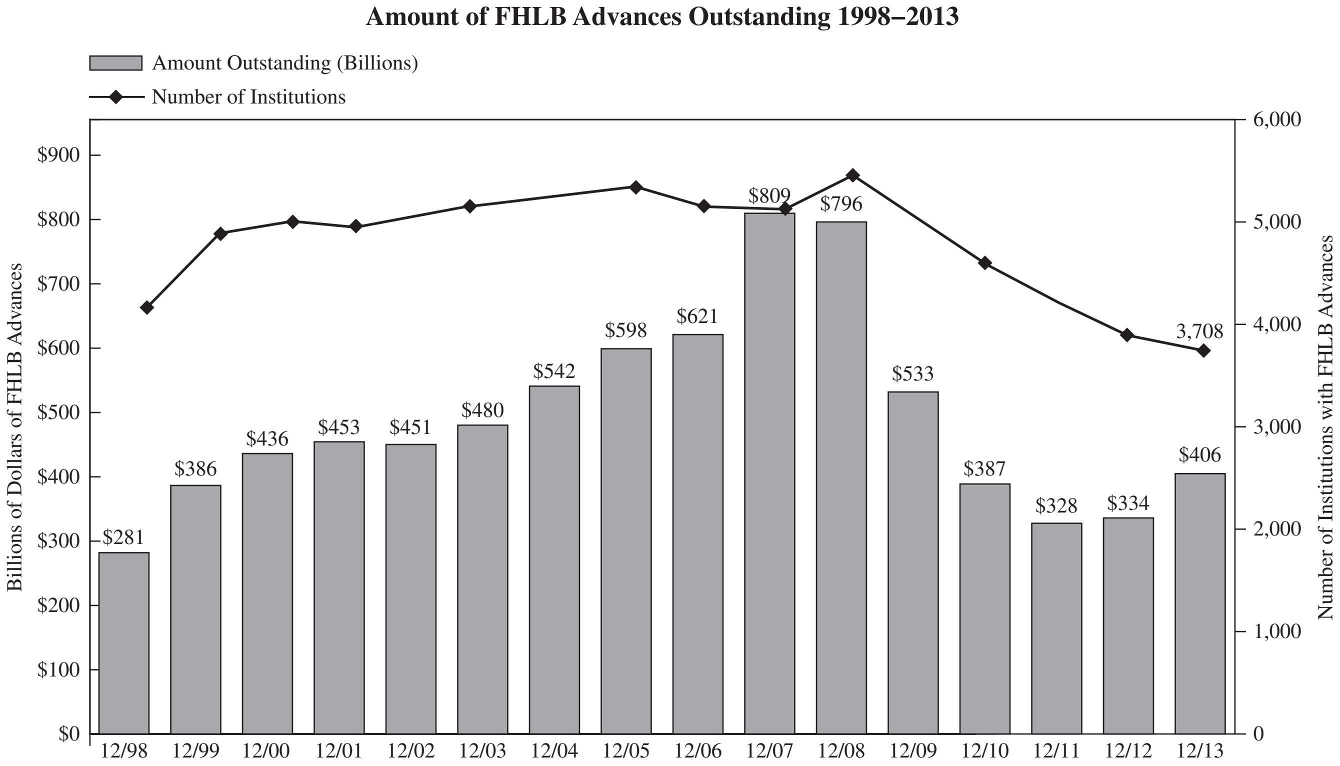
With today's intense competition for retail, or core deposits, many banks today rely heavily on advances (borrowings) from one of the FHLBs. The FHLB system is a government-sponsored enterprise that was originally created to assist individuals in home buying. Today, FHLBs are among the largest U.S. financial institutions. FHLB system borrowings are rated AAA (Aaa) because of the government sponsorship. FHLBs borrow cheaply and buy government securities or make loans to other institutions. These loans represent a source of financing to many banks. Any bank can become a member of the FHLB system by buying FHLB stock. If it has the available collateral, primarily real estate-related loans, a bank can borrow from the FHLB. The Gramm–Leach–Bliley Act of 1999, however, made it much easier for smaller banks to borrow with the funds used for loans not related to real estate. In particular, this act allows banks with less than $500 million in assets to use long-term advances for loans to small businesses, small farms, and small agribusinesses.

The act also establishes a new permanent capital structure for the FHLBs in which two classes of stock are authorized and redeemable on six-months' and five-years' notice. The greater competition for funds and the authorization of new uses for FHLB advances has resulted in rapid growth in the number of banks with FHLB borrowing and the dollar amount of these borrowings. Exhibit 10.7 tracks the growth in commercial banks with FHLB advances and the dollar amount of these advances since 1998. Note the large increase in advances in 2007–2008 linked to the liquidity crisis followed by a sharp decline. Many large banks, such as Washington Mutual, Countrywide Financial, and Wachovia borrowed extensively from the FHLB to help meet cash-flow needs associated with problem assets and the inability to borrow elsewhere at similar cost. None of these firms exist in their same form today with the failure of Washington Mutual and acquisitions of Countrywide and Wachovia by Bank of America and Wells Fargo, respectively. The sharp drop in number of banks borrowing via advances and dollar amount outstanding reflect both the drop in loan demand and regulatory efforts to reduce bank reliance on this form of funding.

FHLB borrowings come in the form of **advances**, which take a variety of forms. Advances can have maturities as short as one day or as long as 20 years. Banks with temporary funding needs (typically linked to increases in home lending) often use short-term advances with maturities from 30 to 90 days. A more recent trend has seen banks use longer-term advances as a more permanent source of funding for loan growth. In many instances, the interest cost compares favorably with the cost of jumbo CDs and other purchased liabilities. The range of potential maturities further allows banks to better manage their interest rate risk by helping them adjust effective maturities or durations of their funding and match them with assets. In addition, banks can borrow virtually any amount as long as they have the qualifying collateral. The interesting issue is whether these advances are truly a permanent source of funds and thus comparable to core deposits, or whether they are hot money.

Some of these FHLB advances are callable in the sense that the FHLB has the right to call the advance prior to maturity, typically after a predetermined deferment period. For example, a five-year callable advance may be called after one year. By agreeing to an advance with this call feature, a bank sells an option to the FHLB and receives value by paying a lower initial interest rate. Of course, if rates increase, the FHLB will call the loan and the bank will be forced to replace the funds at a higher rate. These and other FHLB advances are comparable to structured RPs available through repo dealers.

EXHIBIT 10.7 Commercial Banks with FHLB Advances, 1998–2013 (Second Quarter)



Source: FDIC Quarterly Banking Profile, Second Quarter 2013, www.FDIC.gov.

Electronic Money

Electronic commerce, in its infancy just a few years ago, has grown quite rapidly. If one considers the impact of technology in banking, it is apparent that almost all financial products can be provided electronically. One can pay for goods electronically, apply and receive a loan electronically, even invest and transfer funds electronically. The need for a physical bank location reflects customer preference—it is not a requirement for doing business.

Some analysts believe that smart cards, e-cash, and e-checks will soon become the dominant means of payment for Internet transactions. E-cash and e-checks are not Federal Reserve money but rather digital "tokens," somewhat like bus tokens or casino chips, only electronic versions. These funds represent encrypted value that is first paid for by credit card or cash and then presented for online purchases. Lauren Bielski argues that e-money "is arguably more of an electronic instruction to pay than true 'electronic money.'"[15] With respect to small payments, e-money has been compared to "prepaid" phone cards in that one "purchases" electronic value that can be used to make payments securely. On the large payment side, Electronic Data Interchange (EDI), a paperless exchange of business information between business partners, is used by more than 100,000 companies today.

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[15] See Lauren Bielski (2000).

Those green pieces of paper stuffed in your pocket or wallet, sometimes referred to as money or dollars, could someday become cryptographically sealed digital images stored electronically. This "digital" money may be stored on a smart card, a plastic credit card-sized card with a microchip; an "electronic wallet," a small wallet-sized reader and loader for smart cards, or even the hard disk of your computer or the bank's computer.

There are basically two types of smart cards: an "intelligent" card and a "memory" card. An **intelligent card** contains a microchip with the ability to store and secure information and makes different responses depending on the requirements of the card issuer's specific application needs. Intelligent cards offer a read and storage capability, and new information can be added or updated at anytime; additional funds can be added or the card can be terminated if needed. **Memory cards** simply store information. Similar to the stored information on the back of a credit card, a storage card can contain value that the user can spend in a pay phone, retail store, or vending machine. Memory-type smart cards are popular on college campuses.

Wireless transactions using computers and mobile devices are increasingly used in the United States. Many nonbank vendors, such as PayPal (owned by eBay) and Square, are extremely active in the payments arena. PayPal is involved in effecting customer transactions in many different forms and signed a partnership agreement with Total Systems in 2013. At present, its customers can transfer or receive funds electronically in over 30 currencies with entities throughout the world. Square provides a small cube that any individual or business can insert into a mobile phone's audio jack, which then enables the user to accept credit card payments. Such innovations will get more dramatic in the coming years.

Virtually all large transactions—the trillions of dollars handled each day by banks, other financial institutions, and the Federal Reserve clearinghouses—are digital. Wholesale electronic payments, using wire transfers such as the Clearing House Interbank Payment System (CHIPS) and the Fedwire, account for over three-fourths of the value of transactions.

The 2010 Federal Reserve Payments Study indicates that paper transactions in the form of checks declined by 7.1 percent from 2006 to 2009. Exhibit 10.8 (which excludes large Fedwire and CHIPS payments) shows that checks amounted to 22 percent of noncash payments in 2009, or 10 percent less than in 2006. Debit transactions increased the most, reaching 35 percent of noncash payments in 2009; this was followed by credit card payments that fell to 20 percent of noncash payments in 2009, with prepaid card payments rising to 5 percent. ACH payments represented the other 18%.

Other types of electronic payments include **electronic funds transfer (EFT)**, which is an electronic movement of financial data, designed to eliminate the paper instruments normally associated with such funds movement. There are many types of EFTs including ACH, POS, ATM, direct deposit, telephone bill paying, automated merchant authorization systems, and preauthorized payments. A **point of sale (POS)** transaction is a sale that is consummated by payment for goods or services received at the point of the sale or a direct debit of the purchase amount from the customer's checking account. That is, funds are transferred at the time the sale is made.[16] An **automated clearinghouse (ACH)** transaction is an electronically processed payment using a standard data format. A computer network to clear and settle electronic payment transactions links ACH institutions. ACH payments are electronic payments of funds and government securities among financial institutions and businesses. ATMs, or automatic teller machines, have been a popular EFT system for many years. These machines provide customers electronic access to their funds all over the world. Direct deposits of paychecks and social security checks are quite common today as well. Automated merchant and preauthorized payments are actually the other side of direct deposits in which payments are made

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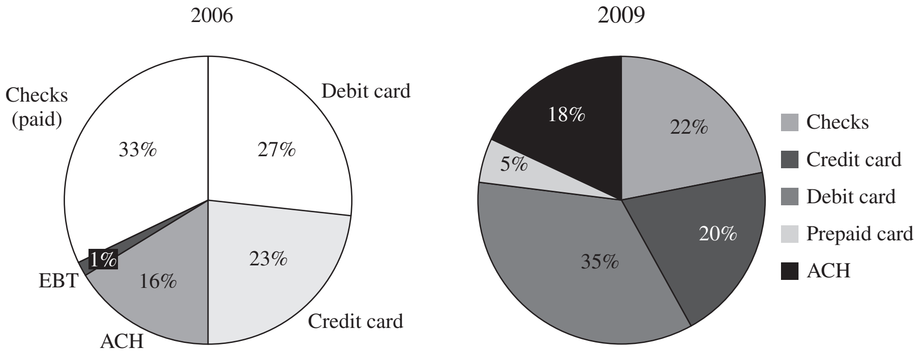
[16] Technically speaking, it can actually take one to three days before the funds are transferred.

EXHIBIT 10.8 **Distribution of the Number of Noncash Payments in 2006 and 2009**



Source: The 2010 Federal Reserve Payments Study, www.frbservices.org/files/communications/pdf/research/2007_payments_study.pdf

automatically and electronically. In both cases, direct deposits and automated payments, one level of paper has been eliminated. These payments go directly to the party authorized for payment. For example, rather than an employee receiving a check and depositing it in his or her bank account, the payment is made directly to the employee's bank with instructions to credit the customer's account.

Even though Internet bill payments, telephone bill payments, automatic deposits, and bank drafts are considered to be electronic payments, many may not be. For example, in many cases paper checks are still written on the customer's behalf and mailed to the business. Obviously, these types of payments will most likely become totally electronic in the near future. The real question is, even though we have the technology to become a "cashless" society today, will you part with your paper money or will technology force you to give it up?

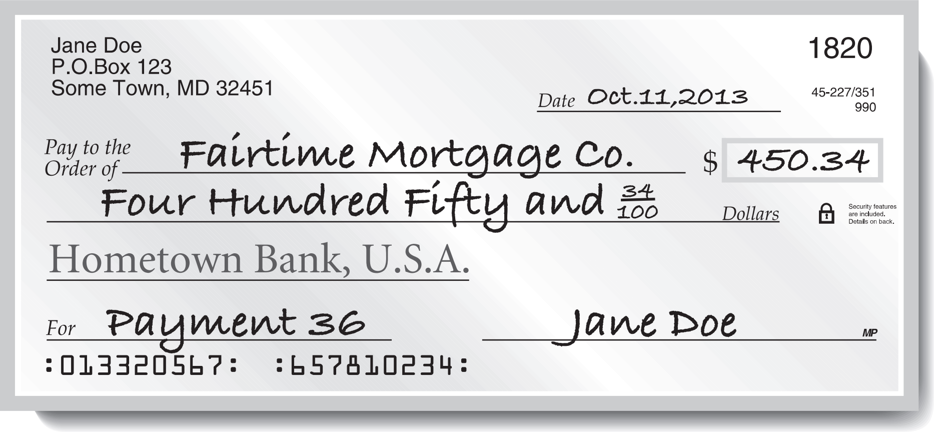
Check 21

Congress passed the Check Clearing for the 21st Century Act in 2003 and it became effective on October 28, 2004. **Check 21**, as this Act is known, was designed with three primary purposes:

1. To facilitate check truncation by reducing some of the legal impediments
2. To foster innovation in the payments and check collection system without mandating receipt of checks in electronic form
3. To improve the overall efficiency of the nation's payments system

Check truncation is the conversion of a paper check into an electronic debit or image of the check by a third party in the payment system other than the paying bank. Check 21 facilitates check truncation by creating a new negotiable instrument called a substitute check, which permits banks to truncate original checks, process check information electronically, and deliver substitute checks to banks that want to continue receiving paper checks. A **substitute check** (see Exhibit 10.9) is the legal equivalent of the original check and includes all the information contained on the original. The law does not require banks to accept checks in electronic form nor does it require banks to use the new authority granted by the act to create substitute checks. The Check 21 Act is clearly a necessary first step in phasing out paper checks.

EXHIBIT 10.9 Substitute Check Authorized by Check 21



Jane Doe
P.O.Box 123
Some Town, MD 32451

1820

Date Oct.11,2013

45-227/351
990

Pay to the Order of Fairtime Mortgage Co. $ 450.34

Four Hundred Fifty and 34/100 Dollars

Security features are included. Details on back.

Hometown Bank, U.S.A.

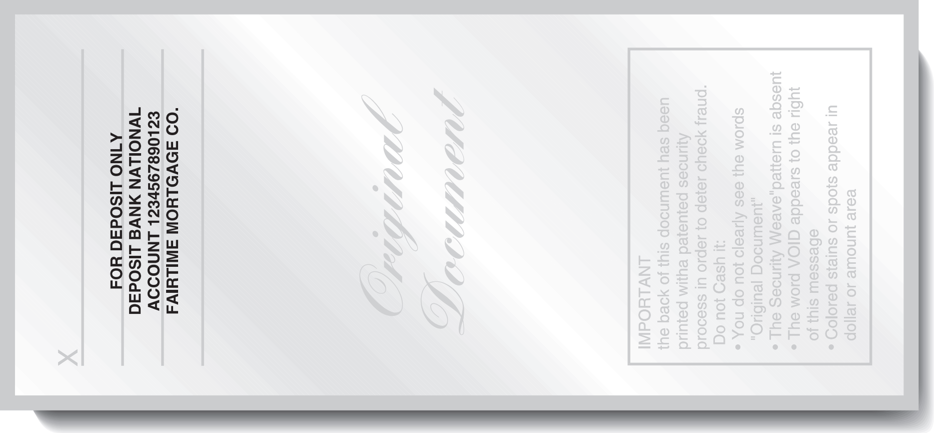
For Payment 36

Jane Doe

MP

:013320567: :657810234:

Front view of a substitute check



X

FOR DEPOSIT ONLY
DEPOSIT BANK NATIONAL
ACCOUNT 1234567890123
FAIRTIME MORTGAGE CO.

Original Document

IMPORTANT
the back of this document has been printed witha patented security process in order to deter check fraud.
Do not Cash it:
- You do not clearly see the words "Original Document"
- The Security Weave"pattern is absent
- The word VOID appears to the right of this message
- Colored stains or spots appear in dollar or amount area

Back view of a substitute check

Source: FRB Frequently Asked Questions about Check 21, www.federalreserve.gov/paymentsystems/truncation/faqs2.htm#ques1.

Check 21 enables banks to handle more checks electronically instead of physically moving paper checks from one bank to another, which should make check processing faster, more efficient, and therefore less expensive. Banks can capture a picture of the front and back of the check along with the associated payment information and transmit this information electronically. If a receiving bank or its customer requires a paper check, the bank can use the electronic picture and payment information to create a paper "substitute check." This process enables banks to reduce the cost of physically handling and transporting original paper checks, which can be very expensive.

If you receive your canceled checks back with your account statement today, you will continue to receive canceled checks unless your bank notifies you otherwise, but some of the canceled checks may be substitute checks. Banks today are not required to keep original checks for any specific length of time, and Check 21 does not add any new retention requirements. In many cases, the original check may be destroyed. Requests for original checks will mean that your bank may provide you with the original check, a substitute check, or a copy of the check.

Some consumers have concerns about the potential reduction in float time. They know that using a debit card expedites the movement of funds out of an account. Hence, some consumers purposely use checks to slow the process of transferring funds from their account. First, it is illegal to write a check for which you do not have the funds already in your account; hence this activity is not one that can be easily defended from a consumer's point of view. Second, most checks clear in just one or two days currently, so that the reduction in float is minimal.

Exhibit 10.10 outlines the standard check-clearing process. Checks drawn against transactions accounts are presented to the customer's bank for payment and ultimately "cleared" by reducing the bank's deposit balance at the Federal Reserve or a correspondent bank. Payments made electronically directly and immediately alter balances held at Federal Reserve Banks. This network for transferring funds electronically is called the Fedwire. For example, an individual visiting San José, California, purchases goods from a local business for $500 by writing a check on his demand deposit account held at Community National Bank (CNB) in Portland, Oregon. The check-clearing process begins when the business deposits this check at the Bay Area National Bank (BANB). Because BANB assumes the risk that the check may not be good, it does not allow the depositor to use the funds immediately. Normally, a bank places a **hold on the check** until it verifies that the check writer has enough funds on deposit to cover the draft. BANB thus increases the ledger balances of the

EXHIBIT 10.10 Example of the Check-Clearing Process

Bay Area National Bank, San José				Bank of California, San Francisco			
ΔASSETS		**ΔLIABILITIES**		**ΔASSETS**		**ΔLIABILITIES**	
1. CIPC	+$500	Demand deposit owed the business	+$500	2. CIPC	+$500	Demand deposit (BANB)	+$50
4. CIPC	−$500			5. CIPC	−$500		
Demand deposit at BOC	+$500			Demand deposit at FRB of San Francisco	+$500		

Federal Reserve Bank of San Francisco				Community National Bank, Portland			
ΔASSETS		**ΔLIABILITIES**		**ΔASSETS**		**ΔLIABILITIES**	
3. CIPC	+$500	DACI	+$500	6. Demand deposit at FRB of San Francisco	−$500	Demand deposit owed the individual	−$500
5.		DACI	−$500				
		Demand deposit (BOC)	+$500				
6. CIPC	−$500	Demand deposit (CNB)	−$500				

Note: CIPC indicates checks in the process of collection; BOC, Bank of California; FRB, Federal Reserve Bank; BANB, Bay Area National Bank; DACI, deferred credit availability items; and CNB, Community National Bank.

business's demand deposit account and its own cash item in the process of collection (CIPC). The business's usable collected balances, ledger balances minus float, are unchanged.

During Stage 2, BANB forwards the check to its upstream correspondent, the Bank of California (BOC) in San Francisco. This bank replicates BANB's procedures, deferring credit to BANB for several days until the check clears. In Stage 3, BOC presents the check to the Federal Reserve Bank of San Francisco. The Federal Reserve follows a timetable indicating how long a bank must wait before it can receive credit on deposited items. The dollar amount of deferred credit is labeled deferred availability credit items (DACI). Until the Federal Reserve provides credit, it increases its CIPC and DACI equally so that Federal Reserve float (CIPC–DACI) equals zero.

Up to this point, no depositor can spend its funds, and the check has not been presented to CNB for payment. Frequently, correspondent banks and the Federal Reserve give credit on checks deposited by other banks *prior* to actually verifying that the checks are good. This is indicated as Stages 4 and 5 in Exhibit 10.11. BANB, however, does not provide the same credit to the business depositor until the check clears. After Stage 4, BANB can invest its deposit at BOC while it defers crediting the business account. BOC, in turn, receives reserve credit before the check actually clears. During Stage 6, the Federal Reserve Bank presents the original check to CNB, which verifies that the individual has enough funds on deposit to cover the payment.

Most checks now complete this trip in one to three days. The speed of check processing has increased dramatically in response to check-system improvements other than Check 21. Thus, today, once a check is deposited with a bank, it is almost always delivered overnight to the paying bank and debited from the check writer's account the next business day. To accelerate the process, banks encode checks with magnetic numbers that can be read by high-speed machines and often move checks via overnight couriers between destinations. Obviously, the greater the number of handlers and distance, the longer it takes to transfer and verify a check. Check-processing speeds should continue to increase, over time, as banks make further operational changes in response to Check 21. Essentially, they do not let depositors spend the proceeds until there is reasonable certainty the deposit is good.

Measuring the Cost of Funds

The previous sections outlined the importance for bank managers of continuously monitoring the cost of bank funding sources. Changes in interest rates and the composition of liabilities and equity alter financing costs and may reduce available liquidity. Whenever financing costs change, managers must change asset yields to maintain profit margins. Similarly, changes in the types of assets a bank holds affect liquidity needs, the bank's profitability and risk, and the cost of funding these assets.

Managing liabilities was relatively routine for most commercial banks prior to the 1980s when federal regulators dictated maximum rates banks could pay on deposits, and customers had few alternatives for their savings. Banks competed for depositors primarily through location and personal service. Customers were quite loyal. These factors gave rise to the well-known 3-6-3 method of running a bank: pay 3 percent on deposits, charge 6 percent on loans, and hit the golf course at 3 o'clock!

Reading any newspaper or financial publication shows how different the environment is today. Banks have virtually unlimited opportunities to develop new deposit products with any maturity that pay market rates, but they must now compete with a variety of firms offering similar products and services. Any individual wishing to open a transactions account can use a commercial bank, credit union, savings and loan, money market mutual fund, American Express, or firms such as GE Capital, State Farm, and USAA. Although this choice is attractive to consumers, it creates considerable uncertainty for banks regarding the availability and cost of funding sources.

It is important that managers understand how to measure the cost of financing bank operations. Accurate cost measurement allows the bank to compare prices between alternative funding sources and to assure that assets are priced to cover costs and pay shareholders a required return. The following analysis describes two approaches to estimating the cost of total bank funds. Before doing so, it summarizes differences in the concepts of average and marginal cost of funds.

The Average Historical Cost of Funds

Some banks incorrectly use average historical costs, developed earlier in the chapter, in their pricing decisions. They simply add historical interest expense with noninterest expense (net of noninterest income) and divide by the investable amount of funds to determine the minimum return required on earning assets. Profit is represented as a markup over this average cost. The primary problem with historical costs is that they provide no information as to whether future interest costs will rise or fall. When interest rates rise, average historical costs understate the actual cost of issuing new debt. In this environment, fixed-rate asset yields based on historical costs will not be high enough to cover costs and meet profit targets. When interest rates fall, the opposite occurs. Average historical costs overstate actual interest costs on new debt so that fixed-rate loans may be priced too high to be competitive. The use of average costs assumes that interest rates will be constant at historical levels during the current pricing period.

Pricing decisions should be based on marginal costs compared with marginal revenues. Suppose that a bank can make a new, one-year loan at 6 percent. The bank's simple average cost of funds equals 2 percent. If the bank compares the new loan rate (marginal revenue rate) with the average cost of funds to determine whether it will make the loan, it estimates a 4 percent spread and accepts the loan. Suppose that it must finance the loan at the margin by issuing a new, one-year jumbo CD at 5 percent. This represents the marginal interest cost of a single source of new funds. If the bank compares the marginal loan rate with the marginal CD rate, it estimates a 1 percent spread and rejects the loan because it cannot cover overhead costs and default risk expense. Because pricing new loans is an incremental decision, quoted rates should be based on incremental (marginal) funding costs, not historical average costs.

The best use of average historical costs is in evaluating past performance. By comparing average borrowing costs and asset yields, it is relatively easy to understand, after the fact, why a bank's expenses and profits differ from peer banks'. Average costs for noninterest expenses, such as check-handling and brokerage fees, can also be evaluated and applied toward measuring expected new debt costs. Typically, these outlays increase by predictable amounts with inflation. The Contemporary Issues box, "Marginal versus Average," clarifies the differences between these measures.

The Marginal Cost of Funds

The **marginal cost of debt** is a measure of the borrowing cost paid to acquire one additional unit of investable funds. The **marginal cost of equity capital** is a measure of the

CONTEMPORARY ISSUES

Marginal versus Average

Confusion over the terms *average* and *marginal* makes it difficult to evaluate performance measures and understand pricing rules. This is especially true for average costs and weighted marginal costs, which are similar-sounding concepts. With cost and pricing data, readers should view simple averages as referring to historical values. The marginal concept, by contrast, refers to incremental or new values.

Consider, for example, a baseball player's batting average. The press reports a historical average representing the summary performance measure over all games played and a marginal average representing the last game. Suppose that during the first two games in a year, the player gets three hits out of 10 batting attempts. His average is 3 divided by 10, or 0.300. Common usage omits the reference to percent, so the batter is "hitting 300." During the next game, the player gets two hits in five at-bats. His marginal average for the five incremental at-bats is 0.400, which raises his overall (historical) average to 0.333 (five hits in 15 at-bats). The player's overall average increases because the marginal performance (0.400) exceeded the previous historical average (0.300). If the player does not get a hit in his next five at-bats (0.000 marginal average), his historical average will drop to 0.250.

minimum acceptable rate of return required by shareholders. Together, the marginal costs of debt and equity constitute the marginal cost of funds, viewed either as independent sources or as a pool of funds.[17] Independent sources of funds have distinct marginal costs that vary with market interest rates, handling costs, and reserve requirements. These independent costs can then be combined to yield an overall weighted marginal cost estimate for all new funds. When interest rates are expected to rise, marginal costs exceed historical costs. When rates are expected to fall, marginal costs are lower.

Marginal costs are especially useful in pricing decisions. If these costs are known, a bank can set asset yields at some markup over marginal costs to lock in a profitable spread. Presumably, the markup reflects default risk as well as the required return to shareholders. Marginal costs also serve as indicators of the relative cost of different funds, which banks can use to target the least expensive sources for financing growth.

Costs of Independent Sources of Funds

Unfortunately, it is difficult to measure marginal costs precisely. Management must include both interest and noninterest costs it expects to pay and identify which portion of the acquired funds can be invested in earning assets. There is also considerable disagreement on whether equity costs are relevant and, ultimately, how to measure equity costs. One formula for measuring the explicit marginal cost of a single source of bank liabilities is:

$$\text{Marginal cost of liability j} = \frac{\text{Interest rate} + \text{servicing costs} + \text{acquisition cost} + \text{insurance}}{\text{Net investable balance of liability j}} \tag{10.2}$$

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[17] Banking terminology generally refers to the average or marginal cost of funds as the associated cost of liabilities without reference to equity financing. The cost of equity is incorporated as a required spread over the cost of debt necessary for a bank to meet profit targets and pay shareholders their required return.

All elements of the numerator are *expected* costs, annualized as a percentage of each dollar obtained. The denominator measures the fraction of liabilities that can be invested to generate interest income. With transactions accounts, for example, the fraction in nonearning assets will reflect legal reserve requirements plus any allocation to such nonearning assets as float or correspondent balances. A bank may also add indirect costs to the numerator, such as the implicit cost of increased risk associated with higher leverage, to obtain an effective marginal cost estimate. Of these costs, only acquisition costs that primarily reflect marketing expenses are truly discretionary. Interest rates are largely determined by market conditions as banks are price takers; servicing costs are determined by the volume of check-processing business handled by a bank; and deposit insurance costs are set by the FDIC.

Consider the following marginal cost estimates associated with obtaining additional interest-checking account funding:

Market interest rate = 0.2%
Servicing costs = 2.8% of balances
Acquisition costs = 0.15% of balances
Deposit insurance costs = 0.25% of balances
Net investable balance = 85.0% (10% required reserves and 5% float)

Equation 10.2 indicates that the estimated marginal cost of obtaining additional interest-checking balances equals 6.65 percent.

$$\text{Marginal cost of interest-checking balance} = \frac{0.002 + 0.028 + 0.0015 + 0.0025}{0.85} = 4.0\%$$

Intuitively, this cost estimate is the all-inclusive incremental cost of obtaining the investable balances from additional interest-checking funds. Two issues, however, can potentially create large measurement errors:

1. The relevant interest rate must be forecast over the entire planning horizon, a task made difficult by volatile interest rates. Thus, forecasts need to be modified frequently.[18]
2. As discussed previously, a bank must rely on its comptroller or cost accountant to generate meaningful estimates of noninterest costs associated with each debt source. This involves allocating overhead, advertising outlays, and the cost of employee time for handling checks, servicing customer complaints, posting account information, and bidding for public funds.

The following discussion summarizes general procedures used to estimate the pretax marginal cost of various sources of bank funds. Tax implications are not considered for convenience and because pretax cost estimates are used in asset pricing decisions.

Cost of Debt. The marginal cost of different types of debt, k_d, varies according to the magnitude of each type of liability. High-volume transactions accounts generate substantial servicing costs and have the highest reserve requirements and float. The advantage of low interest cost on transactions accounts is offset by other costs and the fact that banks can invest a smaller percentage of investable funds. Purchased funds, by contrast, pay

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[18] For comparative purposes, all interest rates should be measured identically. Effective rates that recognize differences in discrete and continuous compounding and between interest-bearing versus discount instruments should be used. The fact that the Truth in Savings Act requires banks to report an APY to customers makes this easier.

higher rates but carry smaller transactions costs and zero reserve requirements, hence, greater investable balances.

The cost of long-term nondeposit debt equals the effective cost of borrowing from each source, including interest expense, transactions, servicing, and acquisition costs. Traditional analysis suggests that this cost is the discount rate that equates the present value of expected interest and principal payments with the net proceeds to the bank from the issue.[19]

Cost of Equity. Conceptually, the marginal cost of equity, k_e, equals the required return to shareholders. It is not directly measurable because dividend payments are not mandatory. Still, several methods are commonly used to approximate this required return, including the dividend valuation model, capital asset pricing model (CAPM), and targeted return on equity model:[20]

- **Dividend Valuation Model.** Returns to common stockholders take the form of periodic dividend receipts and changes in share price during the interval of stock ownership. Dividend valuation models discount the expected cash flows from owning stock in determining a reasonable return to shareholders. The cost of equity equals the discount rate (required return) used to convert future cash flows to their present value equivalent.
- **Capital Asset Pricing Model (CAPM).** Large institutions with publicly traded stock can obtain an estimate of their cost of equity from the CAPM. This model relates market risk, measured by Beta (β), to shareholders' required returns. Formally, the required return to shareholders (k_e) equals the riskless rate of return (r_f) plus a risk premium (ρ) on common stock reflecting nondiversifiable market risk
- **Targeted Return on Equity Model.** Investors require higher pretax returns on common stock than on debt issues because of the greater assumed credit risk. Depending on the business cycle, the differential in returns ranges from 2 to 8 percent. As an approximation, a firm's cost of equity should exceed its cost of debt by some positive differential. Many banks use a **targeted return on equity** guideline based on the cost of debt plus a premium to evaluate the cost of equity. This method simply requires that owners and managers specify a desirable return to shareholders in terms of return on equity. This return is then converted to a pretax equivalent yield. It assumes that the market value of bank equity equals the book value of equity. Although this measure has deficiencies, it is easy to calculate for banks without publicly traded stock and serves as a benchmark for other cost-of-equity approximations.

Cost of Preferred Stock. Preferred stock has characteristics of debt and common equity. It represents ownership with investors' claims superior to those of common stockholders but subordinate to those of debtholders. Like common stock, preferred stock pays dividends that may be deferred when management determines that earnings are too low. Like long-term

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[19] Suppose, for example, a bank issues \$10 million in par value subordinated notes paying \$700,000 in annual interest and carrying a seven-year maturity. It must pay \$100,000 in flotation costs to an underwriter. In this case, the effective cost of borrowing (k_d), where t equals the time period for each cash flow, is: $k_d = 7.19\%$

$$\$9,900,000 = \sum_{t=1}^{7} \frac{\$700,00}{(1+k_d)^t} + \frac{\$10,000,00}{(1+k_d)^7}$$

$$k_d = 7.19\%$$

[20] For a complete discussion on estimating the cost of equity, consult any good financial management textbook.

bonds, preferred stock stipulates contractual dividend payments over the life of the security and often provides call protection and sinking fund contributions. Recently, preferred issues paying variable-rate dividends have become increasingly common.

The marginal cost of preferred stock (k_p) equals the required return to stockholders and can be approximated using the dividend valuation model similar to the model used for common equity, except that dividend growth is zero. Consider the case of noncallable, nonsinking fund preferred stock sold at par with a fixed-dividend payment.[21]

Trust Preferred Stock. A recent innovation in capital financing is the introduction of **trust preferred stock**, which is a hybrid form of equity capital at banks. It is attractive to a bank issuer because it effectively pays dividends that are tax deductible. To issue the securities, a bank holding company (BHC) establishes a special purpose entity (SPE) that it owns. The SPE sells preferred stock to investors and loans the proceeds of the issue to the bank in the form of a note. Interest on the note equals dividends paid on the preferred stock. This loan interest is tax deductible such that the BHC effectively gets to deduct dividend payments on the preferred stock.[22]

Trust preferred securities were an important component of regulatory capital for many BHCs since the 1996 Federal Reserve ruling that allowed limited amounts of trust preferred securities to be included in Tier 1 capital. In 2004, the Fed proposed a rule that would apply a limit of 25 percent of Tier 1 capital, after deducting goodwill, for trust preferred stock. Deducting goodwill from core capital elements was intended to ensure that a BHC was not unduly leveraging its tangible equity. Many BHCs carrying goodwill on their balance sheets could count a small portion of their trust preferred stock as Tier 1 capital.

Trust preferred stock played an important role in the recent financial crisis. Prior to 2007, most large banking organizations issued trust preferred stock as did many community banks. Due to their smaller size, community banks typically pooled their offerings of trust preferred securities such that investors received dividends from all banks in the pool equal to their pro rata share ownership in the pool. Some banks bought trust preferred stock as part of their investment portfolios. When the crisis hit and many banks experienced asset quality problems, they charged-off large amounts of loans and sharply increased provisions for loan losses, which depleted their capital. Regulators responded by restricting dividend payments. BHCs, in turn, relied on the dividends from their subsidiary banks as the source of revenue to service the note held by the SPE. The terms of most trust preferred securities allowed the issuer to defer dividends for up to five years without being in default. Many BHCs that issued trust preferred securities did not make the interest payments such that investors did not receive their promised payments from the SPE.

In July 2013, the Federal Reserve approved new capital guidelines in line with the Basel III recommendations. Under the new rules, trust preferred securities do not qualify as Tier 1 capital after a set phase-out schedule. As a concession to smaller banks, trust preferred securities issued before May 19, 2010, by institutions with less than $15 billion in assets, still count as Tier 1 capital.

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[21] With dividend payments contractually fixed, expected dividend growth equals 0. Therefore, k_P = preferred dividends/net price of preferred stock. To calculate the marginal cost of common and preferred stock when dividends are not constant, the reader should review examples provided in any current corporate finance textbook. The effective cost of common and preferred stock should also reflect the portion of these funds that is allocated to nonearning assets. Although reserves are not required, banks typically allocate fixed assets and intangibles to equity sources. Computationally, management divides the equity marginal cost estimate by 1 minus the percentage in nonearning assets.

[22] The after-tax cost of trust preferred stock would be: k_{tp} = (dividends on trust preferred × (1 − marginal tax rate))/net price of trust preferred stock.

Weighted Marginal Cost of Total Funds

Many banks price loans using the marginal cost of a single source of debt funds as the base rate. For example, prime commercial customers often are allowed to choose the interest rate they pay as some markup over the marginal cost of CDs, LIBOR, or federal funds. Obviously, the customer selects the base rate expected to be the lowest over the credit period. Unfortunately, the cost of any single source of funds may change more or less than the cost of other sources and thus vary substantially from the bank's composite cost of financing.

The best cost measure for asset-pricing purposes is a weighted marginal cost of total funds (WMC). This measure recognizes both explicit and implicit costs associated with any single source of funds. It assumes that all assets are financed from a pool of funds and that specific sources of funds are not tied directly with specific uses of funds. WMC is computed in three stages:

1. Forecast the desired dollar amount of financing to be obtained from each individual debt and equity source. This requires the bank to specify a planning horizon, such as one year, and identify significant changes in composition of liabilities and equity over time. Management should determine a marketing strategy and allocate employees' time to the different account-generating functions.
2. Estimate the marginal cost of each independent source of funds. It should allocate fundraising and processing costs among the different liability and equity components and project interest and dividend costs for each source, recognizing any perceived changes in risk associated with changes in financial leverage. Each cost estimate should also reflect management's assignment of nonearning assets per Equation 10.2 that indicates the percentage of investable funds.
3. Combine the individual estimates to project the weighted cost, which equals the sum of the weighted component costs across all sources. Each source's weight (w_j) equals the expected dollar amount of financing from that source divided by the dollar amount of total liabilities and equity. Thus, if k_j equals the single-source j component marginal cost of financing, where there are m liabilities plus equity, the WMC of total funds is:

$$\text{WMC} = \sum_{j=1}^{m} w_j k_j \tag{10.3}$$

Marginal Cost Analysis: an Application

The following analysis demonstrates the procedures for measuring a bank's cost of funds. The analysis consists of projecting the bank's balance sheet composition and marginal costs in order to generate a weighted marginal cost of total funds.

Suppose that you are the cashier for Community State Bank and a member of the bank's ALCO or Risk Committee. The ALCO has just completed its monthly meeting and asked you to generate an estimate of the bank's weighted marginal cost of funds for the next year. For the first time in several years, there was a consensus among the senior officers that the economy would experience moderate growth throughout the year. Inflation is expected to remain stable around 2 percent, and interest rates would increase only slightly. As part of the meeting, the committee approved a preliminary budget that projected income, net of dividends, equal to $1.2 million, representing a lower return on equity and return on assets compared with the prior year. Total average assets are projected to grow by $7 million, of which $6 million is new loans. Liabilities are expected to grow proportionately relative to the past year except that the bank will rely proportionately more on CDs.

Exhibit 10.11 summarizes the ALCO's consensus forecast for the next year. Columns (a) and (b) list the projected composition of funding between debt and equity sources over the next year in dollar amount and percentage. Column (c) lists the interest rates expected to prevail during the year as projected by the senior investment officer. Processing and acquisition costs for each type of liability and the investable percentages are based on the bank controller's estimates and are reported in columns (d) and (e). The expected marginal cost for each source, using these projections as defined in Equation 10.2, is presented in column (f). The weighted marginal cost of funds, obtained by summing the products of figures in columns (b) and (f) for each component, is calculated in column (g) and reported at the bottom of the column: 6.19 percent for the year. This projected marginal cost exceeds historical costs because the bank forecasts an increase in interest rates and expects to obtain a higher percentage of funds from more expensive sources.

The marginal cost-of-funds estimate should be applied carefully in pricing decisions. The bank in this example should charge at least 6.19 percent on loans (assets) of average risk and average cost to administer the loan, to cover the marginal costs of debt, and to pay shareholders a reasonable return. The bank should add a risk premium for loans of greater-than-average default risk to compensate for the increased probability of greater charge-offs and should charge a premium for smaller loans or loans with high administrative costs. Whether a bank meets its aggregate profit target depends on the bank's ability to price assets to meet this hurdle rate, its actual default

EXHIBIT 10.11 Forecast of the Weighted Marginal Cost of Funds: Projected Figures for Community State Bank

	(a) Average Amount ($1,000)	(b) Percentage of Total	(c) Interest Cost	(d) Processing, Acquisition Costs	(e) Investable Percentage	(f) Component Marginal Costs	(g) WMC of Funds (b) × (f)
Demand deposits	$28,210	31.0		7.0%	85.0	8.24%	0.0255
Interest checking	5,551	6.1	1.5%	6.0%	85.0	8.82%	0.0054
Money market demand accounts	13,832	15.2	2.0%	2.0%	97.0	4.12%	0.0063
Other savings accounts	3,640	4.0	2.5%	1.2%	98.5	3.76%	0.0015
Time deposits <$100,000	18,382	20.2	2.9%	1.4%	99.0	4.34%	0.0088
Time deposits >$100,000	9,055	10.0	3.0%	0.3%	99.5	3.32%	0.0033
Total deposits	78,670	86.5					
Federal funds purchased	182	0.2	0.5%	0.0%	100.0	0.50%	0.0010
Other liabilities	4,550	5.0		0.0%	60.0	0.00%	
Total liabilities	83,402	91.6					
Stockholders equity	7,599	8.4	11.5%		96.0	11.98%	0.0101
Total liabilities and equity	91,001	100.00					
Weighted marginal cost of capital	→						6.19%

experience, and whether noninterest income covers noninterest expense net of costs allocated to attracting and handling liabilities.

Differences in the weighted marginal cost projection generally reflect different interest rate scenarios and variations in the composition of liabilities. Assume, for the moment, that as an ALCO member you have serious reservations that economic stability will persist. Economic crisis may well spread to the United States, and the economy is somewhat fragile. Inflation may increase faster than expected, and the Fed might increase interest rates faster than the ALCO's forecast. If this occurred, interest rates would rise well above the ALCO's forecast, and the bank would have difficulty issuing new CDs. Hence, the bank's marginal cost of funds might be higher than that expected according to the previous analysis.

Funding Sources and Banking Risks

The previous examples demonstrate the difficulty of accurately projecting funding costs. Unanticipated changes in interest rates and the composition of bank liabilities can significantly raise or lower interest expense. The net effect on bank profits depends on whether interest expense rises or falls more than interest income. The same rate and mix effects also influence a bank's risk position. This section examines the relationship between the composition of bank funds and banking risk, identifying differences between small and large banks.

Banks face two fundamental problems in managing their liabilities: uncertainty over what rates they must pay to retain and attract funds; and uncertainty over the likelihood that customers will withdraw their money regardless of rates. The basic fear is that they will be vulnerable to a liquidity crisis arising from unanticipated deposit withdrawals and depositors or lenders simply refusing to provide funds. Banks must have the capacity to borrow in financial markets to replace deposit outflows and remain solvent. Liquidity problems have grown with the increased reliance on borrowed funds, brokered deposits, and Internet deposits. When a bank is perceived to have asset quality problems, customers with uninsured balances move their deposits to other institutions. The problem bank must then pay substantial premiums to attract replacement funds or rely on regulatory agencies to extend emergency credit.

Customer loyalty is tied closely to the strength of the relationship between the bank and the deposit customer. The most loyal customers are those with multiple relationships (demand deposit, time deposit, car loan, mortgage, etc.), who live or work in the bank's primary trade area, whose deposit balances are fully insured, who have been customers for many years, and who have regular monthly transactions using bank products and services. Of course, loyalty is a two-way street as the bank must offer consistent, high-quality service. The importance of these account attributes is demonstrated in Chapter 11.

Funding Sources: Liquidity Risk

The recent financial crisis demonstrated the importance of liquidity and liquidity risk, particularly at the largest banks. Bank regulators now mandate that banks develop and regularly test formal contingency funding plans (discussed in Chapter 11). Liquidity risk associated with a bank's deposit base is a function of many factors, including the number of depositors, average size of accounts, location of the depositor, and specific maturity and rate characteristics of each account. These features are customer driven, and banks cannot dictate the terms of deposit contracts. However, banks can monitor potential deposit outflows if they are aware of seasonal patterns in outstanding balances and the timing of large transactions such as payroll draws on commercial accounts and maturing high-balance CDs. They can periodically contact large depositors to provide rate quotes and assess the probability of the customer reinvesting the funds.

Equally important is the *interest elasticity* of customer demand for each funding source. How much can market interest rates change before the bank experiences deposit outflows? If the bank increases its rates, how many new funds will it attract? Ideally, a bank would like to lower its customers' rate sensitivity. It can do so by packaging deposit products with other services or privileges so that withdrawals deprive the customer of all services, or by developing personal relationships with depositors. In this way, management can determine the base funding level (core deposit base) below which outstanding balances should never fall.

The largest banks that rely more on jumbo CDs, Eurodollars, and asset-backed commercial paper face similar problems. Investors in these instruments are highly rate sensitive and sensitive to the quality of assets backing commercial paper—as evidenced by Citigroup's problems with structured investment vehicles. Depositors often prefer short-term maturities and will move their balances if a bank experiences problems or when competitors offer higher yields. Large depositors with uninsured balances, especially foreign investors, frequently react to rumors of financial distress by shifting their funds into less risky Treasury securities until the crisis passes. For this reason, the largest U.S. banking organizations maintain dealer operations in London, Singapore, and Hong Kong to guarantee access to financial markets 24 hours a day.

The liquidity risk any one bank faces depends on the competitive environment. Many smaller banks operate in communities with only a few competitors that tacitly price deposits comparably. Customers like to invest their funds locally so they can conveniently contact their banker with questions or easily withdraw or move balances. Liquidity risk is relatively low and deposit outflows are predictable. As indicated earlier, many community banks view the FHLB as a primary source of liquidity. It is important to note the liquidity advantage that stable core deposits provide. Given the Federal Reserve's role as a lender of last resort, most banks view the Federal Reserve as the final provider of liquidity through the discount window, particularly in the event of a crisis.

Funding Sources: Interest Rate Risk

Most banks have been flooded with additional core deposits since the financial crisis, as customers wanted FDIC-insured deposits. The fundamental issue they now face is what portion of these deposits is truly core and will remain with the bank as interest rates rise. Today, many depositors and investors prefer short-term instruments that can be rolled over quickly as interest rates change. Banks must offer substantial premiums to induce depositors to lengthen maturities and assume interest rate risk. Many banks have chosen not to pay the premiums and subsequently reprice liabilities more frequently than in past years.

These changes affect banks' interest rate risk position to the extent that they do not adjust their asset rate sensitivity. A bank that was perfectly hedged (no interest rate risk) prior to the financial crisis would today be liability sensitive if it did not acquire more rate sensitive assets. For this reason, many institutions attempt to price all loans on a floating-rate basis and no longer purchase bonds for their investment portfolios with maturities beyond five to seven years.

One widely recognized strategy for reducing interest rate risk and the long-term cost of bank funds is to aggressively compete for retail core deposits. Individuals are generally not as rate sensitive as corporate depositors. Once a bank attracts deposit business, many individuals will maintain their balances through rate cycles as long as the bank provides good service and pays attention to them. Such deposits are thus more stable than money market liabilities. Core deposits carry an additional advantage for banks because interest costs are lower, but the disadvantage is that they cost more to process. Other strategies involve using structured repos and other option-based funding sources.

Funding Sources: Credit Risk

During the financial crisis, the FDIC was highly critical of many banks that used large amounts of wholesale funding. FDIC analysts observed that many failed banks relied heavily on FHLB advances and jumbo CDs to fund their operations. In fact, the chartering agencies approved numerous new bank charters during the boom years (1990s through 2006), and many of these firms pursued high-growth strategies. They established operations in fast-growing real estate markets, such as Phoenix, Las Vegas, Miami, Atlanta, and coastal cities in California and the Carolinas, and financed loan growth with wholesale funds. When real estate markets collapsed, many of these fast growing banks failed.

The question is whether the funding sources caused the failures or whether the choice of loans caused the failures. Wholesale liabilities have long been used appropriately by many banks. FHLB advances, in particular, can be excellent instruments to help community banks manage interest rate risk. It was the inappropriate use of FHLB advances and jumbo CDs to fund overly speculative loans that created the problems. The fundamental point is that there is a link between funding sources and credit risk, but the linkage is tied to whether the underlying banks followed reasonable business plans, performed the appropriate credit analysis when making loans, and grew at reasonable rates where they could adequately monitor credit risk. The use of wholesale funding exacerbated problems when bank managers and the regulators did not adequately monitor business plans and credit risk.

Summary

This chapter focuses on the different types of funding sources available to banks and the relationship between funding sources and liquidity risks. We initially discuss the characteristics of various bank liabilities and the measurement of costs associated with these liabilities and equity capital. Small-denomination instruments exhibit fundamentally different risk-return features compared with those of large-denomination liabilities. The chapter introduces the specific features of immediately available funds, RPs, Eurodollars, and borrowings from the FHLB and Federal Reserve Banks as sources of funds. It describes the difference between the average cost of funds and marginal cost of funds and demonstrates the appropriate calculations and use in pricing decisions.

Questions

1. Rank the following types of bank liabilities, first according to their level of liquidity risk, and then according to their interest rate risk. Then rank them according to their current cost to the bank. Explain why the rankings vary.

   DDAs
   Interest-checking accounts
   MMDAs
   Small time deposits
   Jumbo CDs
   Federal funds purchased
   Eurodollar liabilities
   Federal Home Loan Bank advances

2. Indicate how a bank's core deposits differ from its wholesale liabilities in terms of interest elasticity. What factors are relatively more important for attracting and retaining core deposits as compared with purchased funds?
3. Using the data from Exhibit 10.4, determine the average monthly cost of servicing the typical student's demand deposit account, which generates 27 withdrawals (15 electronic), two transit checks deposited, two transit checks cashed, two deposits (one electronic), and one on-us check cashed per month. Assume there is one account maintenance charge for an account in which checks are not returned and that net indirect expenses apply. Assume that the bank can invest 85 percent of the deposit balance at 4 percent and charges the student $3.50 in fees monthly. What is the break-even deposit balance the bank must hold for its revenues to cover its costs? **Project:** Use the information in Exhibit 10.4 and your answers to Question 3 to assess your account relationship with your bank. Compare your average balance with the break-even balance you calculate, and determine whether your account would be profitable to the bank. What is your bank's "not sufficient funds" (NSF) charge, and how will these fees influence account profitability?
4. Explain why it is or is not reasonable for a bank to charge an explicit fee for balance inquiries (calling to request balance verification).
5. Assume the following transactions occur sequentially:
   a. The DMV Corporation, based in New Orleans, converts a $3 million demand deposit held at the New York Money Center Bank to a $3 million Eurodollar deposit held at Barclays Bank in London.
   b. Barclays Bank opens a $3 million Eurodollar deposit at the Bank of England in London.
   c. The Bank of England makes a $3 million Eurodollar loan to Pflug & Company in England. Provide T-accounts for DMV, New York Money Center Bank, Barclays Bank, and the Bank of England that describe each set of transactions. Explain how many Eurodollar deposit liabilities were created at each stage and what happened to the original demand deposit held by DMV.

6. As a potential jumbo CD depositor, under what circumstances would you prefer a variable-rate CD over a fixed-rate CD? Under what circumstances would you prefer a zero-coupon CD over a variable-rate CD?

7. How large would Barnett's uninsured deposits be in these FDIC-insured banks if the funds were held at the same point in time?
   a. Barnett owns a joint account with his sister for $175,000 in Metro Bank.
   b. Barnett owns an account in his name only for $80,000 in Metro Bank.
   c. Barnett owns a joint account with his wife for $455,000 in Rural Bank.
   d. Barnett owns a joint account with his parents for $530,000 in Rural Bank.
8. Identify whether you should use an average cost of bank funds or a marginal cost of funds in the following situations.
   a. Setting the rate on a new loan
   b. Evaluating the profitability of a long-standing customer's relationship
   c. Calculating the bank's income tax liability
   d. Deciding whether to build a new building or refurbish the old one
   e. Deciding whether to advertise the bank's jumbo CDs or borrow funds in the Eurodollar market
9. What are the consequences of a bank mistakenly pricing loans based on the historical cost of funds? Do they differ in a rising-rate environment versus a falling-rate environment?
10. What types of bank liabilities generate the highest servicing costs? What types generate the highest acquisition costs?
11. Use the following information to estimate the marginal cost of issuing a $1 million CD paying 3.25 percent interest. It has a one-year maturity and the following estimates apply relative to the balance obtained:
    Acquisition costs = 1/8 of 1 percent
    FDIC insurance = 1/12 of 1 percent
    Required reserves percentage = 0 percent
12. The weighted marginal cost of funds is used in pricing decisions. Explain how it should be used if the loan being priced exhibits average risk. How should the weighted marginal cost of funds be used if the loan carries above-average risk?
13. What are the different types of cash assets and the basic objectives for holding each?
14. In many cases, banks do not permit depositors to spend the proceeds of a deposit until several days have elapsed. What risks do banks face in the check-clearing process? Does this justify holds on checks?
15. What is the difference between a correspondent, respondent, and bankers' bank?
16. What do the terms core deposits and volatile, or noncore, deposits mean? Explain how a bank might estimate the magnitude of each.
17. Explain how each of the following will affect a bank's deposit balances at the Federal Reserve:
    a. The bank ships excess vault cash to the Federal Reserve.
    b. The bank buys U.S. government securities in the open market.
    c. The bank realizes a surplus in its local clearinghouse processing.
    d. The bank sells federal funds.
    e. A $100,000 certificate of deposit at the bank matures and is not rolled over.
    f. Local businesses deposit tax payments in the Treasury's account at the local bank.

18. Banks must pledge collateral against four different types of liabilities. Which liabilities require collateral, what type of collateral is required, and what impact do the pledging requirements have on a bank's asset liquidity?
19. Explain how a bank's credit risk and interest rate risk can affect its liquidity risk.
20. What can a bank do to increase its core deposits? What are the costs and benefits of such efforts? Generally, how might management estimate the relative interest elasticity of various deposit liabilities of a bank?
21. What are trust preferred securities? What role did they play in the recent financial crisis?
22. Explain why the Federal Reserve extended discount window loans to Goldman Sachs, American Express, Citigroup, Bank of America, and other large banking organizations during the recent financial crisis.

Problems

Analyzing Profitability. A senior bank officer has asked you to analyze the profitability of selected customer deposit relationships. The procedure is to estimate the total expense associated with account activity and compare this with projected revenues. Use the data from Exhibit 10.4 to answer the following questions.

1. The typical low-balance customer at your bank with an average monthly demand deposit balance under $175 exhibits the following monthly activity: 35 withdrawals (11 electronic), two transit checks deposited, one transit check cashed, two deposits (one electronic), and one on-us check cashed per month. Assume there is one account maintenance for an account in which checks are not returned and that net indirect expenses apply.
    a. Use the unit cost data to estimate the average monthly expense for the bank to service this account.
    b. Suppose the bank can earn an average 6.5 percent annually on investable deposits (ledger balances minus float minus required reserves). The typical customer keeps an average monthly balance net of float equal to $116 in the account and pays a $3.25 monthly service charge. The bank must hold 10 percent required reserves against the average balance and thus can invest 90 percent of the balance. Determine whether the account is profitable for the bank.
2. The typical interest-checking account customer at your bank maintains a monthly balance of $1,250 net of float, writes 34 checks or withdrawals (21 electronic), deposits four transit checks, cashes two transit checks, makes two deposits (one electronic), and cashes one on-us check per month. Assume there is one account maintenance for an account in which checks are not returned and that net indirect expenses apply. Interest is paid on the account at an annual 1.5 percent rate. Use the unit cost information to determine whether this account is profitable. Assume the bank collects no service charges and can again earn 4.5 percent on investable balances net of 10 percent required reserves.

Weighted Marginal Cost of Funds. The table below provides information that can be used to estimate Northwestern National Bank's weighted marginal cost of funds. The estimates represent a best-guess forecast of the funding sources and associated costs for the year. Follow the format in Exhibit 10.11 and calculate the bank's forecasted weighted marginal cost of funds.

Liabilities and Equity	Average Amount	Interest Cost	Processing and Acquisition Costs	Investable Percentage
Demand deposits	$44,500	0.0%	6.7%	85.0%
Interest checking	69,900	1.1	5.0	86.0
Money market demand accounts	49,800	1.8	1.6	97.0
Other savings accounts	25,100	2.3	1.0	98.0
Time deposits <$100,000	187,600	2.8	1.5	98.0
Time deposits ≥$100,000	63,000	3.5	0.3	97.0
Total deposits	439,900			
Federal funds purchased	18,000	1.0	0.0	100.0
Other liabilities	7,500		0.0	50.0
Total liabilities	465,400			
Stockholders equity	34,600	12.5%*		95.0
Total liabilities and equity	500,000			

*Required return

Activities

1. Evaluate the activity you generated in your checking account last month. How many home debits, transit checks, debits, and deposits did you create? Include an estimate of how many times you used an ATM. What interest did you earn on your balance and what fees did you pay? Use the data from Exhibit 10.4 to determine the bank's break-even deposit balance without "not sufficient funds" (NSF) check charges. Given the amount of your bank's NSF charge per item, how many NSF check charges must a bank collect for your account to be profitable?
2. Take a survey of local banks regarding the pricing of transactions accounts. Include a list of all fees associated with these account relationships. Compare the different types of pricing strategies and identify the type of customer (low/high balance, low/high activity, etc.) that each bank appears to be targeting. Which account appears to be most attractive to the average college student?

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11

Managing Liquidity

How financial institutions fund their operations plays an important role in determining profitability and risk. As demonstrated in the previous chapter, funding decisions influence the mix and cost of liabilities as well as an institution's liquidity risk and interest rate risk profile. When the U.S. economy was rapidly expanding during the early 2000s, many banks pursued high-growth strategies funding new loans with brokered CDs and FHLB advances. Their business models focused on marginally profitable growth while they expanded market share. When the financial crisis hit in 2007, these banks in high-growth real estate markets often experienced a sharp rise in nonperforming loans, later followed by liquidity problems. The liquidity problems appeared because the banks did not have enough core deposits or hold enough liquid assets. In some cases, CD holders did not roll over their deposits, and FHLBs reduced credit lines and demanded increased collateral against advances. Banks would then typically replace these sources of funds with FDIC-insured internet deposits, such as those obtained via QwickRate.

Consider the case of ANB Financial in Bentonville, Arkansas, which was closed by the OCC on January 31, 2008. At the time of closing, ANB had $2.1 billion in assets and $1.6 billion in brokered deposits. The availability of brokered deposits allowed ANB to grow much more rapidly than was prudent and to invest the majority of its funds in residential construction and development loans. In fact, ANB's assets increased from $631 million in December 2004 to $2.1 billion at the beginning of 2008, a 233 percent increase in four years.

Many financial institutions that failed from 2007–2010 relied on purchased liabilities to fund high-risk loans. For example, many large institutions, such as Lehman Brothers, relied heavily on short-term funding via repurchase agreements. As market participants lost confidence in the value of these institutions' assets, repurchase agreements and other short-term funding sources disappeared, resulting in a liquidity crisis. Regulators allowed some of these firms to fail while they opened the Federal Reserve's discount window lending facility to others to prevent failure.

Not surprisingly, regulators responded to the liquidity problems experienced by banks during the crisis by imposing more regulations on all banks. In 2013, the Basel Committee recommended that banks structure their balance sheets to meet a Liquidity Coverage Ratio (LCR) and a Net Stable Funding Ratio (NSFR). The objectives were: (1) to ensure that banks hold an adequate amount of unpledged, high-quality liquid assets (HQLA) so that they can meet potential liquidity needs over a 30-day stress scenario, and (2) to ensure that banks have an adequate amount of stable funding over a one-year horizon based on estimated potential liquidity outflows when confronted with an extended firm-specific stress scenario. These measures will be described in detail later.

Funding decisions affect liquidity, profitability, and risk by determining the stability and quality of the source of funding and hence the need for liquidity. They affect interest rate risk and liquidity risk by determining the rate sensitivity of liabilities, the stability of deposits in preventing unanticipated deposit outflows, and the ease of access to purchased funds. Funding decisions also affect profitability and risk by determining the interest expense on borrowed funds, the noninterest expense associated with overhead costs, and the noninterest income from fees and deposit service charges.

This chapter examines the issues of liquidity planning, cash management, and contingency funding. The first part describes how firms meet liquidity needs. The second part examines the characteristics of cash assets and the rationale for holding each type of cash asset. It considers legal reserve requirements, the source and impact of float, and the pricing of correspondent balances. The third part describes the strengths and weaknesses of traditional measures of liquidity and examines regulatory liquidity requirements imposed under Basel III, which will sharply increase the amount of liquid assets that banks hold. It then applies bank liquidity planning to reserves management and estimates of longer-term funding requirements. A final section summarizes recent regulatory requirements that banks establish contingency funding plans.

Meeting Liquidity Needs

A financial institution has effectively met its liquidity needs when it can acquire sufficient funds quickly and at a reasonable cost—either by issuing liabilities or liquidating assets. Financial institutions can borrow when investors willingly advance funds because they have confidence that the institution will pay them back in a timely manner. They hold liquid assets to help meet potential deposit outflows and withdrawals of other liabilities and to help fund investments in loans. **Bank liquidity**, more generally, refers to *a bank's capacity to acquire immediately available funds at a reasonable price*. It encompasses the impact of alternative funding sources and their predictability; the potential sale of liquid assets; borrowing in the form of federal funds purchased, Federal Home Loan Bank (FHLB) advances, and commercial paper; new issues of CDs, Eurodollars, and subordinated debt; and new stock offerings. Sufficient liquidity is essential for a financial institution, as it must plan for both expected and unexpected balance sheet fluctuations as well as future growth. This view of liquidity explicitly recognizes that firms can acquire liquidity in three distinct ways:

1. Selling assets
2. New borrowings
3. New stock issues

The cost of liquidity, or more importantly, how effective each liquidity source is at meeting the institution's liquidity needs, depends on market conditions evidenced by the market's perception of risk at the institution as well as in the marketplace, the market's perception of bank management and its strategic direction, and the current economic environment. Financial companies meet their liquidity needs by holding HQLA that can be readily sold, by issuing new liabilities and, over the longer-term, by retaining earnings and issuing equity. HQLA, such as short-term Treasury securities, must be unpledged (not used as collateral against bank liabilities) and should be traded in liquid markets with readily observable prices. Liabilities represent sources of liquid funds if a bank can easily borrow at reasonable rates, or at rates comparable to peers. Finally, the issuance of common and preferred stock also represents a source of liquidity but only if there is a ready market for these instruments at a reasonable cost. The cost of equity exceeds the cost of debt so banks typically prefer debt financing. Common stock offerings also typically dilute earnings and thus lower shareholder value near-term. Thus new stock offerings and the retention of earnings are normally intended as longer-term strategies to improve liquidity and solvency.

Holding Liquid Assets

A **liquid asset** is one that can be easily and quickly converted into cash with minimum loss. Contrary to popular notion, however, "cash assets" do not generally satisfy an institution's liquidity needs. To understand this, we need to define the four basic types of **cash assets** at a financial institution: vault cash, demand deposit balances held at Federal Reserve Banks, demand deposit balances held at private financial institutions, and cash items in the process of collection (CIPC). While the Federal Reserve has recently paid a small amount of interest on its deposit liabilities, cash assets earn little interest, so the entire allocation of funds represents a substantial opportunity cost for a financial institution. The objective, therefore, is to minimize the amount of cash assets held and hold only those required by law or for operational needs.

Cash assets do not satisfy an institution's liquidity needs because they do not cover unanticipated cash requirements. For example, if an institution experiences an unexpected loss of vault cash, it must immediately replace the cash, or it will have less vault cash than required for legal or operational needs. Unless management chooses to hold large balances at the Fed, its cash assets meet only temporary liquidity needs. With low interest rates in recent years as the Fed has kept its targeted federal funds rate between zero and 0.25% and T-bill rates have hovered under 0.25%, many banks have held large balances at the Fed. From 2007–2013, loan demand was relatively low, and many banks were willing to forego modestly higher yields on riskier investment securities to avoid potential reductions in market values when rates eventually rise.

Banks hold cash assets to satisfy four objectives. First, banks supply coin and currency to meet customers' regular transactions needs. The amount of cash in a bank's vault corresponds to customer cash deposits and the demand for cash withdrawals. Both exhibit seasonable fluctuations, rising prior to holidays such as Christmas and falling immediately thereafter. Second, regulatory agencies mandate legal reserve requirements that can be met only by holding qualifying cash assets. Third, banks serve as a clearinghouse for the nation's check-payment system. Each bank must hold sufficient balances at Federal Reserve Banks or other financial institutions so that customer transactions (checks, debits, etc.) will clear when presented for payment. Finally, banks use cash balances to purchase services from correspondent banks.

If cash assets are not really a source of liquidity for a financial company, what assets are? The following are generally considered to be liquid assets:

1. Cash and due from banks and the Federal Reserve Banks in excess of requirements
2. Federal funds sold and reverse repurchase agreements
3. Short-term Treasury and agency obligations not pledged as collateral
4. High-quality short-term corporate and municipal securities not pledged as collateral
5. Some government-guaranteed loans that can be readily sold

These assets are liquid because they can be quickly converted into immediately available funds with limited price depreciation.

New Borrowing

Beyond selling assets, financial institutions can access liquid funds by borrowing in the financial markets. Borrowing is attractive because it can normally be completed quickly and at predictable prices. In well-functioning money and capital markets, banks can issue debt to a host of individuals, pension funds, insurance companies, etc., to obtain cash. Historically, depository institutions had an advantage over nondepository institutions because they could fund their operations with core deposits (e.g., savings accounts, checking accounts, and small time deposits), whereas other institutions could not. Over time, many investment banks and manufacturing companies acquired industrial loan companies or limited-purpose banks that allowed them to offer FDIC-insured deposits and access FHLB advances. Investment banks, in particular, began using brokered CDs, commercial paper and repurchase agreements (repos) as permanent funding sources. Many large firms offered high-rate CDs over the Internet.

Importantly, the use of these noncore funding sources added liquidity risk to these firms' operations. Remember that commercial paper is unsecured, and a large portion of jumbo CDs are not FDIC-insured such that an institution that gets into trouble will see holders of these liabilities flee at the first opportunity. Similarly, repos and FHLB advances require that the borrowing institution post collateral against these debts. When the institution gets into trouble, typically because the assets it holds (loans, securities, and collateralized debt obligations (CDOs)) fall in value, repo lenders and the FHLBs withdraw from the market and/or sharply increase collateral requirements. As such, institutions may be excluded from borrowing in this form and are forced to replace the funds elsewhere. See the Contemporary Issues box titled "Borrowing at the Fed". The risk of using borrowings as a source of liquidity in this form is that it is "asset-quality sensitive." If the quality of an institution's assets declines, or the market forms a negative perception of an institution's business model and risk, market participants will not lend the institution the funds it needs.

CONTEMPORARY ISSUES

Borrowing at the Fed

During the heart of the recent financial crisis, the Federal Reserve extended large amounts of loans to institutions in financial distress. These firms needed the financing to avoid failure. By its actions, the Fed bailed out these firms which otherwise would likely have had to file for bankruptcy protection. Some firms not in distress also took advantage of the cheap and stable funding from the Fed in order to increase profitability.

In a 2011 research report, Bloomberg news reported that on a single day, December 5, 2008, the Fed extended a combined $1.2 trillion in loans to different firms.[1] There were many different borrowing programs directed at different types of institutions that relied on different sources of funding. Borrowers included some foreign-based organizations, as well as domestic firms. The term "Too Big to Fail" (TBTF) was coined to reflect the government's role in providing this liquidity. Most analysts and market participants believe that the bailout efforts were necessary to prevent a collapse of the global financial system. However, the residual costs continue to be large. They include the following:

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[1] See Ivry, Keuon, and Kuntz (2011). Bloomberg obtained the data only after filing a Freedom of Information Act request and waiting two years for the Fed to release the information under court order.

(1) the bailouts create a moral hazard by which TBTF institutions continue to take on excessive risk because the government will always be there to save them; (2) TBTF institutions receive a subsidy in the form of lower borrowing costs due to the implied government guarantee; (3) TBTF institutions have continued to grow and increase their market share throughout the crisis and afterward as other institutions were allowed to fail and did not receive the subsidy inherent in the implied government guarantee; (4) regulatory burdens will increase for all financial institutions as government agencies and bank regulators impose increasingly restrictive regulations to control bank risk-taking and search for consumer compliance violations; and (5) the courts and regulatory agencies will effectively "tax" TBTF institutions as "punishment" for their poor risk management practices pre-crisis. In short, the cost of banking will rise while the expected returns to bank stockholders will fall.

Objectives of Cash Management

Banks prefer to hold as few cash assets as possible without creating transactions problems from deposit outflows. Excess holdings have a high opportunity cost represented by the incremental interest that could be earned on an alternative investment. As the level of interest rates rises, so does the opportunity cost and the incentive to economize on cash assets. There are, however, significant risks in holding too little cash. Imagine depositors' concerns if they were told that their bank did not have enough currency on hand for withdrawals. A bank must similarly keep enough deposit balances at other banks and the Federal Reserve to cover deposit outflows, or it will be forced to replenish its balances under duress. Owning too few cash assets potentially creates liquidity problems and increases borrowing costs. Continued deficiencies are attributed to poor management, which ultimately leads to close regulatory scrutiny and deteriorating business relationships.

Fortunately, vault cash needs are largely predictable. Local businesses make regular cash deposits, and bank customers generally withdraw cash at predictable intervals near weekends, holidays, and when they receive their paychecks. Vault cash shortages can be avoided by requesting a currency shipment from the closest Federal Reserve Bank or correspondent bank.

It is much more difficult to accurately predict the timing and magnitude of deposit inflows and outflows that influence deposits held at Federal Reserve Banks and other financial institutions. Deposit inflows raise legal reserve requirements but also increase actual reserve assets and correspondent deposits. Deposit outflows lower reserve requirements and reduce actual deposit holdings. Because deposit flows are determined by customer transactions, depository institutions cannot directly control the timing of when transactions clear. When projecting cash needs, management is thus continually aiming at a moving target.

When an institution realizes unexpected deposit shortages, it must have access to balances at Federal Reserve or correspondent banks via either new borrowings or the sale of noncash assets. Unfortunately, borrowing costs typically increase and funding sources disappear when an institution experiences credit problems or operating difficulties. Similarly, assets that can be easily sold near par value typically earn lower yields. Hence, an institution's cash needs are closely related to its liquidity requirements and sources. The fundamental management goal underlying cash and liquidity management is to accurately forecast cash needs and arrange for readily available sources of cash at minimal cost.

Reserve Balances at the Federal Reserve Bank

Depository institutions hold deposits at the Federal Reserve in part because the Federal Reserve imposes legal reserve requirements and deposit balances qualify as legal reserves. As discussed later, banks must hold deposit balances at the Fed equal to a fraction of qualifying liabilities. Institutions also hold deposits to help process deposit inflows and outflows caused by check clearings, maturing time deposits and securities, wire transfers, and other transactions. Deposit flows are the link between a bank's cash position and its liquidity requirements.

Consider the T-account at the top of Exhibit 10.1 (see Chapter 10), which documents the impact of a $100,000 maturing CD (not rolled over) that clears through the bank's reserve account at the Federal Reserve. The outflow may represent a daily net clearing drain, where the value of checks written on deposits at the sample bank exceeds the value of checks drawn on other banks that are deposited at the sample bank and presented to the Federal Reserve for payment. The offsetting adjustment to the deposit loss is a $100,000 decrease in reserve balances at the Federal Reserve. In this simplified example, required reserves do not decline because reserves are not required against CD balances. A liquidity problem arises, however, because actual deposit balances held at the Federal Reserve decrease by $100,000. If the bank was holding the minimum reserve required (no excess reserves), the bank would be deficient $100,000 in required reserves. This represents its immediate liquidity needs. Note, however, that even though the required reserve balance at the Federal Reserve satisfied the bank's clearing requirements, these funds would have to be replaced; that is, required reserves do not provide the bank a longer-term liquidity source. If, however, the bank had excess reserve balances at the Fed of $100,000, the deposit outflow would have reduced the bank's reserves at the Fed by $100,000, but no immediate liquidity need would arise. All such deposit outflows directly reduce a bank's deposit balances either at the Federal Reserve or correspondent banks and raise its liquidity needs. A deposit inflow has the opposite impact.

Required Reserves and Monetary Policy

The purpose of required reserves is to enable the Federal Reserve to control the nation's money supply. By requiring depository institutions to hold deposit balances in support of transactions accounts, the Federal Reserve hopes to control credit availability and thereby influence general economic conditions. There are fundamentally three distinct monetary policy tools: open market operations, changes in the discount rate, and changes in the required reserve ratio:

1. **Open market operations** are conducted by the Federal Reserve Bank of New York under the direction of the Federal Open Market Committee (FOMC). The sale or purchase of U.S. government securities in the "open market," or secondary market, is the Federal Reserve's most flexible means of carrying out its policy objectives. Through the purchase or sale of short-term government securities, the Fed can adjust the level of reserves in the banking system. Through open market operations, the Fed can offset or support changes in reserve requirements, changes in the discount rate, as well as seasonal or international shifts of funds, and thereby influence short-term interest rates and the growth of the money supply. Fed open market purchases increase reserves in the banking system, hence liquidity. Fed open market sales of securities decrease bank reserves and liquidity by lowering deposit balances at the Fed.

2. **Discount window** borrowing occurs when depository institutions borrow deposit balances directly from Federal Reserve Banks, with the **discount rate** representing the interest rate that institutions pay. Changes in the discount rate directly affect the cost of borrowing. When the Fed raises the discount rate, it discourages borrowing by making it more expensive. Fed decreases in the discount rate make borrowing less expensive.
3. **Changes in reserve requirements** directly affect the amount of legal required reserves and thus change the amount that a depository institution can lend. For example, a required reserve ratio of 10 percent means that a bank with $100 in deposit liabilities outstanding must hold $10 in required reserves in support of deposits. The institution can thus lend only 90 percent of these deposits. When the Fed increases (decreases) reserve requirements, it formally increases (decreases) the required reserve ratio that directly reduces (raises) the amount a depository institution can lend. Thus, lower reserve requirements increase liquidity and lending capacity, while higher reserve requirements decrease liquidity and lending capacity.[2]

The Federal Reserve sets required reserves for all depository institutions equal to a fraction of the dollar amount of selected liabilities. With a legal reserve requirement equal to 10 percent for demand deposits and 0 percent for all time deposits (see Exhibit 11.3 for actual percentage requirements), an institution with $100 million in demand deposits and $500 million in time deposits will have to hold required reserves of $10 million. This amount actually represents the *minimum* amount the bank must keep in vault cash or on deposit at the Federal Reserve. If this bank actually holds $12 million in deposits at the Fed plus vault cash, it has $2 million in excess reserves, which represents a source of liquidity. If the volume of outstanding demand deposits were to increase to $120 million, the bank's required reserves would rise to $12 million and there would be no excess reserves. In general, when deposit liabilities increase (decrease), required reserves increase (decrease). Thus, the amount of deposit balances a depository institution holds at the Federal Reserve will vary directly with the magnitude of reservable bank liabilities.[3] As discussed in the next section, depository institutions can circumvent the requirements by substituting liabilities that are not subject to the requirements for those that are. The Fed can also control the money supply and credit availability in other ways.

The Impact of Sweep Accounts on Required Reserve Balances

Under the Federal Reserve's Regulation D, checkable deposit accounts, such as demand deposit, ATS, NOW, and other checkable deposit accounts, have a 10 percent reserve requirement, but money market deposit accounts (MMDAs) are considered to be personal saving deposits and have a zero reserve requirement ratio.[4] In January 1994, the Federal Reserve Board permitted commercial banks to use computerized sweep programs. A sweep account enables a depository institution to shift funds from transactions accounts, which are

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[2] Changing reserve requirement ratios has a significant announcement effect because of the dramatic impact it has on all member financial institutions. It has the additional advantage of affecting all institutions simultaneously to a predictable magnitude.

[3] The use of reserve requirements as a policy tool has declined in the United States and other industrialized countries in recent years because central banks can control the money supply and credit availability in other ways. Sellon and Weiner (1997) attribute the decline to three factors: the change in Federal Reserve policy emphasizing the control of short-term interest rates; the recognition that reserve requirements are a tax on banks in the form of a low-rate loan to the Federal Reserve, which puts them at a competitive disadvantage with other financial institutions; and the active use of "sweep accounts" that have reduced required reserve balances to their lowest level in 30 years.

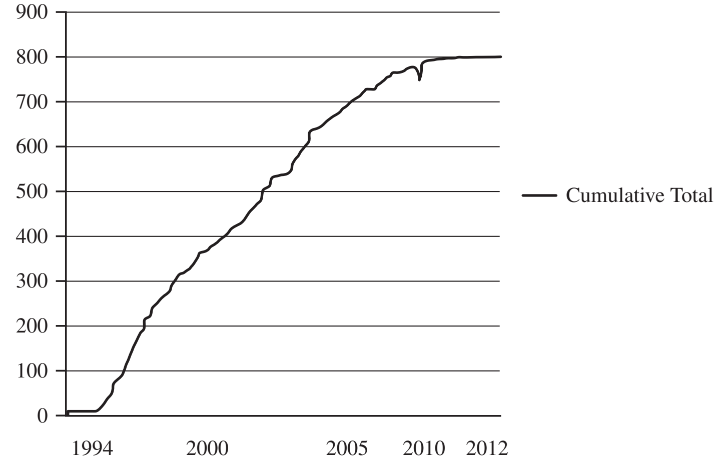
[4] Regulation D and statutory reserve requirements are discussed in the following section. For a good discussion of sweep accounts, see Richard G. Anderson and Robert H. Rasche (2001).

reservable, to MMDAs or other accounts, which are not reservable. For example, a retail sweep account is an account in which the bank's computer "sweeps" excess funds into an MMDA from a demand deposit account. The bank determines the amount of excess funds. Essentially, a bank must designate only an amount of funds necessary to meet daily check clearings as the DDA balance. It could transfer any excess balances daily, thereby forcing a zero daily balance in the DDA. Although it would appear that banks are "moving" a customer's balance from one account to another, in reality the computer software actually dynamically "reclassifies" the customer's balance from a reservable account to a nonreservable account. This effectively reduces a bank's statutory required reserves while leaving the customer's account balance unchanged. Because customers are not very sensitive to the rates paid on these accounts, the bank's interest costs may not be much higher while it reduces required reserves. Exhibit 11.1 demonstrates the rapid growth of retail sweep account programs at commercial banks since 1994.

There are generally two types of retail sweep programs in use today. The first is a weekend program. This account reclassifies transactions deposits as savings deposits at the close of business on Friday and back to transactions accounts on Monday. On average, this means that on Friday, Saturday, and Sunday (occasionally on a Monday holiday), or three-sevenths of the week, required reserves on these deposits are zero. Because reserve requirements are computed on the basis of a seven-day week, this would come close to cutting required reserves in half.[5] A second type of sweep account is the minimum threshold account. In these accounts, the bank's computer moves the customer's account balance to an MMDA when the dollar amount of funds exceeds some minimum and returns the funds as needed. It is interesting to note how sophisticated bank computer systems have become. Prior to the extensive use of computers in banks, these types of programs were only available to the largest and most profitable customers because of the time and effort required to calculate and move funds.

The number of withdrawals or transfers out of an MMDA is restricted by Regulation D to no more than six each month. If the number exceeds six, the MMDA is classified as

EXHIBIT 11.1 Growth of Sweep Transactions Deposits into MMDAs: 1994–2012



Source: Board of Governs of the Federal Reserve System, Division of Monetray Affairs, publication was terminated in March 2012.

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[5] Some consultants offering sweep account programs claim that a bank can reduce its effective reserve requirement to 1 percent rather than the statutory 10 percent of reservable balances.

an ATS (automatic transfer to savings) account and reserve requirements apply. The second type of sweep account, then, is limited in that the full amount of funds must be moved back into the transactions account on the sixth transfer of the month.

These retail sweep programs should not be confused with business sweep programs, which are quite popular. Regulation Q (under the Banking Acts of 1933 and 1935) prohibits depository institutions from paying explicit interest on business demand deposit accounts. A commercial sweep account sweeps excess funds from business demand deposits overnight (typically) into nondeposit, interest-earning assets such as repurchase agreements and money market mutual funds. These liabilities are not bank deposit accounts and are not FDIC insured; hence, they are not subject to reserve requirements.

Meeting Legal Reserve Requirements

The actual computation of legal reserve requirements is more complex than that suggested by the earlier example. Specifically, not all deposits are subject to reserves, banks reduce the volume of deposits subject to required reserves by subtracting correspondent balances and vault cash, both of which serve as a reserve asset, and required reserves are calculated over a two-week period. This last condition is important because it stipulates that an institution does not have to hold a specific amount of cash assets on each day, but a minimum amount over a longer period. From 1998 to the present, the Fed has followed a **lagged reserve accounting (LRA)** system in which it requires banks to hold reserves against outstanding deposit balances from three to five weeks earlier. The principal benefit is that it facilitates planning by enabling banks to more readily calculate and meet minimum required reserves. However, LRA reduces the Fed's ability to control the money supply and may increase the volatility of interest rates. The following analysis examines current reserve requirements in detail and provides a comprehensive example. Exhibit 11.2 introduces important terminology.

EXHIBIT 11.2 **Important Terminology**

Base computation period: The 14-day period during which a bank's outstanding liabilities determine the amount of required reserves to be held during the reserve maintenance period.

Collected balances: The dollar value of ledger balances minus float.

Correspondent bank: A bank that provides services to other financial institutions and receives payment in the form of either deposit balances or direct user fees.

Daylight overdrafts: The process of authorizing payments within a business day from deposit accounts held at the Federal Reserve or correspondent banks in excess of actual balances held.

Deferred availability credit items: The dollar amount of checks deposited at the Federal Reserve Bank for which the Federal Reserve has not yet granted credit.

Earnings credit: The assumed interest rate at which a bank can invest customer deposit balances to earn interest income.

Investable balances: The dollar value of collected balances minus required reserves.

Reserve maintenance period: The 14-day period during which a bank must hold sufficient deposit balances at the Federal Reserve to meet its legal reserve requirement.

Respondent bank: A bank that buys services from other financial institutions and pays by holding nonearning deposit balances at the correspondent bank or via direct user fees.

Transactions accounts: All deposits on which the account holder is allowed to make withdrawals by negotiable instruments and more than three monthly telephone and preauthorized funds transfers.

Federal Reserve Regulations D and M specify minimum reserve requirements for commercial banks. The regulations stipulate that each bank must hold cash reserves equal to a fraction of its base liabilities. There are three elements of required reserves: the dollar magnitude of base liabilities, the required reserve fraction, and the dollar magnitude of qualifying cash assets. Base liabilities are composed of **net transactions accounts** in which the holder is permitted to make withdrawals by negotiable or transferable instruments, payment orders, and telephone and preauthorized transfers in excess of three per month. MMDAs are not classified as transactions accounts. The dollar amount equals the sum of the balances that are listed on the bank's books, referred to as ledger balances, minus the sum of a bank's CIPC and collected balances due from private depository institutions. No reserves are required against any other liability.

A bank's qualifying reserve assets include vault cash, deposits held at Federal Reserve Banks, and deposits held in pass-through accounts at other financial institutions. The relevant percentages, or required reserve ratios, appear in Exhibit 11.3. In 2014, the first $13.3 million of daily average net transactions accounts was exempt, while banks had to hold 3 percent on the amounts between $13.3 million and $89 million, and 10 percent on any amount over $89 million.[6] The Board of Governors can vary these reserve ratios within established regulatory limits.

Lagged Reserve Accounting

Under the current LRA procedure, weekly reporting institutions maintain reserves on their reservable liabilities with a 30-day lag.[7] That is, the reserve maintenance period for a weekly reporter begins 30 days after the beginning of a reserve computation period. In particular, banks must maintain reserves—on a daily average basis—for a 14-day period beginning on the third Thursday following the computation period. A **computation period** consists of two one-week **reporting periods** and, therefore, consists of 14 consecutive days beginning on a Tuesday and ending on the second Monday thereafter. A **maintenance period** consists of 14 consecutive days beginning on a Thursday and ending on the second Wednesday thereafter. The **reserve balance requirement** to be maintained in any given 14-day maintenance period ending on Wednesday,

EXHIBIT 11.3 Reserve Requirement Percentages for Depository Institutions Effective in 2014

Type of Deposit		Percentage
Net transactions accounts		
Exempt amount	$13.3 million	0
Up to	$89.0 million	3
Over	$89.0 million	10
All other liabilities		0

Source: Board of Governors of the Federal Reserve System, Press Release, November 5, 2013.

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[6] Financial institutions that are not members of the Federal Reserve System can use pass-through balances to meet reserve requirements. Pass-through balances are deposits held at either the FHLB, the National Credit Union Administration Central Liquidity Facility, or any bank that keeps balances at the Federal Reserve Bank. The exempt amount increases each year as a fraction of the increase in aggregate reservable liabilities.

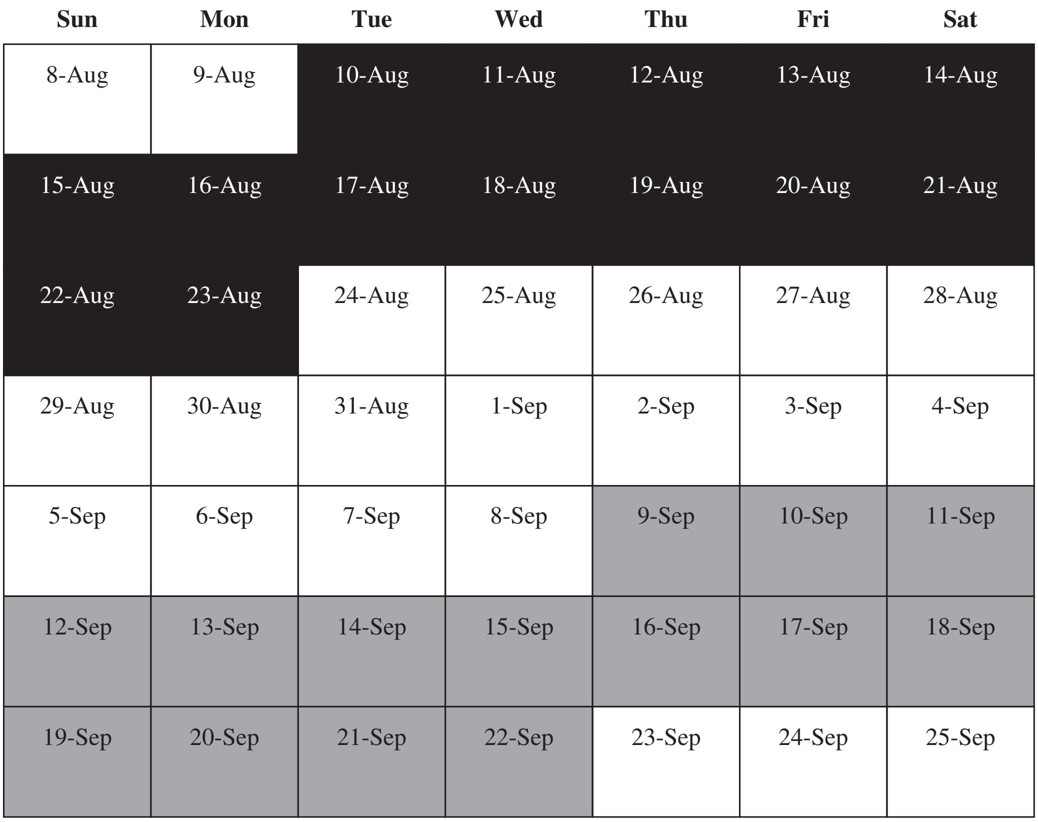
[7] Smaller banks compute and meet reserve requirements quarterly (i.e., banks with less than $207.7 million in reservable liabilities) or annually (i.e., banks with less than $8.5 million in reservable liabilities).

- equals the reserve requirement on reservable liabilities calculated as of the computation period that ended 17 days prior to the start of the associated maintenance period,
- minus vault cash as of the same computation period used to calculate the reserve requirement—that is, the 14-day computation period ending 17 days before the start of the associated maintenance period.

Both vault cash and Federal Reserve deposit balances qualify as reserves, but the timing varies. Daily average balances determine the amount of vault cash that qualifies over the two-week computation period that ends 17 days prior to the maintenance period, while reserve balances are held during the reserve maintenance period. The institution must satisfy its reserve requirement in the form of vault cash or balances maintained either directly with a Reserve Bank or in a pass-through account (correspondent bank account). The portion of the reserve requirement that is not satisfied by vault cash holdings is called the **reserve balance requirement**.

Exhibit 11.4 demonstrates the timing of these intervals. Note that Friday balances carry over to Saturday and Sunday such that they have a three-day impact on the

EXHIBIT 11.4 **Relationship between the Reserve Maintenance and Base Computation Periods under Lagged Reserve Accounting**



Sun	Mon	Tue	Wed	Thu	Fri	Sat
8-Aug	9-Aug	10-Aug	11-Aug	12-Aug	13-Aug	14-Aug
15-Aug	16-Aug	17-Aug	18-Aug	19-Aug	20-Aug	21-Aug
22-Aug	23-Aug	24-Aug	25-Aug	26-Aug	27-Aug	28-Aug
29-Aug	30-Aug	31-Aug	1-Sep	2-Sep	3-Sep	4-Sep
5-Sep	6-Sep	7-Sep	8-Sep	9-Sep	10-Sep	11-Sep
12-Sep	13-Sep	14-Sep	15-Sep	16-Sep	17-Sep	18-Sep
19-Sep	20-Sep	21-Sep	22-Sep	23-Sep	24-Sep	25-Sep

■ Lagged Reserve Computation Period

▨ Reserve Maintenance Period

daily average. Because transactions balances are determined (for reserve purposes) about two and one-half weeks in advance and vault cash is determined three days in advance of the reserve maintenance period, a bank can manage its deposit balances at the Fed with a much greater degree of certainty as compared with a system in which required reserves depend on the amount of contemporaneous deposit liabilities. In a contemporaneous system, the final deposit base would not be known.

The procedure for determining required reserves involves multiplying the percentages from Exhibit 11.3 by the daily average amount outstanding for each reservable liability during the base computation period. Banks can vary from the daily average requirement on any day of the maintenance period as long as their average reserve holdings meet the minimum daily requirement over the entire period. Both vault cash and demand balances at the Federal Reserve qualify as reserve assets. Vault cash held during the lagged computation period that ended 17 days prior to the start of the associated maintenance period is used to offset reserve balance requirements. For example, if a bank's daily average required reserves based on reservable liabilities total $20 million during the reserve maintenance period, then required demand balances at the Federal Reserve would equal $18 million if the bank held an average $2 million in vault cash during the computation period.

Finally, actual reserve holdings during the maintenance period can deviate slightly from the exact percentage requirement, with any excess or deficiency carried forward to the next period. The present allowance is 10 percent of daily average required reserves before past excesses or deficiencies and the vault cash offset, or $50,000, whichever is greater. If a bank is deficient by more than this amount, it must pay a nondeductible interest penalty equal to the discount rate plus one percent times the extraordinary deficiency. More importantly, if a bank consistently holds too few reserves, the Federal Reserve will penalize it further by restricting its operating procedures and allowable business activities. If a bank holds more reserves than the allowable excess, it cannot carry this difference forward and thus loses any interest income it could have earned by investing the balances. The timing of these requirements places a premium on Wednesday's transactions just prior to the end of the maintenance week. Because federal funds are an important source of reserves, federal funds trading is very active on Wednesdays, and the federal funds rate is typically more volatile compared with other days.

An Application: Reserve Calculation under LRA

Reserve maintenance requirements can be best demonstrated through an example. Consider the time frame outlined in Exhibit 11.4, with September 9 to September 22 representing the 14-day reserve maintenance period. Exhibit 11.5 presents daily balances for vault cash and net transactions accounts during the lagged reserve computation period for a sample bank. The final columns list the cumulative totals for each balance sheet item over the two-week period and the daily average balances.[8] Note that the base period for net transactions accounts begins on August 10, almost four and one-half weeks before the maintenance period starts.

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[8] Banks can report balance sheet figures to the nearest thousand dollars. Exhibit 11.5 rounds figures to the nearest million.

EXHIBIT 11.5 **Report of Reservable Liabilities and Offsetting Asset Balances**

	Balances at Close of Business Day (Millions of Dollars)															
Lagged Computation Period	**Tue 10-Aug**	**Wed 11-Aug**	**Thu 12-Aug**	**Fri 13-Aug**	**Sat 14-Aug**	**Sun 15-Aug**	**Mon 16-Aug**	**Tue 17-Aug**	**Wed 18-Aug**	**Thu 19-Aug**	**Fri 20-Aug**	**Sat 21-Aug**	**Sun 22-Aug**	**Mon 23-Aug**	**Two-Week Total**	**Daily Average**
DDAs	992	995	956	954	954	954	989	996	960	959	958	958	958	990	$13,573	$969.50
Auto trans. from savings	0	0	0	0	0	0	0	0	0	0	0	0	0	0	$0	$0.0
NOW and Super NOW	221	221	222	223	223	223	223	224	225	225	225	225	225	225	$3,130	$223.57
Deductions:																
DD bal. from U.S. dep.	163	281	190	186	186	186	159	159	274	178	182	182	182	164	$2,672	$190.86
CIPC	96	96	78	78	78	78	95	98	92	79	81	81	81	88	$1,199	$85.64
Net trans. accounts	954	839	910	913	913	913	958	963	819	927	920	920	920	963	$12,832	$916.57
Vault Cash	28	30	31	33	33	33	38	30	31	32	32	32	32	36	$451	$32.21

Exhibit 11.6 demonstrates the required reserves calculation. The procedure has four steps:

1. Calculate daily average balances outstanding during the lagged computation period.
2. Apply the reserve percentages.
3. Subtract vault cash.
4. Add or subtract the allowable reserve carried forward from the prior period.

Daily average balances equal the cumulative total divided by 14, the number of days in the base period. Weekends count even if a bank is not open for business. These daily average balances are then multiplied by the percentages from Exhibit 11.3. The first $13.3 million of net transactions accounts is exempt from required reserves, while the next $75.7 million is subject to the lower 3 percent requirement.

For this sample bank, total daily average gross required reserves equal $85.028 million. Average vault cash of $32.214 million during the lagged computation period is then subtracted to yield a net requirement of $52.814 million. Banks can deviate from the exact requirement as long as they make up deficiencies in the following maintenance period. Excess reserve holdings or surpluses of up to 4 percent of gross required reserves can be carried forward to reduce the next period's minimum requirement. The computation in Exhibit 11.6 assumes that the prior period deficiency totaled $2.276 million. The sample bank must hold minimum reserves equal to the net requirement plus any daily deficiency—a total of $53.042 million. The last item in the exhibit, maximum reserves at the Federal Reserve, equals the minimum requirement plus 10 percent of $85.028 million—or $61.545 million. Of course, there is no limit on how much a bank may hold in balances at the Federal Reserve. The term *maximum* refers to the fact that no more than a 10 percent surplus can be used to reduce future balance requirements.

EXHIBIT 11.6 Required Reserves Report, September 9–22

Reservable Liabilities for:	Daily Avg. Deposit Liab. ($ mill)	Reserve Percentage	Daily Avg. Requirement ($ mill)
September 9–22			
Net trans. accounts			
Exempt up to $13.3 million	13.30	0.0%	0.000
$13.3–$89 million	75.70	3.0%	2.271
Over $89 million	827.57	10.0%	82.757
Total	916.57		
Gross reserve requirement			85.028
Daily average vault cash			32.214
Net reserve requirement			52.814
Reserve carry-forward (from prior period)			(2.276)
Minimum reserves to be maintained with Federal Reserve			53.042
Maximum reserves to be maintained			61.545
(0.10 × 85.028) + 53.042			

Correspondent Banking Services

In addition to services from the Federal Reserve such as the holding of deposit balances for reserve requirements and the facilitation of funds transfers, most banks maintain relationships with correspondent banks for similar services. These relationships are usually maintained through deposit accounts at the bank's correspondent financial institutions, and these balances are held as payment for services purchased from the correspondent bank. This interbank deposit network links the activities of small and large banks and banks located in different geographic areas. **Correspondent banking** is the system of interbank relationships in which one bank sells services to other financial institutions. The institution providing the services is the **correspondent bank**, or upstream correspondent, while the institution buying the services is the **respondent bank**, or downstream correspondent. A bank that owns deposit balances is a respondent bank, while a bank that accepts deposits is a correspondent bank. Larger depository institutions typically fill both roles, providing basic services to smaller banks and buying services from large firms that are either located in other geographic markets or able to offer a broader range of services.

Respondent banks purchase services from correspondents for a variety of reasons. Some services, such as check collection, carry advantages over those provided directly by the Federal Reserve System, which generally takes longer to grant credit. Other services are either too expensive to provide independently or cannot be provided because of regulatory constraints. Small banks, for example, want to offer a full range of services to their customers, but the demand for specialty transactions is sporadic. It would be too costly to invest in the technology and manpower for international transactions or investment banking advice on mergers and acquisitions if those services were used infrequently. These services can only be provided in large volume to take advantage of economies of scale, which lower unit costs. Even when priced at a markup over correspondents' costs, these services are cheaper than if provided independently. Respondent banks similarly sell loan participations to correspondent banks when individual loans exceed a bank's legal lending limit.

The predominant services purchased from correspondent banks can be grouped into three broad categories: check clearing and related cash transactions, investment services, and credit-related transactions. Check-clearing services are attractive because respondent banks can reduce float. Correspondent banks often make funds available for respondent investment before the Federal Reserve's scheduled availability. Additional interest earned more than compensates for the required compensating balances. The following correspondent banking services are the most common:

- Check collection, wire transfer, coin and currency supply
- Loan participation assistance
- Data processing services
- Portfolio analysis and investment advice
- Federal funds trading
- Securities safekeeping
- Arrangement of purchase or sale of securities
- Investment banking services: swaps, futures, mergers, and acquisitions
- Loans to directors and officers
- International financial transactions

Respondents purchase other services when the price is below the unit cost of supplying the service directly.

Increased competition has shrunk the pool of commercial bank respondents and put pressure on profit margins. Institutions that acquire a firm in another state no longer need the same services previously obtained through a correspondent. A community banker who acquaints an upstream correspondent with his or her customer base will frequently discover that the correspondent has tried to market services directly to the customer and completely circumvent the respondent bank. This situation has produced two results. First, respondents now unbundle the services of upstream correspondents, purchasing different services from different correspondents rather than dealing with only one firm. Second, community banks are forming and buying services from cooperative institutions known as **bankers' banks**, which are owned by independent commercial banks and are authorized to provide services only to financial institutions. They do not market services directly to bank customers and compete only with other correspondent banks. Bankers' banks maintain a staff that handles check collection; analyzes the credit quality of loan participations; trades in government and corporate securities for investments; and offers other services, such as discount brokerage, leasing, and data processing at competitive prices. The Board of Directors is comprised mainly of community bank CEOs who offer guidance regarding product selection, pricing, and portfolio policies. The primary benefits to community banks is the cost sharing of essential services and knowledge that the bankers' bank will not try to steal its customers.

Liquidity Planning

Banks actively engage in liquidity planning at two levels. The first relates to the management of their short-term liquidity needs and required reserve position. The second level of liquidity planning involves forecasting net funds needs derived from seasonal or cyclical phenomena, overall bank growth, and contingency liquidity needs. The planning horizon is considerably longer, encompassing monthly intervals throughout an entire year. Banks often conduct this type of liquidity planning by generating cash-flow forecasts over time intervals comparable to those used for interest rate sensitivity analysis.

Short-Term Liquidity Planning

Short-term liquidity planning focuses on forecasting closing balances at the Federal Reserve relative to potential legal reserves. The previous sections described the reserve accounting requirements and the procedure for calculating legal requirements. The planning horizon is two weeks, during which a bank must hold a minimum amount of deposit balances at the Federal Reserve. Actual balances vary daily, with many transactions affecting outstanding liabilities and the investment portfolio—but because these transactions occurred over the preceding two weeks, they are known. Many new to the depository institution industry, however, would think that required reserves represent a type of liquidity risk reserve that is required in the event of a significant liquidity need. The line of thinking is that, if the bank can only invest 90 percent of transactions deposits, then it has 10 percent available for emergency liquidity needs. This is not the case. As discussed in the previous section, a depository institution may *not* come up short of reserves. If the bank has a liquidity need, required reserves are not available to use for the need; only those reserve funds that are in excess of those required may be used. Hence, required reserves may create a liquidity problem—not a solution—for the institution!

The fundamental objective in managing a legal reserve position is to meet the minimum requirement at the lowest cost. Because customer preferences determine vault cash needs, they vary largely with the payment patterns of the bank's customers and local businesses. They also exhibit well-defined seasonal patterns. When a bank needs additional vault cash, it simply requests a cash delivery from its local Federal Reserve Bank or a correspondent bank. It similarly ships any excess cash when appropriate. The primary difficulty in meeting required reserves derives from forecasting required deposit balances at the Federal Reserve resulting from volatile shifts in bank liabilities. The process involves forecasting daily clearing balances and either investing any excess at the highest yield or obtaining additional balances at the lowest cost to cover any deficits. The change to the LRA system has made this process somewhat easier.

Exhibit 11.7 identifies several factors that alter a bank's actual and required reserve assets. These factors are separated into nondiscretionary items, over which a bank has virtually no control, and discretionary items, over which it has at least partial control. The most important nondiscretionary items are checks presented for payment. Exhibit 11.7 differentiates between the Federal Reserve's cash letter and local clearings.[9] Because the Federal Reserve provides a schedule for the timing of clearings, a bank knows when previously deferred items will be available. Check clearings are uncontrollable in that bank customers determine the timing and magnitude of check payments. Customers do not normally notify a bank at the time of payment or prior to making deposits.

This uncontrolled activity presents planning problems when large withdrawals or new deposits catch a bank unaware and force it to scramble for additional reserves or to invest newfound funds. Good data management and communications systems—from tellers and ATMs to management—are essential. Interest of 5 percent on $10 million over the weekend is $4,110, a substantial opportunity cost of poor planning! Managers

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[9] A cash letter is a letter or data tape on which a bank lists and describes transit checks.

EXHIBIT 11.7 **Factors Affecting Daily Reserves Held at the Federal Reserve**

Factors Increasing Reserves	Factors Decreasing Reserves
Nondiscretionary	***Nondiscretionary***
Yesterday's immediate cash letter	Remittances charged
Deferred availability items	Deficit in local clearinghouse
Excess from local clearinghouse	Treasury tax and loan account calls
Deposits from U.S. Treasury	Maturing CDs, Eurodollars not rolled over
Discretionary	***Discretionary***
Currency/coin shipped to Federal Reserve	Currency and coin received from Federal Reserve
Security sales	Security purchases
Borrowing from Federal Reserve	Payment on loans from Federal Reserve
Federal funds purchased	Federal funds sold
Securities sold under agreement to repurchase	Securities purchased under agreement to resell
Interest payments on securities	
New certificates of deposit, Eurodollar issues	

should monitor activity in large deposit accounts routinely. They should know when large CDs mature, when the Treasury transfers deposits to the Federal Reserve, and when loan customers make large loan payments. They should also identify any weekly or monthly patterns in deposit flows that arise from normal business activity. This may allow them to use balances from inflows during one part of the maintenance period to offset outflows during another part, rather than jump in and out of federal funds trading.

When managers need to adjust a bank's reserve assets they use the discretionary items listed in Exhibit 11.7. Managers have some control over these transactions and use them to complement uncontrollable deposit flows. In most cases, a bank receives information on clearing surpluses or deficiencies twice daily. Summary figures from yesterday's check clearings are available each morning, along with balances from federal funds trades and securities transactions. In most urban areas, local clearinghouses report net clearings each afternoon from checks submitted that day. Once this information is available, managers may actively increase or decrease daily reserves by choosing among the items in Exhibit 11.7. Although federal funds and RP transactions are the most popular, the choice depends on a comparison of costs and returns.

Managing Float

During any single day, more than $100 million in checks drawn on U.S. commercial banks is waiting to be processed. Individuals, businesses, and governments deposit the checks but cannot use the proceeds until banks give their approval, typically in several days. Checks in process of collection, called "float," are a source of both income and expense to banks.

To understand float management and recent criticism of bank policies, it is necessary to explain the bank payment system. Payments between banks can be made either by check or electronically. Checks drawn against transactions accounts are presented to the customer's bank for payment and ultimately "cleared" by reducing the bank's deposit balance at the Federal Reserve or a correspondent bank. Payments made electronically directly and immediately alter balances held at Federal Reserve Banks. This network for transferring funds electronically is called the Fedwire.

A depository institution that clears a deposit by transferring funds accepts the risk that supporting funds will eventually appear. Referring back to Exhibit 10.10 (see Chapter 10), if the individual does not have sufficient funds to cover the $500 draft, BANB must collect from its business depositor and may suffer losses. To reduce this risk, banks typically place a hold on deposited funds. Essentially, they do not let depositors spend the proceeds until there is reasonable certainty that the deposit is good.

Most individuals at one time or another have played the float game, writing checks against insufficient balances, then rushing to deposit funds that permit the checks to clear. Depository institutions play the same game with electronic funds transfers—for far greater dollar amounts—by authorizing payments from deposits held at the Federal Reserve or correspondent banks in excess of their balances. In doing so, they drive their collected balances below zero. These negative balances are called daylight overdrafts. Normally, enough funds are transferred into the account by the end of each day to cover the overdraft.[10]

Overdrafts could potentially close down the electronic payments system. The primary risk is that some financial institution might fail because it cannot meet a payments obligation. A failure might produce liquidity problems at other banks and have a ripple effect, generating other losses and failures. Suppose, for example, that CNB from Exhibit 10.10 transfers funds over the Fedwire to BANB before the individual makes sufficient balances available to cover the original $500 check to the San José business. Once the wire transfer is received, BANB can release funds to the business without risk. Settlement is immediate and final. If the individual does not provide the underlying balances, CNB could lose the amount of the transfer. When extended to all transactions, any single bank may have daylight overdrafts two or three times larger than its capital base.

There are two main electronic funds transfer networks: the Fedwire and CHIPS. Most of the transactions on the Fedwire involve transfers of immediately available funds between financial institutions and balance adjustments from the purchase or sale of government securities. Most of the wire transfers on CHIPS involve either transfers of Eurodollar balances or foreign exchange trading. Although participants are required to maintain positive balances at the Federal Reserve and correspondent banks at the end of each business day, they may create negative balances (daylight overdrafts) during a day by transferring funds in excess of their initial balance before any deposits are received. Conceptually, the overdraft is a loan, but under current regulation it is costless to the deficient bank because no interest or fees are paid. It may be intentional or unintentional, but it clearly imposes risk to the Federal Reserve or CHIPS. The Fed assumes risk because recipients of wire transfers retain legal title to the funds. The Fed thus essentially guarantees wire transfers.

Liquidity versus Profitability

There is a short-run trade-off between liquidity and profitability. The more liquid an institution is, the lower are its return on equity and return on assets, all other things being equal. Both asset and liability liquidity contribute to this relationship. Asset liquidity is influenced by the quality, composition, and maturity of funds. Large holdings of cash assets clearly decrease profits because of the opportunity loss of interest income. In terms of the investment portfolio, short-term securities normally carry lower yields

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[10] Richard Smoot (1985) discusses overdrafts arising over the major wire transfer systems and analyzes the risks assumed in each case.

than comparable longer-term securities. Investors value price stability, so long-term securities pay a yield premium to induce investors to extend maturities. Institutions that purchase short-term securities thus increase liquidity, but at the expense of higher potential returns. Consider an environment where market expectations are for short-term Treasury yields to remain constant at present levels. The Treasury yield curve will slope upward, reflecting liquidity premiums that increase with maturity. A bank that buys six-month Treasury bills at 5 percent rather than a one-year bill at 5.2 percent gives up 20 basis points for the greater price stability (lower risk).

Loan portfolios display the same trade-off. Loans carrying the highest yields are generally the least liquid. Yields are high because default risk or interest rate risk is substantial and the loan administration expense is high. Loans that can be readily sold usually are short-term credits to well-known corporations or government-guaranteed instruments and thus carry minimal spreads. Amortized loans, by contrast, may improve liquidity even though they are frequently long term because the periodic payments increase near-term cash flow.

In terms of liability liquidity, institutions with the best asset quality and highest equity capital have greater access to purchased funds and can acquire these funds more cheaply since they will pay lower interest rates on their liabilities—but will also generally report lower returns in the short run due to their lower-risk position. Promised yields on loans and securities increase with the perceived default risk of the underlying issuer. Institutions that acquire low-default-risk assets, such as U.S. government securities, forgo the risk premium that could be earned. Similarly, institutions with greater equity financing exhibit lower equity multipliers (total assets/total equity) and thus generate lower returns on equity, even with identical returns on assets. These firms can borrow funds more cheaply because a greater portion of their assets has to be in default before they might fail.

Liquidity planning focuses on guaranteeing that immediately available funds are available at the lowest cost. Management must determine whether liquidity and default-risk premiums more than compensate for the additional risk on longer-term and lower-quality bank investments. If management is successful, long-term earnings will exceed peer banks' earnings, as will bank capital and overall liquidity. The market value of equity will increase relative to peers as investors bid up stock prices.

The Relationship between Liquidity, Credit Risk, and Interest Rate Risk

Liquidity management is a day-to-day responsibility. Depository institutions routinely experience fluctuations in their cash assets, depending on the timing and magnitude of unexpected deposit outflows. Deviations from expectations can normally be attributed to large payments or deposits that clear through the Federal Reserve or local clearinghouse. Most shortages can be met by accelerating planned borrowings or deferring asset purchases. Excess cash can be easily invested in earning assets. A well-managed institution monitors its cash position carefully and maintains low-liquidity risk.

Liquidity risk for a poorly managed financial institution closely follows credit and interest rate risk. In fact, banks that experience large deposit outflows can often trace the source to either credit problems or earnings declines from interest rate gambles that backfired. The normal sequence of events underlying liquidity problems is as follows:

- Bank management assumes substantial risk by mismatching asset and liability maturities and durations or by extending credit to high-risk borrowers.
- The bank reports reduced earnings.

- The media publicizes the credit and interest rate difficulties.
- The bank must pay higher rates to attract and keep deposits and other purchased funds.
- Bank earnings decline further with reduced interest margins and nonaccruing loans, and uninsured depositors move their funds, forcing the bank to sell assets at fire-sale prices and obtain temporary financing from government sources until a merger can be arranged or the bank fails.

Few depository institutions can replace lost deposits independently if an outright run on the bank arises. Liquidity planning forces management to monitor the overall risk position of the bank such that credit risk partially offsets interest rate risk assumed in the bank's overall asset and liability management strategy. If credit risk is high, interest rate risk should be low and vice versa. Potential liquidity needs must reflect estimates of new loan demand and potential deposit losses. The following list identifies factors affecting certain liquidity needs:

New Loan Demand	**Potential Deposit Losses**
• Unused commercial credit lines outstanding	• The composition of liabilities
• Consumer credit available on bank-issued cards	• Insured versus uninsured deposits
• Business activity and growth in the bank's trade area	• Deposit ownership between: money fund traders, trust fund traders, public institutions, commercial banks by size, corporations by size, individuals, foreign investors, and Treasury tax and loan accounts
• The aggressiveness of the bank's loan officer call programs	• Large deposits held by any single entity
	• The sensitivity of deposits to changes in the level of interest rates

Each of the factors under "New Loan Demand" signifies a potential increase in borrowing that might deplete a bank's cash reserves. Suppose, for example, that the Federal Reserve tightens credit policy and pushes short-term interest rates higher. Businesses often choose to borrow under outstanding loan commitments rather than use commercial paper, so that bank loans increase. During recessions, individuals might similarly increase outstanding borrowings under credit card agreements. Loan demand closely follows the economic development and growth in a community such that good economic times accelerate borrowing requests. Finally, some banks require loan officers to systematically call on customers to solicit new business. If such call programs are successful, loan demand will increase accordingly.

The factors under "Potential Deposit Losses" similarly convey information regarding potential cash deficiencies. Depository institutions with substantial core deposits and few purchased liabilities will experience smaller proportionate deposit losses. If the majority of the deposits are federally insured, unanticipated outflows will decline further. Large purchased liabilities are also more sensitive to changes in market interest rates. When rates rise, for example, a bank must increase the rate it pays on these rate-sensitive balances or customers will quickly move their balances in search of higher yields. Finally, many banks are located in markets that experience seasonal or cyclical deposit outflows that track changes in regional economic conditions. Consider a bank in a resort community. Deposits flow into the bank during resort season, but flow out afterward. Managers must thus monitor these influences in order to plan for cash needs.

Traditional Aggregate Measures of Liquidity Risk

As described earlier, banks rely on both assets and liabilities as sources of liquidity. Small banks generally have limited access to purchased funds and thus rely primarily on short-term assets. Larger banks, by contrast, obtain liquid funds mainly via liabilities rather than by selling assets. Traditional liquidity measures focus on balance sheet accounts and measure liquidity in terms of financial ratios.

Asset Liquidity Measures

Asset liquidity refers to the ease of converting an asset to cash with a minimum of loss. The most liquid assets mature near term and are highly marketable. Balance sheet liquidity measures are normally expressed in percentage terms as a fraction of total assets. Most small banks maintain substantial investments in highly liquid assets because they provide liquidity in times of duress. As mentioned previously, highly liquid assets include cash and due from banks in excess of required holdings; federal funds sold and reverse repurchase agreements; short-term U.S. Treasury and agency securities; highly rated corporate and municipal securities; and loans that can be readily sold or securitized. The Dodd–Frank Act of 2010 stipulates that banks can no longer rely exclusively on ratings when making investment decisions. Thus, bank managers must conduct their own assessment of a securities credit risk and essentially validate ratings provided by Moody's, S&P, and Fitch, among others.

In general, the most marketable assets exhibit low default risk, short maturities, and large trading volume in the secondary market. Cash and due from banks is liquid in the sense that a bank needs clearing balances to process transactions on a daily basis. Without deposits at the Federal Reserve or other financial institutions, a bank could not conduct business. Banks normally minimize cash holdings because they do not earn interest. Only excess cash is truly liquid. This excess includes balances held above legal reserve requirements and the amounts required by correspondent banks for services. Cash balances can decline during any single day without presenting serious problems but must be quickly replenished to sustain operations. Thus, cash and due meets daily liquidity requirements, but banks rely on other assets for longer-term or permanent liquidity needs.

Federal funds and reverse RPs typically mature overnight and increase cash and due at maturity if they are not rolled over. The other securities exhibit low default risk and short maturities. Thus, they typically trade at prices close to par and if sold, have a negligible impact on noninterest income. Treasury obligations are backed by federal taxing authority and borrowing capability. U.S. agency securities are issued by quasi-public entities, such as the Federal Home Loan Mortgage Corporation and Federal Land Bank, and have a long history of low defaults. Liquid corporate and municipal securities are highly rated, investment-grade obligations (Baa rated and above) that are well known nationally. Other securities are similarly liquid if their current market value exceeds their book value. This results from management's willingness to sell securities at a gain, which adds to reported net income, but unwillingness to take losses. Finally, standardized loans such as credit card receivables may be liquid if a bank regularly packages and securitizes these assets.

Historically, banks and regulators focused on loan-to-deposit ratios. Because loans are relatively illiquid in general, the greater a bank's loan-to-deposit ratio, the lower the assumed liquidity. As discussed below, the key issue is whether loans generate cash inflows and exhibit high or low default risk.

Pledging Requirements. Not all of a financial institution's securities can be easily sold. Like their credit customers, banks are required to pledge collateral against certain types of borrowing. U.S. Treasuries or municipals normally constitute the least-cost collateral and, if pledged against a debt, cannot be sold until the bank removes the claim or substitutes other collateral. Collateral is required against four different liabilities: securities sold under agreement to repurchase, borrowing from Federal Reserve Banks at the discount window, public deposits owned by the U.S. Treasury or any state or municipal government unit, and FHLB advances. With public deposits, each depositor stipulates which assets qualify as collateral and what the pledging ratio is. For example, cities often stipulate that a local bank can pledge either U.S. Treasury securities or municipals against 100 percent of the city's uninsured deposits at the bank. Treasuries are valued at par, while A-rated or better in-state municipal securities are valued at 110 percent of par. A third-party trustee holds this collateral. Although these terms favor municipal securities, the bank can choose among its securities to pledge long-term bonds. Pledging requirements against RPs and discount window borrowing establish Treasury securities as preferred collateral against 100 percent of qualifying liabilities. The FHLB, in turn, requires banks to pledge real estate-related loans or securities as collateral against its advances. All pledged securities should be subtracted from the above list of liquid assets to obtain the dollar value of net liquid assets.

In summary, the best measures of asset liquidity identify the dollar amounts of unpledged liquid assets as a fraction of total assets. The greater the fraction, the greater the ability to sell assets to meet cash needs. Alternatively, liquid assets as a fraction of purchased liabilities conveys whether net liquidity sources are available from assets. In particular, this ratio should exceed unity indicating that if the bank experiences a run-off of all purchased funds, liquid assets will be sufficient to cover the cash loss.

Loans. Many banks and bank analysts monitor loan-to-deposit ratios as a general measure of liquidity. Loans are presumably the least liquid of assets, while deposits are the primary source of funds. A high ratio indicates illiquidity because a bank is fully loaned up relative to its stable funding. Implicitly, new loans or other asset purchases must be financed with large, purchased liabilities. A low ratio suggests that a bank has additional liquidity because it can grant new loans financed with stable deposits.

The loan-to-deposit ratio is not as meaningful as it first appears. It ignores the composition of loans and deposits. Some loans, such as dealer call loans and government-guaranteed credits, either mature soon or can be easily sold if needed. Others are longer term, with deferred payments, and can be sold only at a substantial discount. Two banks with identical deposits and loan-to-deposit ratios may have substantially different loan liquidity if one bank has highly marketable loans while the other has risky, long-term loans. An aggregate loan figure similarly ignores the timing of cash flows from interest and principal payments. Installment contracts generate cash faster than balloon notes, which defer the principal payment until maturity. The same is true for a bank's deposit base. Some deposits, such as long-term nonnegotiable time deposits, are more stable than others, so there is less risk of withdrawal. Aggregate ratios thus ignore the difference in composition of both assets and liabilities and their cash-flow characteristics.

Finally, loan-to-deposit ratios have generally increased recently with interest rate deregulation. Although ratios averaged 60 to 70 percent in the 1970s, many banks run ratios near 100 percent or more today. This increase results from the loss of demand

and savings deposits and the increased reliance on purchased funds. The corresponding pressure on net interest margins induces many banks to seek more loans, which offer the highest promised yields to maintain interest spreads. It is thus difficult to compare loan-to-deposit ratios over time.

Liability Liquidity Measures

Liability liquidity refers to the ease with which a bank can issue new debt to acquire clearing balances at reasonable costs. Measures typically reflect a bank's asset quality, capital base, and composition of outstanding deposits and other liabilities. The following ratios are commonly cited:

1. Total equity to total assets
2. Loans to deposits
3. Loan losses to net loans
4. Reserve for loan losses to net loans
5. The percentage composition of deposits
6. Total deposits to total assets
7. Core deposits to total assets
8. Federal funds purchased and RPs to total assets
9. Commercial paper and other short-term borrowings to total assets

A financial institution's ability to borrow at reasonable rates of interest is closely linked to the market's perception of asset quality. Institutions with high-quality assets and a large capital base can issue more debt at relatively low rates compared with peers. The reason is that investors believe there is little chance that such banks will fail. Thus, analysts focus on measures of loan quality and risk assets along with a bank's equity base when assessing future borrowing capabilities.

Banks with stable deposits such as transactions accounts, savings certificates, and non-negotiable time deposits generally have the same widespread access to borrowed funds at relatively low rates. Those that rely heavily on purchased funds, by contrast, must pay higher rates and experience greater volatility in the composition and average cost of liabilities. For this reason, most banks today compete aggressively for retail **core deposits**. It is well known that individuals exhibit considerable inertia in their choice of banks as long as they perceive that the bank offers quality, friendly service. The last five ratios listed above provide information regarding the breakdown of liabilities between core deposits and noncore, purchased liabilities.

One procedure for estimating the magnitude of stable, core deposits involves plotting total deposits against time and drawing a line through the low points in the graph. This base line represents core deposits equal to the minimum trend deposit level under which actual deposits never fall. Future stable, or core, deposits can be forecast by extending the base line on trend. **Volatile deposits** are noncore deposits equal to the difference between actual current deposits and the base estimate of core deposits. Implicitly, these are a bank's highly rate-sensitive deposits that customers withdraw as interest rates vary. A curved base line is used to emphasize the lack of growth in stable deposits. Many banks calculate liquidity ratios that use an estimate of volatile deposits as the base.

Many bankers and bank regulators also regularly examine a bank's net noncore funding dependency ratio (NCFD). This ratio compares a bank's noncore liabilities with its short-term assets as a fraction of long-term assets, which provides similar information as a nonfinancial firm's current ratio.

$$\text{NCFD} = \frac{\text{Noncore liabilities} - \text{Short-term assets}}{\text{Long-term assets}}$$

A large positive value indicates that the bank is relatively illiquid in the sense that its wholesale funding swamps its liquid short-term asset holdings. Small negative values are typical and not necessarily indicative of high risk. A negative value for NCFD indicates that the bank is highly liquid. Prior to the financial crisis, most banks operated with large negative NCFD ratios. Post-crisis they have adjusted their balance sheets to make NCFD more positive (less negative).

The real difficulty in managing liabilities is estimating the interest elasticity of different sources of funds. Management would like to know the quantity response to a change in the level of rates. For example, if interest rates increase by an average of 1 percent during the next six months, how much will demand deposits and NOW accounts change? Similarly, if a bank pays one-half of 1 percent more on CDs relative to competitors, how many new funds will it attract? Some information is available from historical relationships. Management can document the magnitude of disintermediation when interest rates rose in past years as an approximation of potential deposit losses, given expected rate changes. Management can also periodically conduct market tests of rate sensitivity by offering yield premiums on selected liabilities independently and observing the quantity response. These estimates are imprecise, however, and actual rate sensitivity can change quickly with economic conditions or changes in the public's evaluation of the bank's financial health. If the market perceives that a bank is not sound, most borrowing sources immediately dry up regardless of the rate premiums paid. In response, many banks aggressively solicit retail deposits using innovative marketing strategies because individuals are less sensitive to interest rates and the deposits are more stable.

Basel III and the Liquidity Coverage Ratio

In November 2013, the Board of Governors of the Federal Reserve, the FDIC, and OCC jointly proposed that internationally active banking organizations, defined as those with $250 billion or more in total assets or $10 billion or more in foreign exposure on balance sheet, meet a minimum liquidity requirement linked to holdings of liquid assets. The requirement will be effective in 2015.[11] The requirement does not formally apply to community banks, but many market participants believe that regulators will require all banks to hold much higher levels of liquid assets than they have historically held.

The requirement establishes a LCR measured as the ratio of an organization's HQLA to its projected net cash outflows over the next 30 days. The minimum value for each business day is one.

$$\text{LCR} = \frac{\text{High-Quality Liquid Assets}}{\text{Projected Net Cash Outflows}} > = 1.0$$

High-quality liquid assets are reserves at the Fed and qualifying securities that are unencumbered by liens and not pledged as collateral such that they can be quickly converted to cash with little or no loss in value. Projected net cash outflows are calculated assuming that certain amounts of deposits and other liabilities would flow out of an institution in a liquidity stress situation. Projected cash inflows over the same 30 days are subtracted to get

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[11] The proposal was part of an international agreement, labeled Basel III, to impose similar liquidity standards across financial institutions in industrialized countries. Each country's bank regulators recommend specific standards for firms in their jurisdictions, and these standards may differ. Basel III terms have been approved by U.S. bank regulators.

net cash outflows. Regulators specify a minimum value of one to force banks to have truly liquid assets at least equal to funding losses. This is analogous to a nonfinancial firm having a minimum current ratio (current assets divided by current liabilities) equal to one.

The objective of the LCR is to improve large organizations' liquidity risk management. During the financial crisis, many large investment banks and commercial banks relied extensively on short-term repos, brokered CDs, and commercial paper as permanent funding sources. With their large holdings of subprime loans, mortgage-backed securities and other CDOs that plummeted in value, they were unable to roll over much of this short-term, wholesale funding. As demonstrated previously, the Federal Reserve often stepped in and made large-dollar discount window loans or other creative loans to prevent these firms from failing. Forcing banks to hold more liquid assets reduces the likelihood that they will have to advance similar funding in the future. The obvious negative is that HQLA offer low yields such that from a profit perspective, these assets make it difficult for a bank to meet its return on equity targets.

Longer-Term Liquidity Planning

In addition to the LCR, banks also manage liquidity risk over periods longer than two weeks or 30 days. All banks, regardless of size, project cash inflows and outflows over 90 days, 180 days, one year, and beyond if necessary. The objective is to ensure that the bank does not face an unanticipated liquidity crisis.

ALCO members are responsible for forecasting deposit growth and loan demand and arranging for adequate liquidity sources to meet potential needs. Projections are generally separated into three categories: base trend, short-term seasonal, and cyclical values. The analysis assesses a bank's liquidity gap, measured as the difference between potential uses of funds and anticipated sources of funds, over monthly intervals. In practice, many large banks perform their analysis weekly. Deposit and loan data are aggregated to supply the calculations.

Exhibit 11.8 summarizes the basic procedure for projecting liquidity needs over a 12-month planning horizon. The sample bank's year-end balance sheet, which serves as the reference point in the planning model, is provided at the top. Total deposits and loans are forecast monthly during the year at the bottom, with the deposit forecast excluding CDs. The base trend forecast examines the regular annual growth component of deposits or loans. Deposits are expected to grow at a 6 percent annual rate and loans at 12 percent. These growth rates are calculated from historical data consistent with the drawing of a trend growth line through annual December figures, as described above. The estimates indicate what the monthly balances would equal if no seasonal or cyclical fluctuations existed and trend growth continued.

Seasonal influences net of trend are identified in the third column of data. Column 2 provides a seasonal index for each month relative to December totals. This index represents the average of the monthly figure relative to the average of the December figure over the past five years. Independent of trend, January deposits average 99 percent of December deposits, while January loans equal 101 percent of December loans. Column 3 lists the difference between the monthly seasonal estimate and the respective December deposit or loan figure. Finally, Column 4 measures cyclical deposits and loans as monthly deviations of the prior year's actual deposit or loan balance and the implied trend plus seasonal component. In this example, the January trend plus seasonal estimate for loans equaled $6 million less than the actual balance. This $6 million represents the next year's forecast of unanticipated cyclical loan needs. The final column lists the forecast of total deposits and total loans, respectively, equal to the sum of figures in Columns 1, 3, and 4.

EXHIBIT 11.8 Forecast of Trend, Seasonal, and Cyclical Components of Deposits and Loans

Reference Balance Sheet (Millions of Dollars)

Assets		Liabilities	
Cash and due from banks	$160	Transactions accounts and nonnegotiable deposits	$1,600
Loans	1,400	Certificates of deposit and other borrowing	280
Investment securities	400	Stockholders equity	120
Other assets	40	Total	$2,000
Total	$2,000		

Deposit Forecast End of Month	(1) Trend Deposits*	(2) Seasonal Deposit Index**	(3) Seasonal Deposits – December Deposits	(4) Cyclical Deposits	(5) Total
January	$1,608	99%	($16)	($3)	$1,589
February	1,616	102	32	8	1,656
March	1,623	105	80	7	1,710
April	1,631	107	112	10	1,753
May	1,639	101	16	1	1,656
June	1,647	96	–64	–8	1,575
July	1,655	93	–112	–15	1,528
August	1,663	95	–80	–9	1,574
September	1,671	97	–48	–4	1,619
October	1,680	101	16	0	1,696
November	1,688	104	64	3	1,755
December	1,696	100	0	0	1696

Loan Forecast

End of Month	Trend Loans*	Seasonal Loan Index**	Seasonal Loans – December Loans	Cyclical Loans	Total
January	$1,413	101%	$14	$6	$1,433
February	1,427	97	–42	–9	1,376
March	1,440	95	–70	–18	1,352
April	1,454	94	–84	–21	1,349
May	1,467	97	–42	–15	1,410
June	1,481	102	28	–3	1,506
July	1,495	108	112	9	1,616
August	1,510	106	84	17	1,611
September	1,524	103	42	11	1,577
October	1,538	99	–14	5	1,529
November	1,553	98	–28	0	1,525
December	1,568	100	0	0	1,568

*Growth trend for December to December averaged 6 percent for deposits and 12 percent for loans.

**Multiply by the preceding December figure.

EXHIBIT 11.9 Estimates of Liquidity Needs (Millions of Dollars)

End of Month	ΔDeposits*	ΔRequired Reserves	ΔLoans*	Liquidity Needs**
January	–$11.00	–$1.10	$33.00	$42.90
February	56.00	5.60	–24.00	–74.40
March	110.00	11.00	–48.00	–147.00
April	153.00	15.30	–51.00	–188.70
May	56.00	5.60	10.00	–40.40
June	–25.00	–2.50	106.00	128.50
July	–72.00	–7.20	216.00	280.80
August	–26.00	–2.60	211.00	234.40
September	19.00	1.90	177.00	159.90
October	96.00	9.60	129.00	42.60
November	155.00	15.50	125.00	–14.50
December	96.00	9.60	168.00	81.60

*ΔDeposits equals the difference in the end-of-year balance sheet figure ($1,600) and the monthly total forecast from ΔLoans equals the difference in the end-of-year balance sheet figure ($1,400) and the monthly total forecast from .

**Estimates of liquidity needs equal the change in loans plus change in required reserves minus the change in deposits. The reserve ratio equals 10 percent. A positive figure represents a shortage, while a negative figure means the bank has surplus funds to invest.

Exhibit 11.9 presents summary estimates of monthly liquidity needs. The cumulative liquidity needed equals the forecast change in loans plus required reserves minus the forecast change in deposits.

$$\text{Liquidity needs} = \text{Forecasted } \Delta\text{loans} + \Delta\text{required reserves} - \text{forecasted } \Delta\text{deposits}$$

A positive figure means the bank needs additional liquid funds. A negative figure suggests that the bank will have surplus funds to invest.

Although this analysis is somewhat general, it can be used to identify longer-term trends in fund flows. In practice, forecasts are prepared for each distinct deposit account and loan category, then summed to yield a total estimate. This allows management to incorporate different trend and seasonal patterns for demand deposits, NOWs, and MMDAs, and thus reduce the aggregate forecast error. For example, demand deposit growth has slowed in recent years while the growth in MMDAs, IRAs, and other deposits has accelerated. Separate estimates capture this diverse behavior.

Management can supplement this analysis by including projected changes in purchased funds and investments with specific loan and deposit flows. One procedure is to calculate a liquidity gap measure over different time intervals. This format is comparable to the interest-rate-risk funding GAP analysis introduced in Chapter 7. It begins by classifying potential uses and sources of funds into separate time frames according to their cash-flow characteristics. The liquidity gap for each interval equals the dollar value of uses of funds minus the dollar value of sources of funds.

Exhibit 11.10 demonstrates this format for a hypothetical bank. By using specific account information, managers can trace the source of any significant outflow or inflow and take remedial action. Consider the data representing the next 30 days for the hypothetical bank. The bank has $50 million in maturing CDs and Eurodollars and $5.5 million in small time deposits that mature. It expects to fund $113 million in new loans and see transactions accounts fall by $4.5 million for a total $173 million in uses. Expected sources of funds include $18 million in maturing securities and $80 million in loan principal

EXHIBIT 11.10 Liquidity Gap Estimates (Millions of Dollars)

	Time Frame		
	0 to 30 Days	31 to 90 Days	91 to 365 Days
Potential Uses of Funds			
Add: Maturing time deposits			
Small time deposits	$5.5	$8	$34
Certificates of deposit over $100,000	40	70	100
Eurodollar deposits	10	10	30
Plus: Forecast new loans			
Commercial loans	60	112	686
Consumer loans	22	46	210
Real estate and other loans	31	23	223
Minus: Forecast net change in transactions accounts*			
Demand deposits	–6.5	105.5	10
NOW accounts	0.4	5.5	7
Money market deposit accounts	1.6	3	6
Total uses	$173	$155	$1,260
Potential Sources of Funds			
Add: Maturing investments			
Money market instruments	$8	$16.5	$36.5
U.S. Treasury and agency securities	7.5	10.5	40
Municipal securities	2.5	1	12.5
Plus: Principal payments on loans	80	262	903
Total sources	98	290	992
Periodic Liquidity Gap**	**$75**	**–$135**	**$268**
Cumulative Liquidity Gap	**$75**	**–$60**	**$208**

*Net of required reserves

**Potential uses of funds minus potential sources of funds.

payments. The liquidity gap for the next 30 days thus equals $75 million. The bank needs to replace the maturing CDs and Eurodollars plus find an additional $25 million in liquid funds to finance this loan growth.

Comparable figures for 31 to 90 days out and 91 to 365 days out are also shown in the exhibit. The cumulative gap summarizes the total liquidity position from the present to the farthest day within each time interval. The bank expects to experience a liquidity surplus two to three months out and a $208 million liquidity shortage for the entire year.

Once normal liquidity needs are forecast, a bank should compare the estimates with potential funding sources and extraordinary funds needs. One researcher introduced a simple format, modified as Exhibit 11.11, that requires each bank to project its borrowing capacity via federal funds purchased, RPs, and unused CDs, and combine it with funds available from reducing federal funds sold and selling loan participations, money market securities, and unpledged securities.[12] This total is then compared with potential

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[12] See Temple (1983).

EXHIBIT 11.11 **Potential Funding Sources (Millions of Dollars)**

	Time Frame		
	0 to 30 Days	**31 to 90 Days**	**91 to 365 Days**
Purchased Funds Capacity			
Federal funds purchased (overnight and term)	$20	$20	$30
Repurchase agreements	10	10	10
Negotiable certificates of deposit			
Local	50	50	60
National	20	20	25
Eurodollar certificates of deposit	20	20	20
Total	$120	$120	$145
Additional Funding Sources			
Reductions in federal funds sold	$5	$5	$5
Loan participations	20	20	20
Sale of money market securities	5	5	5
Sale of unpledged securities	10	10	10
Total	$40	$40	$40
Potential Funding Sources*	$160	$160	$185
Potential extraordinary funding needs			
50% of outstanding letters of credit	5	10	15
20% of unfunded loan commitments	25	30	35
Total	$30	$40	$50
Excess Potential Funding Sources	$130	$120	$135

*Purchased funds capacity plus additional funding sources.

draws against unused loan commitments and letters of credit. Of course, no bank wants to utilize its borrowing capacity fully or sell all of its available assets. It should always leave some potential funding available for extraordinary events.

Applying the data from Exhibit 11.11 to the 30-day gap in Exhibit 11.10, the sample bank has considerable flexibility in meeting its liquidity need. First, it could simply replace the maturing CDs and Eurodollars with similar borrowings, for which it has an estimated $90 million capacity. Second, the bank could borrow via federal funds or RPs, eliminate federal funds sold, and make up the difference with new CDs. The best alternative is the one with the lowest cost. In general, large banks prefer to borrow rather than liquidate assets, while small banks sell assets or restrict growth. The best use of this information is to conduct "what-if" analyses to determine the cost implications of various alternatives and assess how much flexibility management has in adjusting its cash position. Large banks with international operations should perform this liquidity analysis in each currency in which they operate since their liquidity position might vary by currency.

Considerations in the Selection of Liquidity Sources

Managers need to carefully assess their institution's funding alternatives in both normal and crisis times. For most depository institutions, loan growth exceeds deposit growth net of CDs and Eurodollars. In the short run, banks have the option of financing this net growth either by selling securities or obtaining new deposits. In the long run, this net growth must be financed out of purchased liabilities because banks own a limited amount of securities. Yet many banks have limited access to new purchased funds because they are small with no market reputation, or they have exhausted their borrowing capacity in terms of their capital base and earnings potential. There are two possible solutions to this dilemma. Management can either restrict asset growth or seek additional core deposits or equity. Regulatory actions to raise bank capital requirements, discussed in Chapter 12, have the beneficial side effect of improving access to the money and capital markets.

Banks with options for meeting liquidity needs evaluate the characteristics of various sources to minimize costs. The following factors should be considered when evaluating asset sales or new borrowings:

Asset Sales	New Borrowings
1. Brokerage fees	1. Brokerage fees
2. Securities gains or losses	2. Required reserves
3. Foregone interest income	3. FDIC insurance premiums
4. Any increase or decrease in taxes	4. Promotion costs
5. Any increase or decrease in interest receipts	5. Interest expense
6. Ease of use as collateral against future borrowings	

The costs should be evaluated in present-value terms because interest income and interest expense may arise over substantially different time periods. The choice of one source over another often involves an implicit interest rate forecast.

Suppose, for example, that a bank temporarily needs funds for six months. Management has decided to sell $1 million of Treasuries from the bank's portfolio. The choice is between securities with either one year or five years remaining to maturity. Both securities sell at par and earn 5.5 percent annually. If the bank sells the one-year security, it implicitly assumes that the level of short-term Treasury rates is going to fall far enough below 5.5 percent so that any eventual reinvestment of funds would yield less than that on a five-year security. If the bank sells the five-year bond, it assumes that the level of short-term rates will rise above 5.5 percent, on average.

Suppose, instead, that the bank decides to issue either a six-month CD or a one-month CD. Clearly, the six-month CD locks in interest expense and requires only one transaction. A one-month CD will need to be rolled over, with uncertain future interest expense. Transactions costs will also be higher. The rationale for issuing any shorter-term CD can only be that the present value of expected interest expense plus transactions costs will be lower with this alternative.[13]

Contingency Funding Plans

Financial institutions must have carefully designed contingency funding plans that address strategies for handling unexpected liquidity crises and outline the appropriate procedures for dealing with liquidity shortfalls occurring under abnormal, stress conditions. Emergencies can be either short-term or long-term and stem from many sources.

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[13] The yield curve incorporates both liquidity premiums and interest rate expectations. Thus, one-month yields at 5 percent and six-month yields at 5.2 percent signify that traders expect one-month rates to increase. By issuing a one-month security, the borrower implicitly assumes that rates will not increase as much as what is implied by the yield curve.

Major hurricanes on the Texas and Louisiana coast in 2002 created a cash crisis for several banks because they physically ran short of cash in their branches or ATMs. The problem that many depository institutions had during that time was their limited ability to physically access their branches or ATMs. Other liquidity crises often result from economic or market forces. A bank that suffers credit quality problems, for example, might face a

CONTEMPORARY ISSUES

Bank Runs Still Occur During Crises Periods

Northern Rock: Headquartered in the U.K., Northern Rock was a mortgage lender that relied heavily on short-term wholesale funding, such as commercial paper, rather than core retail deposits. Such a balance sheet allowed the bank to generate a higher net interest margin and grow at high rates, but also subjected the bank to significant liquidity risk. In August 2007, investors in commercial paper and similar instruments started refusing to reinvest maturing instruments, so that the markets froze. By September 2007, Northern Rock could not access other borrowings, and management turned to the Bank of England for an emergency loan. Retail depositors, fearing the loss of their funds if the bank failed, lined up outside Northern Rock branches demanding to withdraw their funds. Unable to find a buyer for Northern Rock, the British government nationalized the bank, causing government (taxpayers) to assume the subsequent losses.

Bear Stearns: In 2008, Bear Stearns was an investment bank that operated with high financial leverage (over 30 x) and had accumulated a large portfolio of real estate-related assets. Significant funding came in the form of repos and deposits held by hedge funds in Bear Stearns' prime brokerage unit. On March 10, the hedge funds and repo holders aggressively pulled their funding, forcing Bear Stearns to sell assets and look elsewhere for borrowed funds. Conveniently, the Federal Reserve provided a temporary bridge loan to JPMorgan Chase which allowed it to buy Bear Stearns at $2 per share, down from $65 per share just one week prior. The combination of poor asset quality, high debt with limited equity, and the loss of confidence in key lenders produced a run. In April 2008, SEC Chairman Christopher Cox told the Senate Banking Committee that "the Bear Stearns experience has challenged the measurement of liquidity in every regulatory approach, not only here in the United States but around the world."[14] Even though Bear Stearns was an investment bank and not a depository institution, the massive run it experienced was similar to a deposit run at a commercial bank signaling that runs occur on liabilities other than traditional bank deposits.

IndyMac: In July 2008, a massive run on deposits at Pasadena, California, based IndyMac forced the FDIC to close the bank before the regulators originally planned. IndyMac was a mortgage lender that specialized in Alt-A mortgages and reverse mortgages. Underwriters for Alt-A mortgages, also labeled low-doc or no-doc mortgages, did not require borrowers to disclose much personal financial information other than that necessary to obtain a credit score. Thus, borrowers could state their own income without any verification required, allowing them to choose a large enough figure to "qualify" for the loan. Reverse mortgages allow mortgage borrowers to convert equity in a home to cash, requiring IndyMac to advance cash for such contracts. With the collapse in home values, IndyMac couldn't generate sufficient cash flows to service debts—hence the run by depositors. In May 2008, Senator Charles Schumer of New York publicized a letter stating, "IndyMac could face a failure." Over the next 11 days, depositors withdrew $1.3 billion. Just prior to its failure, IndyMac reported total assets of $32 billion and deposits of $19 billion. In a March 2009 press release announcing the sale of IndyMac, the FDIC estimated the failure's cost to the FDIC insurance fund at $10.7 billion.

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[14] From *Testimony Concerning Recent Events in the Credit Markets,* Chairman Christopher Cox, U.S. Securities and Exchange Commission, before the U.S. Senate Committee on Banking, Housing and Urban Affairs, April 3, 2008, www.sec.gov/news/testimony/2008/ts040308cc.htm.

significant deposit outflow as customers become concerned about the safety of their deposits. This was demonstrated by runs on Northern Rock, IndyMac, and Bear Stearns during the early stages of the recent financial crisis as described in the Contemporary Issues box on previous page. Regulators now require every institution to formally prepare a contingency funding plan (CFP) that will document the bank's approach to managing potential liquidity needs during stress periods of increasingly severe magnitudes.

Contingency Planning

A financial institution's ability to withstand, in a timely and cost-effective manner, both temporary and longer-term disruptions in funding can be the difference between survival and failure. To address this, depository institutions establish formal contingency funding plans that are based on a clear strategy to provide access to liquid funds in times of stress. In addition to balance sheet and off-balance sheet actions, the plans identify key individuals responsible for taking action and the timely flow of information throughout the organization even when times are good. A CFP is a written plan that describes specific actions that a bank should take in response to different adverse situations. A meaningful plan should include the following:

1. A narrative section that addresses the senior officers who are responsible for dealing with external constituencies (regulators, the media, and organizations that provide funding); internal and external reporting requirements; and the types of events that trigger specific funding needs.
2. A quantitative section that assesses the impact of potential adverse events on the institution's balance sheet (changes); incorporates the timing of such events by assigning deposit and wholesale funding run-off rates; identifies potential sources of new funds; and forecasts the associated cash flows across numerous short-term and long-term scenarios and time intervals. The scenarios should include a wide range of potential internal crises (such as unanticipated deposit losses) as well as external crises (such as the global anxieties associated with events like the Sept. 11, 2001, attacks on the World Trade Center).
3. A section that summarizes the key risks and potential sources of funding; identifies how the modeling will monitored and tested; and establishes relevant policy limits.

The institution's liquidity contingency strategy should clearly outline the actions needed to provide the necessary liquidity. Often this will mean selling certain assets, or issuing liabilities at less-than-favorable prices. The institution's plan must consider the cost of changing its asset or liability structure versus the cost of facing a liquidity deficit. The contingency plan should prioritize which assets would have to be sold in the event that a crisis intensifies. The institution's relationship with its liability holders, which is critical, should also be factored into the contingency strategy. These relationships must be well maintained during periods of normal activity so that the institution is in a better position to obtain any necessary funds during less-than-optimal conditions.

The institution's plan should also provide for back-up liquidity. These back-up lines of credit include those from the Federal Reserve Bank and unused credit facilities from other financial institutions. A plan must have specific action steps and establish lines of authority in decision making. Finally, the plan should be approved by the institution's board of directors.

One reason contingency liquidity planning is difficult is because when the plan is being made, the probability of needing emergency sources of liquidity seems remote. Management must continually assess the possibility that crises may arise, perceived and real, so that the bank is always positioned to access funds.

Summary

This chapter focuses on the management of liquidity risk at financial institutions. It introduces different types of cash and liquid assets, briefly outlines their characteristics, then explores the reasons why depository institutions hold each type and how the magnitudes of each can be minimized. Liquid assets generally include federal funds sold and RPs, short-term unpledged Treasury and other highly marketable securities, and loans that can be readily sold at predictable prices. Their primary advantage over cash is that they earn interest. Liquidity planning is an ongoing part of a good asset and liability management strategy. In the short run, liquidity planning focuses on meeting legal reserve requirements. It specifically involves monitoring net deposit outflows and inflows and deciding how to finance deficiencies or invest excess funds. Financial firms manage their cash position to minimize required holdings because cash assets do not generate interest income. Vault cash is held to meet customer transactions needs. Depository institutions hold demand deposit balances at the Federal Reserve and other financial institutions to meet the Federal Reserve's legal reserve requirements and to purchase services such as check clearing. Float, or checks in the process of collection, is a natural by-product of the check-clearing process.

The last part of the chapter examines two different stages of liquidity planning. The first focuses on the management of a bank's required reserve position over the two-week maintenance period. The second analyzes monthly liquidity gaps as measures of liquidity risk throughout the next year. A bank's liquidity gap measures the difference between the dollar value of expected cash outflows and expected cash inflows within a given time interval. Positive liquidity gaps indicate a net liquidity need, while negative liquidity gaps indicate surplus investable funds. Planning models for each stage of analysis are applied to a hypothetical bank's data. Finally, in response to regulatory concerns regarding the availability of liquidity in a crisis, banks must now establish formal contingency funding plans. The last section describes the basic features of such plans and their importance in helping meet liquidity needs in times of unanticipated adverse events.

Questions

1. The determination of cash requirements is closely associated with a bank's liquidity requirements. Explain why.
2. What are the advantages and disadvantages of a bank holding more cash? What are the advantages and disadvantages of large banks having to meet minimum LCR requirements?
3. Monetary theory examines the role of excess reserves (actual reserves minus required reserves) in influencing economic activity and Federal Reserve monetary policy. Viewed in the context of a single bank, excess reserves are difficult to measure. Explain what amount of a bank's actual reserve assets are excess reserves during any single day in the reserve maintenance period under lagged reserve accounting.
4. Which of the following activities will affect a bank's required reserves?
   a. The local Girl Scout troop collects coins and currency to buy a new camping stove. The troop deposits $250 in coins and opens a small time deposit.
   b. You decide to move $200 from your MMDA to your NOW account.
   c. You sell your car to the teller at your bank for $5,000. The teller pays with a check drawn on the bank, and you deposit the check immediately into your checking account at the bank.

   d. The local university takes one-half of the fall tuition receipts and buys a three-month CD.
   e. Ford Motor Company opens an assembly plant outside town and opens a checking account at the local bank for $100,000 with a check drawn on its bank in Detroit.

5. What is the difference between a correspondent, respondent, and bankers' bank?
6. A corporate customer borrows $150,000 against the firm's credit line at a local bank. Indicate with a T-account how the transaction will affect the bank's deposit balances held at the Federal Reserve when the firm spends the proceeds.
7. Liquidity planning requires monitoring deposit outflows. In each of the following situations, which of the outflows are discretionary and which are not? If the outflow is not discretionary, is it predictable or unexpected?
   a. In April, a farmer draws down his line of credit in order to purchase seed.
   b. Students borrow to pay fall tuition.
   c. The bank makes a preferred stock dividend payment.
   d. A fire destroys a portion of the local business district, and many firms apply for reconstruction loans.
   e. The bank pays rent on its offices.
   f. On the Friday before the citywide festival, all ATMs in town have been drained of cash.
   g. A New York bank has just opened a local banking office and is offering a VCR to anyone who transfers funds from a CD at another bank.
   h. The bank buys most of the newly issued local municipal securities.
8. Your bank's estimated liquidity gap over the next 90 days equals $180 million. You estimate that projected funding sources over the same 90 days will equal only $150 million. What planning and policy requirements does this impose on your $3 billion bank?
9. What are the conceptual differences between the trend, seasonal, and cyclical components of a bank's loans and deposits? Discuss why a bank should examine each component rather than simply look at total loans and deposits.
10. What are the key components of a bank's contingency funding plan? What are the differences between the narrative section and the quantitative section?
11. Assume that a bank expects to access each of the following sources of funds in the event of an unanticipated liquidity need. In what situations might the counterparty not supply the promised funding?
    a. $5 million federal funds line with a large regional bank
    b. $10 million borrowing capacity, given existing collateral, with the FHLB of Des Moines
    c. Sale of $20 million of mortgage-backed securities
12. Explain the role that the Federal Reserve played in providing loans to financial institutions during the financial crisis of 2007–2010.
13. What does the acronym TBTF refer to in banking terminology? Provide an example of a TBTF firm indicating what makes it TBTF.

Activity

Calculation of Required Reserves. At the close of business on Wednesday, Gene Wandling was reviewing whether Hawkeye National Bank was successful in meeting its legal reserve requirements at the Federal Reserve. The bank had just completed the two-week reserve maintenance period, during which it held a daily average of $238 million in reserve deposits with the Federal Reserve. The bank had a daily average reserve deficiency the previous maintenance period of $3.75 million, which was within the allowable limit.

Hawkeye National Bank's daily average net transactions accounts for the base computation period along with balances for selected assets are listed below.

Daily Average (Millions of Dollars)	
Net transactions accounts	$3,257
Demand deposits due from U.S. depository institutions	366
Cash items in process of collection	181

Hawkeye National Bank could use daily average vault cash holdings of $19.3 million to offset its reserve requirement. Using the reserve percentages from Exhibit 11.3, calculate the bank's daily average required reserve holdings during the maintenance period. Did Hawkeye meet its reserve target? If the bank had carried forward a daily reserve surplus of $2.1 million instead of a deficiency, would it have met its target? What are the costs to a bank if its reserves fall outside the target range?

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12

The Effective Use of Capital

In the early 1990s, the Federal Reserve Board of Governors (Fed), Federal Deposit Insurance Corporation (FDIC), and Office of the Comptroller of the Currency (OCC) imposed minimum risk-based capital (RBC) standards to help control commercial bank risk taking. These RBC standards required higher levels of capital against higher-risk bank assets. Thus, banks with more risky loans were required to operate with more capital. The Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA) established a system of prompt regulatory action with sanctions for undercapitalized institutions. These requirements mandated specific regulatory responses, including bank closures where appropriate, for institutions whose capital fell short of regulatory minimums.

Unfortunately, during the recent financial crisis, many banks found themselves in need of additional capital at a time when the markets did not allow equity issues. In 2008, Congress passed the Troubled Asset Relief Program (TARP) with the intended purpose of purchasing distressed assets from financial institutions. In November 2008, Treasury Secretary Paulson stated that the original purpose of purchasing assets was not the most effective use of TARP funds and created the Capital Purchase Program (TARP-CPP) in which the Treasury would take senior preferred stock positions in financial companies. This senior preferred stock would count as Tier 1 capital, the gold standard in a financial institution's capital. The cost of the preferred stock was 5 percent per annum (dividend rate) plus warrants. After five years, the dividend rate increased to 9 percent. This unprecedented capital injection by the federal government dramatically changed the face of the industry. Congress's original intention was that these funds would allow financial institutions to replace capital lost due to loan and trading losses and begin to free up credit. Near the end of 2008, however, most financial institutions that participated in the TARP-CPP used the funds to acquire other financial institutions or possibly to hoard cash. Those that were able to buy back the preferred stock did so as soon as possible. Many problem banks still have costly TARP preferred stock outstanding that is now paying 9 percent.

In 2004, the Basel Committee on Bank Supervision, with U.S. bank regulators' endorsement, proposed new capital standards with an implementation date of 2007. These capital standards were revised by U.S. regulators in July 2013, which will have the effect of increasing required equity capital beginning in 2015. These Basel III standards are discussed later in the chapter.

Why Worry about Bank Capital?

Capital plays a significant role in the risk-return trade-off at banks. Increasing capital reduces risk by cushioning the volatility of earnings, restricting growth opportunities, and lowering the probability of bank failure. It also reduces expected returns to shareholders, as equity is more expensive than debt. Decreasing capital increases risk by increasing financial leverage and the probability of failure. Not surprisingly, it also increases potential returns. The fundamental decision regarding capital thus focuses on how much capital is optimal. Firms with greater capital can borrow at lower rates, make larger loans, and expand faster through acquisitions or internal growth. In general, they can pursue riskier investments. A second important decision concerns the form in which new capital is obtained, because regulators allow certain types of debt and preferred stock to qualify as capital to meet the requirements. These decisions are examined in this chapter in light of the regulatory definition of capital, its function, and its cost. The chapter also describes the nature of the new Basel III capital requirements and possible market impacts.

Bank regulators' primary objective is to ensure the safety and soundness of the U.S. financial system. A serious concern is that failures of individual banks, particularly large institutions, might erode public confidence in the financial system and lead to frozen markets in which transactions cannot be completed. The federal government attempts to limit the magnitude and scope of bank failures and ensure confidence by setting and enforcing regulations and by imposing minimum capital requirements for individual banks. Banks meet the requirements when they obtain an acceptable amount of financing in the form of qualifying equity capital and related long-term debt sources. Such capital requirements reduce the risk of failure by acting as a cushion against losses, providing access to financial markets to meet liquidity needs, and by limiting growth.

Bank supervision has reached the point where regulators now specify minimum amounts of equity and other qualifying capital that banks must obtain to continue operations.[1] Historically, regulators stipulated minimum capital-to-total-asset ratios but did not worry about the quality of bank assets. While bank capital-to-asset ratios averaged near 20 percent at the turn of the century, comparable ratios today are closer to 8–10 percent. Recent equity-to-asset ratios for commercial banks and savings institutions appear in Exhibit 12.1. Note that these ratios are much higher in 2013 versus 2007, the year just prior to the worst of the financial crisis, for all but the smallest banks. The decline at institutions under $100 million in assets demonstrates the problems that small community banks face in exiting the recession. Still, the ratios are highest for institutions with less than $100 million in assets in both years. Finally, the equity ratios are higher for savings institutions versus similar-size commercial banks, reflecting in part, the high capital ratios at mutual savings banks.

Under the old capital regulation, two banks of the same size would have to operate with the same amount of capital, independent of their risk profiles. Specifically, it did not matter what type of assets a bank held, because the same percentage requirement applied to all assets equally. Thus, a bank that held only Treasury securities needed the same amount of capital as the same-sized bank that held speculative real estate loans. Does this seem reasonable? The answer depends on the role that capital serves and how regulators want to control bank risk.

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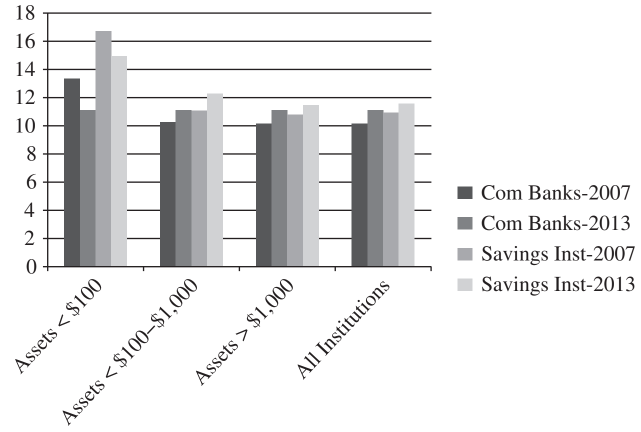
[1] The International Lending Supervision Act of 1983 empowered the Fed, FDIC, OCC, and Federal Home Loan Bank Board to mandate legally binding minimum capital requirements. Most banks acceded to prior guidelines even though the legal requirement did not exist.

EXHIBIT 12.1 **Equity to Asset Ratios for Different Size Commercial Banks and Savings Institutions: December 2007 versus December 2013**



All figures are in millions of dollars.

Capital-to-asset ratios at commercial banks and savings banks are below similar ratios at other types of financial institutions and well below capital ratios at nonfinancial businesses. This difference reflects the intermediation function of depository institutions and thus is not remarkable. High financial leverage, however, increases the relative riskiness of operations by providing less protection to creditors upon liquidation of the firm. Bankers also recognize that high leverage increases potential profitability, so they often attempt to minimize external equity financing. Regulators, by contrast, want to increase bank equity financing and focus on balancing solvency risks with an individual bank's profit potential.

This chapter introduces the risk-based capital requirements that banks have been subject to since the end of 1992. It then examines the functions of bank capital and its impact on commercial bank operations. The chapter addresses the following issues: (1) What constitutes bank capital? (2) What functions do capital accounts serve? (3) How much capital is adequate? (4) What is the impact of regulatory capital requirements on bank operating policies? (5) What are the advantages and disadvantages of various sources of internal and external capital?

These issues are important because federal regulators appear intent on raising or maintaining high capital standards for banks and other institutions over time. The last section describes the framework for the new Basel III capital standards.

Risk-Based Capital Standards

Prior to the mid-1980s, bank capital requirements were generally established without regard to a bank's asset quality, liquidity risk, interest rate risk, operational risk, and related risks. Thus, when banks fell under pressure to increase earnings, capital requirements imposed no constraints to risk taking other than limiting growth. Bank regulators did force banks to have more capital than the minimums when they perceived bank risk to be excessive, but this determination often occurred long after management made risky investment decisions.

The 1986 Basel Agreement

In 1986, U.S. bank regulators proposed that commercial banks be required to maintain minimum amounts of capital that reflect the riskiness of their assets. By the time it was implemented, the proposal, known as the Basel Agreement, included RBC standards for banks in 12 industrialized nations. U.S. bank regulators phased in the requirements starting in 1990, with the regulations fully in place by the end of 1992. Importantly, countries that are members of the Organization for Economic Cooperation and Development (OECD) attempt to enforce similar risk-based requirements on their home country financial institutions.

Although the terms varied between nations, primarily in terms of what constitutes capital, the original Basel Agreement contained several important elements. First, a bank's minimum capital requirement is linked, by formula, to its credit risk as determined by the composition of assets. The greater the credit risk, the greater the required capital. Second, stockholders equity is deemed the most critical type of capital. As such, each bank is expected to operate with a minimum amount of equity based on the amount of credit risk. Third, the minimum total capital requirement increased to 8 percent of risk-adjusted assets. Finally, the capital requirements were approximately standardized between countries to "level the playing field," that is, to remove competitive advantages that banks in one country might have over banks in other countries because of regulatory or accounting differences.

Risk-Based Elements of Basel I

To determine minimum capital requirements for a bank under the general RBC requirement of Basel I, bank managers follow a four-step process.

1. Classify assets into one of four risk categories, appropriate to the obligor, collateral, or guarantor of the asset.
2. Convert off-balance sheet commitments and guarantees to their on-balance sheet "credit equivalent" values and classify them in the appropriate risk categories.[2]
3. Multiply the dollar amount of assets in each risk category by the appropriate risk weight; this product equals risk-weighted assets.
4. For a U.S. bank to be adequately capitalized, multiply risk-weighted assets by the minimum capital percentages, either 4 percent for Tier 1 capital or 8 percent for total capital.

The process ensures that assets with the highest perceived credit risk have the highest risk weights and require the most capital. In addition to these credit risk-based standards, the Fed, FDIC, and OCC adopted measures related to the supervisory treatment of interest rate risk and market risk capital requirements, which are described in general later in the chapter.

Consider the data in Exhibit 12.2 for Regional National Bank (RNB). As indicated in the first column of data, total assets for the bank were just under \$5 billion, and the bank had almost \$656 million in off-balance sheet items. Under the former capital standards, RNB would have needed 6 percent total capital or approximately \$299.7 million (0.06 × \$4,994,849) in primary and secondary capital. The exhibit demonstrates that the RBC requirements are slightly higher for total capital.

Exhibit 12.3 lists the four risk categories and the general types of assets that fall into each category for RNB. Exhibit 12.4 demonstrates the application of Step 2, above, which

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[2] Banks were required to hold capital against off-balance sheet activities long before the Enron collapse.

EXHIBIT 12.2 **Regional National Bank (RNB), Risk-Based Capital (Millions of Dollars)**

	Assets $1,000	Risk Weight	Risk-Weighted Assets
Category 1: Zero percent			
Cash and reserve	104,525	0.00%	0
Trading Account	830	0.00%	0
U.S. Treasury and agency securities	45,882	0.00%	0
Federal Reserve stock	5,916	0.00%	0
Total Category 1	157,153		0
Category 2: 20 percent			
Due from banks/in process	303,610	20.00%	60,722
Interest-bearing depository/F.F.S.	497,623	20.00%	99,525
Domestic depository institutions	38,171	20.00%	7,634
Repurchase agreements (U.S. Treasury and agency)	329,309	20.00%	65,862
U.S. agencies (government sponsored)	412,100	20.00%	82,420
State and municipal's secured tax authority	87,515	20.00%	17,503
C.M.O. backed by agency securities	90,020	20.00%	18,004
SBAs (government-guaranteed portion)	29,266	20.00%	5,853
Other Category 2 assets	0	20.00%	0
Total Category 2	1,787,614		357,523
Category 3: 50 percent			
C.M.O. backed by mortgage loans	10,000	50.00%	5,000
State and municipals/all other	68,514	50.00%	34,257
Real estate: 1–4 family	324,422	50.00%	162,211
Other Category 3 assets	0	50.00%	0
Total Category 3	402,936		201,468
Category 4: 100 percent			
Loans: commercial/agency/institution/leases	1,966,276	100.00%	1,966,276
Real estate, all other	388,456	100.00%	388,456
Allowance for loan and lease losses	(70,505)	0.00%	0
Other investments	168,519	100.00%	168,519
Premises, equity other assets	194,400	100.00%	194,400
Other Category 4 assets	0	100.00%	0
Total Category 4	2,647,146		2,717,651
Total assets before off-balance sheet	4,994,849		3,276,642
Off-balance sheet contingencies			
0% collateral category	0	0.00%	0
20% collateral category	0	20.00%	0
50% collateral category	364,920	50.00%	182,460
100% collateral category	290,905	100.00%	290,905
Total contingencies	655,825		473,365
Total assets and contingencies before allowance for loan and lease losses and ATR	5,650,674		3,750,007
Less: Excess allowance for loan and lease losses			(2,152)
Total assets and contingencies	$5,650,674		$3,747,855
Capital requirements			
Tier I @ 4%	$199,794	4.00%	$149,914
Total capital @ 8%	399,588	8.00%	299,828

EXHIBIT 12.3 General Description of Assets in Each of the Four Risk Categories

Asset Category	Risk Weight	Effective Total Capital Requirement*	Obligor, Collateral, or Guarantor of the Asset
1	0%	0%	Generally, direct obligations of OECD central government or the U.S. federal government (e.g., currency and coin, government securities, and unconditional government-guaranteed claims). Also, balances due or guaranteed by depository institutions.
2	20%	1.6%	Generally, indirect obligations of OECD central government or the U.S. federal government (e.g., most federal agency securities, full faith and credit municipal securities, and domestic depository institutions). Also, assets collateralized by federal government obligations are generally included in this category (e.g., repurchase agreements [when Treasuries serve as collateral] and CMOs backed by government agency securities.)
3	50%	4%	Generally, loans secured by 1–4 family properties and municipal bonds secured by revenues of a specific project (revenue bonds).
4	100%	8%	All other claims on private borrowers (e.g., most bank loans, premises, and other assets).

*Equals 8 percent of equivalent risk-weighted assets and represents the minimum requirement that must be met to be adequately capitalized.

involves converting off-balance sheet activity into a balance sheet equivalent value. Exhibit 12.5 provides a summary list of the balance sheet items in each category. Note that the lowest-risk category carries a zero weight because there is no default risk (or very little) with direct obligations of the federal government, such as cash, Treasury securities, and U.S. agency securities issued by the Government National Mortgage Association (GNMA).[3] Default risk is assumed to increase for assets in each of the subsequent categories. Thus, assets in Category 2 are subject to a 20 percent risk weight and an *effective* total capital-to-total-assets ratio of 1.6 percent (0.2 × 8 percent). Category 2 assets are short-term and often carry U.S. government agency guarantees (e.g., U.S. agency securities, general obligation municipal bonds, interest-bearing depository institution deposits, and federal funds sold, among other assets). Each type is low in default risk so that the risk weight is slightly above that for zero default-risk assets. First mortgages, collateralized mortgage obligations (CMOs), and municipal revenue bonds constitute the bulk of the 50 percent risk-weighted assets under Category 3, which carry a 4 percent effective total capital ratio (0.5 × 8 percent). The final category includes assets with the highest default risk, such as commercial loans and real estate loans other than first mortgages, and thus these assets carry a risk weight of 100 percent.

An important element of the general risk-based standards is that a bank's off-balance sheet items must be supported by capital. A bank that exposes its operations to risk by making long-term loan commitments, offering letter-of-credit guarantees, and participating in interest rate swaps and forward or futures transactions must hold capital against the exposure. Management first converts the dollar value of each off-balance sheet item to an on-balance sheet *credit equivalent* amount, as indicated in the third column of Exhibit 12.4, using the conversion factors shown in Exhibit 12.6. The converted credit equivalent amount is then assigned to the appropriate risk category, based on the

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[3] For RNB, trading account securities consist solely of U.S. Treasury securities.

EXHIBIT 12.4 Regional National Bank (RNB), Off-Balance Sheet Conversion Worksheet

	Amount ($1,000)	Credit Conversion Factor	Credit Equivalent Amount ($1,000)
Contingencies 100% conversion factor			
Direct credit substitutes	165,905	100.00%	165,905
Acquisition of participations in BA*, direct credit substitutes	0	100.00%	0
Assets sold with recourse	0	100.00%	0
Futures and forward contracts	50,000	100.00%	50,000
Interest rate swaps	75,000	100.00%	75,000
Other 100% collateral category	0	100.00%	0
Total 100% collateral category	290,905		290,905
Contingencies 50% conversion factor			
Transaction-related contingencies	0	50.00%	0
Unused commitments > 1 year	364,920	50.00%	182,460
Revolving underwriting facilities (RUFs)	0	50.00%	0
Other 50% collateral category	0	50.00%	0
Total 50% collateral category	364,920		182,460
Contingencies 20% conversion factor			
Short-term trade-related contingencies	0	20.00%	0
Other 20% collateral category	0	20.00%	0
Total 20% collateral category	0		0
Contingencies 0% conversion factor			
Loan commitments < 1 year	0	0.00%	0
Other 0% collateral category	0	100.00%	0
Total 0% collateral category	0		0
Total off-balance sheet commitment	**655,825**		**473,365**

*BA refers to bankers acceptances.

obligor, collateral, or guarantor of the asset, and then multiplied by the associated risk weight to calculate risk-adjusted assets. Exhibit 12.4 indicates that long-term loan commitments greater than one year ($364,920) are classified as 50 percent conversion items, while standby letters of credit or direct credit substitutes ($165,905), futures and forward contracts ($50,000), and interest rate swaps ($75,000) are converted using a 100 percent conversion factor.[4] Figures in the final column represent converted amounts. Once converted to on-balance sheet equivalents, all of these commitments are classified as Category 4 assets subject to a 100 percent risk weighting.

The second and third columns of Exhibit 12.2 indicate the associated risk weight and the dollar value of each balance sheet figure, respectively, for RNB. Risk-weighted assets are calculated by multiplying the dollar value of assets in Column 1 by its respective risk weight. Total risk-weighted assets are the sum of risk-weighted assets in each category, including off-balance sheet items. Total risk-weighted assets for RNB thus equaled

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[4] Values for futures, forwards, and interest rate swaps represent the sum of the mark-to-market value plus the potential future increase in credit exposure. See Exhibit 12.5.

EXHIBIT 12.5 **Summary of Risk Categories and Risk Weights for Risk-Based Capital Requirements**

Risk Weights and Risk Categories for Specific Balance Sheet Items*

Category 1: 0%

(1) Currency and coin (domestic and foreign) held in the bank or in transit
(2) Securities issued by the U.S. government and other OECD central governments (including U.S. Treasury securities)
(3) Claims that are unconditionally guaranteed by the U.S. government and its agencies and other OECD central governments (including GNMA and SBA securities and loans guaranteed by the Export–Import Bank)
(4) Gold bullion held in the bank's vaults or in another's vaults on an allocated basis, to the extent offset by gold bullion liabilities
(5) Credit equivalent amount of those off-balance sheet direct claims on, or claims unconditionally guaranteed by, the U.S. government and other OECD central governments

Category 2: 20%

(1) Cash items in the process of collection (CIPC)
(2) Balances due from (claims guaranteed by) U.S. depository institutions and other OECD banks
(3) Short-term (one year or less) claims guaranteed by non-OECD banks
(4) Securities, loans, local currency, and other claims conditionally guaranteed by the U.S. government and its agencies and other OECD central governments (e.g., VA and FHA mortgage loans and student loans on which the U.S. Department of Education acts as a reinsurer)
(5) Claims on, guaranteed, or collateralized by securities issued by U.S. government-sponsored agencies (e.g., loans collateralized by FHLMC pass-through securities) or official multilateral lending institutions or regional development banks (e.g., the World Bank including the International Finance Corporation)
(6) Certain privately issued mortgage-backed securities representing indirect ownership of U.S. government agency or U.S. government-sponsored agency mortgage-backed securities (e.g., GNMA, FNMA, and FHLMC pass-through securities)
(7) General obligation claims on municipal securities and the portion of claims that are guaranteed by the full faith and credit of local governments and political subdivisions in the U.S. and other OECD local governments
(8) Credit equivalent amount for those off-balance sheet items that are risk weighted at 20 percent; e.g., credit equivalent amount of claims collateralized by cash on deposit (standby letters of credit collateralized by cash)

Category 3: 50%

(1) Loans that are fully secured by first liens on 1–4 family residential properties and loans fully secured by first liens on multifamily residential properties that have been prudently underwritten
(2) Privately issued mortgage-backed securities representing direct and indirect ownership of the mortgage loans (if the mortgages are prudently underwritten and are not restructured, past due, or in nonaccrual status)
(3) Revenue bonds (municipal revenue securities) or similar claims that are obligations of U.S. state or local governments, or other OECD local governments, for which the government is committed to repay the debt only out of revenues from the facilities financed
(4) Credit equivalent amount for those off-balance sheet items that are to be risk weighted at 50 percent; e.g., credit equivalent amounts of interest rate and foreign exchange rate contracts that are not accorded a lower risk weight as a result of the counterparty, collateral, or a guarantee

Category 4: 100%

(1) All other loans, debt securities, and other claims where the counterparty is a private obligor
(2) Premises and fixed assets
(3) Margin accounts on futures contracts
(4) Other real estate owned
(5) All other assets not already reported above
(6) Credit equivalent amounts of those off-balance sheet items where the counterparty is a private obligor and which are not accorded a lower risk weight as a result of collateral or a guarantee

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*Several of the risk-weight categories refer to claims against OECD countries; i.e., the Organization for Economic Cooperation and Development. The following countries are members of the OECD: Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States. In addition, Saudi Arabia should be treated as an OECD country. All other countries should be treated as non-OECD countries.

Note: For more details, see the Federal Financial Institutions Examination Council FFIEC Report Forms available on the Internet at www.ffiec.gov.

EXHIBIT 12.6 Summary of Off-Balance Sheet Conversion Factors for Risk-Based Capital Requirements

100% Conversion Factor

1. Direct credit substitutes (general guarantees of indebtedness and guarantee-type instruments, including standby letters of credit serving as financial guarantees for, or supporting, loans and securities)
2. Risk participations in bankers acceptances and participations in direct credit substitutes (for example, standby letters of credit)
3. Sale and repurchase agreements and asset sales with recourse, if not already included on the balance sheet
4. Forward agreements (that is, contractual obligations) to purchase assets, including financing facilities with certain drawdown

50% Conversion Factor

1. Transaction-related contingencies (for example, bid bonds, performance bonds, warranties, and standby letters of credit related to a particular transaction)
2. Unused commitments with an original maturity exceeding one year, including underwriting commitments and commercial credit lines
3. Revolving underwriting facilities (RUFs), note issuance facilities (NIFs), and other similar arrangements

20% Conversion Factor

1. Short-term, self-liquidating trade-related contingencies, including commercial letters of credit

0% Conversion Factor

1. Unused commitments with an original maturity of one year or less, or that are unconditionally cancelable at any time

Credit conversion process for off-balance sheet interest rate, foreign exchange, equity derivative, and commodity and other contracts—

In general, to calculate the credit equivalent amount for these contracts, a bank should, for each contract, add:

(1) The mark-to-market value (only if a positive value) of the contract; i.e., the contract's current credit exposure or replacement cost, and

(2) An estimate of the potential future increase in credit exposure over the remaining life of the instrument.

For risk-based capital purposes, potential future credit exposure of a contract is determined by multiplying the notional principal amount of the contract (even if the contract had a negative mark-to-market value) by the appropriate credit conversion factor from the chart presented below (existence of a legally enforceable bilateral netting agreement between the reporting bank and a counterparty may be taken into consideration when determining both the current credit exposure and the potential future exposure of off-balance sheet derivative contracts).

Remaining Maturity	Interest Rate Contracts	Foreign Exchange and Gold Contracts	Equity Derivative Contracts	Precious Metals (Except Gold)	Other Commodity Contracts
One year or less	0.0%	1.0%	6.0%	7.0%	10.0%
More than one year through five years	0.5%	5.0%	8.0%	7.0%	12.0%
More than five years	1.5%	7.5%	10.0%	8.0%	15.0%

Source: Federal Financial Institutions Examination Council FFIEC Report Forms, available on the Internet at www.ffiec.gov.

$3.75 billion. Finally, RNB's minimum capital requirements are specified as a fraction of total risk-weighted assets. Figures at the bottom of Exhibit 12.2 indicate that RNB would need $149.9 million in Tier 1 capital and $299.8 million in total capital to be adequately capitalized.

The next section describes the items that qualify as bank capital under the current standards. At this point, it is sufficient to know that banks must simultaneously meet three minimum capital ratios. Regulators assign banks to one of five categories based on these minimum ratios simultaneously. To be adequately capitalized, a bank's Tier 1 capital must equal no less than 4 percent of risk-weighted assets, total capital must equal at least 8 percent of risk-weighted assets, and leverage capital must equal no less than 3 percent of adjusted total assets.

What Constitutes Bank Capital?

According to the accounting definition, **capital**, or *net worth*, equals the cumulative value of assets minus the cumulative value of liabilities, and represents ownership interest in a firm. It is traditionally measured on a book-value basis where assets and liabilities are listed in terms of historical cost.[5] In banking, the regulatory concept of bank capital differs substantially from accounting capital. Specifically, regulators include certain forms of debt and loan loss reserves when measuring capital adequacy. This policy raises numerous issues regarding the function of bank capital and its optimal mix for individual institutions.

Accounting capital includes the book value of common equity and preferred stock outstanding. **Total equity capital** equals the sum of common stock, surplus,retained earnings capital reserves, and net unrealized holding gains (losses) on available-for-sale securities, cumulative foreign currency translation adjustments, and perpetual preferred stock as defined below:

- **Common stock** equals par value of common stock outstanding; thus, if there are one million shares outstanding with par value of $10 per share, common stock will show $10 million.
- **Surplus,** or **common equity surplus,** equals the excess over par value at which common stock was issued plus the value of undivided profits allocated to surplus. Suppose, in the above case, that one million common stock shares were originally sold in the marketplace to net a bank $15 per share. The excess, $5 per share, or $5 million, would be allocated to surplus.
- **Retained earnings** equals the value of cumulative retained earnings minus transfers to surplus. Retained earnings increase when a bank reports net income that exceeds cash dividend payments, and decreases when net income is less than cash dividends or the bank reports a loss.
- **Capital reserves for contingencies** and other capital reserves equal the value of cumulative reserves established for deferred taxes or contingencies. Contingencies include expected payments to retire outstanding preferred stock, settle lawsuits, and satisfy other extraordinary obligations. These reserves have been combined with undivided profits for reporting purposes since 1978.

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[5] FASB 115 requires banks to mark-to-market those securities that are not classified as held-to-maturity. Because marking securities to market value will directly affect equity capital, capital listed on a bank's balance sheet is a hybrid between book value and market value. Updates to FASB Statement No. 115 require that banks must now differentiate between credit related losses, which are reflected in earnings, and other losses that affect accumulated other comprehensive income (AOCI).

- **Net unrealized holding gains (losses) on available-for-sale securities.** Common stockholders equity includes any net unrealized holding losses on available-for-sale equity securities with readily determinable fair values, but excludes other net unrealized holding gains (losses) on available-for-sale securities. FASB 115 requires banks and other firms to mark certain available-for-sale securities (AFSs) to their market value. These unrealized losses (gains) directly affect equity reported on the balance sheet, but do not affect qualifying capital for risk-based calculations. As noted later, Basel III rules require that banks with more than $250 billion in assets or more than $10 billion in foreign exposure must include unrealized gains and losses on AFS securities as part of common equity Tier 1 (CET1) capital beginning in 2015. Other U.S. banks can opt-out of this accounting treatment.
- **Preferred stock** includes the book value of aggregate preferred stock outstanding. While it exhibits many of the same characteristics as long-term bonds, preferred stock represents ownership in a firm with claims superior to common stock but subordinated to all debt holders. It is issued either in *perpetuity* or with a *fixed maturity* (limited life). Most issues are callable and some are convertible to common stock. Dividend payments may be fixed, much like coupon payments on bonds, or may vary with some market index over the life of the issue. Unlike coupon payments, dividends are not deductible for corporate income tax purposes.

Regulatory capital ratios focus in part on the **book value of equity**, which equals the book value of bank assets minus the book value of total liabilities. Most analysts try to estimate the market value of bank equity when assessing financial performance and risk. This can be done in several ways. One procedure is to multiply the number of outstanding shares of stock by the most recent stock price per share. Another procedure requires estimating the market value of bank assets and subtracting the market value of bank liabilities. As discussed in Chapter 8, the market, or economic, value of equity is an important measure of performance in interest rate risk management. In the case of bank failure, claims of equity stockholders are paid only after the claims of all debt holders and preferred stockholders have been satisfied.

Regulators also include long-term **subordinated debt** in Tier 2 capital, which is part of the broader definition of total bank capital (Tier 1 and Tier 2). The term *subordinated* means that claims of the debt holders are paid only after the claims of depositors. Subordinated debt takes many forms. It includes straight bonds with long maturities that carry fixed rates. It also includes variable-rate bonds, capital notes, or bonds that are convertible into the bank's common or preferred stock. The fact that nonequity accounts constitute capital relates to regulatory perceptions of capital's function. Mandatory convertible debt and subordinated long-term debt are included because they carry relatively long-term maturities, and creditors' claims are subordinated to those of depositors. These funding sources, therefore, provide solvency protection for insured depositors and the insurance funds.

Risk-based capital standards utilize two measures of qualifying bank capital, as summarized in Exhibit 12.7. **Tier 1**, or **core capital**, consists of common stockholders equity, noncumulative perpetual preferred stock and any related surplus, and minority interests in equity capital accounts of consolidated subsidiaries, minus intangible assets like goodwill and disallowed deferred tax assets. For most banks, Tier 1 capital will equal common stockholders equity capital less any net unrealized holding gains or losses on available-for-sale equity securities. **Tier 2**, or **supplementary capital**, is limited to 100 percent of Tier 1 capital and consists of cumulative perpetual preferred stock and any related surplus, long-term preferred stock, limited amounts of term subordinated debt and

EXHIBIT 12.7 **Definition of Qualifying Capital**

Components	**Minimum Requirements**
Tier 1 (Core) Capital	
Common stockholders equity*	Must equal or exceed 4 percent of risk-weighted assets.
Noncumulative perpetual preferred stock and any related surplus	No limit; regulatory caution against undue reliance.
Minority interests in equity capital accounts of consolidated subsidiaries	No limit; regulatory caution against undue reliance.
Less: goodwill, other disallowed intangible assets, and disallowed deferred tax assets, and any other amounts that are deducted in determining Tier 1 capital in accordance with the capital standards issued by the reporting bank's primary federal supervisory authority	
Tier 2 (Supplementary) Capital	
Cumulative perpetual preferred stock and any related surplus	Total of Tier 2 is limited to 100 percent of Tier 1[†].
Long-term preferred stock (original maturity of 20 years or more) and any related surplus (discounted for capital purposes as it approaches maturity)	No limit within Tier 2.
Auction rate and similar preferred stock (both cumulative and noncumulative)	No limit within Tier 2.
Hybrid capital instruments (including mandatory convertible debt securities)	Subordinated debt and intermediate-term preferred stock are limited to 50 percent of Tier 1, amortized for capital purposes as they approach maturity.
Term subordinated debt and intermediate-term preferred stock (original weighted average maturity of five years or more)	50 percent of Tier 1 capital (and discounted for capital purposes as they approach maturity).
Allowance for loan and lease losses	Lesser of the balance of the allowance account or 1.25 percent of gross risk-weighted assets.
Tier 3 (Capital Allocated for Market Risk)	
Applicable only to banks that are subject to the market risk capital guidelines	May not be used to support credit risk.
	Tier 3 capital allocated for market risk plus Tier 2 capital allocated for market risk are limited to 71.4 percent of a bank's measure for market risk.
Deductions	
Deductions are made for: investments in banking and finance subsidiaries that are not consolidated for regulatory capital purposes; intentional reciprocal cross-holdings of banking organizations' capital instruments; and other deductions as determined by the reporting bank's primary federal supervisory authority	As a general rule, one-half of aggregate investments would be deducted from Tier 1 capital and one-half from Tier 2 capital.
Total Capital (Tier 1 + Tier 2 − Deductions)	Must equal or exceed 8 percent of risk-weighted assets. For most banks, total risk-based capital will equal the sum of Tier 1 capital and Tier 2 capital.

*For risk-based capital purposes, common equity capital includes any net unrealized holding losses on available-for-sale equity securities with readily determinable fair values, but excludes other net unrealized holding gains (losses) on available-for-sale securities.

[†] Amounts in excess of limitations are permitted but do not qualify as capital.

Source: Federal Financial Institutions Examination Council FFIEC Report Forms, available on the Internet at www.ffiec.gov.

intermediate-term preferred stock, and a limited amount of the allowance for loan and lease losses (up to 1.25 percent of gross risk-weighted assets).[6]

Regulators are also concerned that a bank could acquire a sufficient dollar amount of low-risk assets (federal government securities) such that RBC requirements would be negligible. Suppose, for example, that RNB from Exhibit 12.2 held all of its assets in the form of cash and due balances and Treasury securities. In this case, its risk-weighted assets would equal zero and its Tier 1 and total capital requirements would be zero. This would allow (at least theoretically) RNB to operate with no equity capital! To prevent this from occurring, regulators impose a minimum 3 percent **leverage capital ratio**, defined as Tier 1 capital divided by total assets net of goodwill, other disallowed intangible assets, and disallowed deferred tax assets. The impact is that all banks must maintain some minimum amount of equity capital relative to their total assets in recognition of risks other than default risk.

Tier 3 Capital Requirements for Market Risk under Basel I

Market risk is the risk of loss to the bank from fluctuations in interest rates, equity prices, foreign exchange rates, commodity prices, and exposure to specific risk associated with debt and equity positions in the bank's trading portfolio. Market risk exposure is, therefore, a function of the *volatility* of these rates and prices and the corresponding sensitivity of the bank's trading assets and liabilities. This exposure is generally low at community banks and most banks that do not have trading accounts. As demonstrated during the financial crisis when many large organizations experienced substantial write-downs of securities and trading assets, market risk is much higher at the largest organizations.

Risk-based capital standards require that all banks with significant market risk measure their market risk exposure and hold sufficient capital to mitigate this exposure. A bank is subject to the market risk capital guidelines if its consolidated trading activity, defined as the sum of trading assets and liabilities for the previous quarter, equals 10 percent or more of the bank's total assets for the previous quarter, or $1 billion or more in value. Banks subject to the market risk capital guidelines must maintain an overall minimum 8 percent ratio of total qualifying capital [the sum of Tier 1 capital, Tier 2 capital, and Tier 3 capital allocated for market risk, net of all deductions] to risk-weighted assets and market risk-equivalent assets.

Tangible Common Equity

In response to the financial crisis, bank regulators placed greater importance on how much tangible common equity a bank had. Tangible common equity equals a bank's tangible assets minus its liabilities and any preferred stock outstanding. As such, it reflects what would be left over if a bank were to liquidate and use the proceeds to pay off claims from debtors and preferred stockholders. It assigns no value to intangible assets, such as goodwill, mortgage servicing assets, and deferred tax assets. Regulators and analysts construct a tangible common equity ratio (TCE) defined as tangible common equity divided by tangible assets:

$$\text{TCE} = \frac{\text{Common Stockholders Equity} - \text{Intangible Assets}}{\text{Total Assets} - \text{Intangible Assets}}$$

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[6] The definitions of Tier 1 and Tier 2 capital are from *Instructions for Preparation of Consolidated Reports of Condition and Income (FFIEC 031, 032, 033, and 034),* Federal Financial Institutions Examination Council. FFIEC Report Forms are available on the Internet at www.ffiec.gov.

A declining and low TCE signals problems and prompts quick regulatory action to restrict a bank's activities and improve risk management practices and profitability.

Basel III Capital Standards

In July 2013, federal regulators approved Basel III capital rules with the intent to increase bank capital requirements and upgrade the quality of bank capital. The new requirements impose higher minimum capital ratios and place a greater emphasis on common equity as a preferred form of capital. The Basel III rules apply differently to larger organizations versus smaller ones. Generally, smaller organizations can count more items as capital and have more time to comply with the new requirements. The increased capital requirements arise from stricter rules on what qualifies as capital, as well as the introduction of a new minimum capital ratio, common equity Tier 1 (CET1). When fully implemented, banks must hold a capital conservation buffer in addition to the old RBC minimums.

$$\text{CET1} = \frac{\text{Common Equity Tier 1 Capital}}{\text{Risk-weighted Assets}}$$

Consider the RBC ratios introduced earlier. Under Basel III, the minimum capital requirements, when the final rules are implemented in 2019, are listed below.

	Current Minimum	Final Rule		
		Minimum	Buffer	Total
Tier 1 capital/risk-weighted assets	4%	6.0%	2.5%	8.5%
Total capital/risk-weighted assets	8%	8.0%	2.5%	10.5%
Leverage ratio	4%	4.0%	–	–
CET1 ratio	–	4.5%	2.5%	7.0%

For smaller banks, the biggest changes involve the calculation of risk-weighted assets because certain types of residential mortgages carry higher risk weights. Fortunately, banks with less than $15 billion in assets that previously issued perpetual preferred stock (TruPs) can continue to include this stock as Tier 1 capital with certain limits.[7]

Weaknesses of the Risk-Based Capital Standards

There are several fundamental weaknesses inherent in the RBC requirements. First, as indicated earlier, the Basel I general RBC requirements do not account for risks other than credit risk, except for market risk at large banks with extensive trading operations. Certainly, a bank that assumes extraordinary amounts of interest rate risk in volatile rate environments, or high liquidity risk with a heavy reliance on purchased liabilities, has an abnormally high chance of failing. Nevertheless, the bank's capital requirement is determined by its asset composition. Regulators can, of course, identify risk takers and raise required capital above the minimums, but this system is somewhat subjective and is

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[7] There are numerous other provisions that reference when dividends can be paid and allow small banks a one-time option to include or exclude accumulated other comprehensive income (AOCI) elements, primarily unrealized gains and losses on investments, as capital.

often implemented only after problems become apparent. Second, banks subject to the advanced approaches of Basel II use internal models and report the results of their own model to the regulators. In many cases, regulators accepted the model and risk assessment rather than doing their own independent evaluation. Recent unanticipated losses arising during the financial crisis of 2007–2010 demonstrated that many large institutions' models dramatically understated firm risk.

Importantly, by the end of 2007, over 94 percent of institutions were considered to be well capitalized. This means, for the most part, that the RBC requirements were not "binding" for all banks. Hence, once a bank achieves the status of "well capitalized," there are few incentives for the bank to make additional efforts to control risk. Significant losses at the largest institutions in 2008, however, sharply lowered their capital levels.

What Is the Function of Bank Capital?

Much confusion exists over what purposes bank capital serves. The traditional corporate finance view is that capital reduces the risk of failure by providing protection against operating losses and extraordinary losses. While this holds for nonfinancial firms that rely on long-term debt with relatively low financial leverage, it is less applicable to financial companies.

From the regulators' perspective, bank capital serves to protect the deposit insurance funds in the case of bank failures. When a bank fails, regulators can either pay off insured depositors or arrange a purchase of the failed bank by a healthy bank.[8] The greater a bank's capital, the lower the cost of arranging a merger or paying depositors. An additional benefit of minimum capital requirements is that the owners of equity and long-term debt impose market discipline on bank managers because they closely monitor bank performance. Excessive risk taking lowers stock prices and increases borrowing costs, which adversely affect the wealth of these monitoring parties.

The function of bank capital is thus to reduce bank risk. It does so in three basic ways:

- It provides a cushion that allows firms to absorb losses and remain solvent.
- It provides ready access to financial markets and thus guards against liquidity problems caused by deposit outflows.
- It constrains growth and limits risk taking.

Bank Capital Provides a Cushion for Absorbing Losses. Consider the balance sheets for the two hypothetical firms in Exhibit 12.8. The manufacturing firm has 60 percent current assets and 40 percent fixed assets. Its financing is composed of 60 percent debt and 40 percent equity. Exactly one-half of the debt is short term, such that its current ratio equals 2. The commercial bank, by contrast, operates with very few fixed assets and finances 92 percent of its assets with debt and just 8 percent with equity. Its current ratio is less than 1. The value of the manufacturing firm's assets would have to decline by more than 40 percent before the firm would see its equity fall below zero and be technically insolvent. An 8 percent decline in asset values would similarly make the bank insolvent. Equity reduces the risk of failure by increasing the proportion of allowable problem assets that can default before equity is depleted.

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[8] The FDIC insures deposits and bank regulators routinely examine banks for safety and soundness with the intent of limiting risk taking.

EXHIBIT 12.8 Comparative Balance Sheets: Manufacturing Firm versus Commercial Bank

Manufacturing Firm		Commercial Bank	
Assets		**Assets**	
Cash	4%	Cash	8%
Accounts receivable	26%	Short-term securities	17%
Inventory	30%	Short-term loans	50%
Total current assets	60%	Total current assets	75%
		Long-term securities	5%
		Long-term loans	18%
Plant and equipment	40%	Plant and equipment	2%
Total assets	100%	Total assets	100%
Liabilities		**Liabilities**	
Accounts payable	20%	Short-term deposits	60%
Short-term notes payable	10%	Short-term borrowings	20%
Total current liabilities	30%	Total current liabilities	80%
Long-term debt	30%	Long-term debt	12%
stockholders equity	40%	Stockholders equity	8%
Total liabilities and equity	100%	Total liabilities and equity	100%

The issue, however, is not this simple. For example, why do creditors allow banks to operate with far greater financial leverage than manufacturers? One reason is that banks exhibit little operating risk because fixed assets are low. Yet, several factors suggest that banks should have more equity. First, the market value of bank assets is more volatile than the value of assets at a typical manufacturing firm. Market values change whenever interest rates change and whenever bank borrowers experience difficulties. Manufacturing companies own proportionately fewer financial assets and are not as sensitive to interest rate fluctuations. Second, banks rely proportionately more on volatile sources of short-term debt, many of which can be withdrawn on demand. It seems reasonably probable that banks might be forced to liquidate assets at relatively low values. On the positive side, however, most of a bank's assets are financial and hence are generally more liquid and less risky (everything else being equal) than the real assets held by nonfinancial companies. After all, it is often easier to sell Treasury securities and high-quality bank loans than an automobile assembly plant!

This capital discrepancy can be largely explained by federal deposit insurance and bank regulatory policy.[9] Individual retirement accounts and nonretirement accounts are insured up to $250,000. Even if a bank fails, an insured depositor is fully reimbursed. This system prevents massive withdrawals of small-denomination deposits and makes uninsured creditors the arbiters of bank risk. Just as significantly, bank regulators provide de facto insurance for uninsured creditors at the largest financial institutions. Rather than let these banks fail, regulators arrange mergers or acquisitions that allow such firms to continue operations without liquidation—hence, the label Too Big To Fail (TBTF) for

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[9] The FDIC insures deposits and bank regulators routinely examine banks for safety and soundness with the intent of limiting risk taking.

the largest organizations.[10] In these extreme cases, no private capital is technically required for the banks to continue operations. In general, deposit insurance and regulatory policy increase bank liquidity, which reduces the amount of equity financing required.

In 2008, the FDIC found other innovative ways to deal with large bank failures. When the FDIC closed the $32 billion dollar IndyMac Bank, it created IndyMac Federal Bank to which it transferred insured deposits and substantially all of the assets. As conservator, the FDIC operated IndyMac Federal Bank to best position the bank for future sale, as well as to continue to provide banking services in the communities. In October 2008, during weekend negotiations with Citigroup and Wells Fargo, federal regulators mandated the sale of Wachovia. When Wells Fargo initially withdrew its interest, Citigroup agreed to buy parts of Wachovia with federal assistance. Later during the week, the Treasury unilaterally modified a tax ruling to allow greater carry-forward of tax losses, thereby making it attractive for Wells Fargo to submit a higher bid (given that it now would receive over $20 billion in assistance with the new tax treatment). This ruling represented significant value, which made it controversial, because neither Congress nor the Internal Revenue Service had a voice in the decision.

The role of capital as a buffer against loan losses is clear when put in the context of cash flows rather than accounting capital. Consider a bank whose customers default on their loans. Defaults immediately reduce operating cash inflows because the bank no longer receives interest and principal payments. Cash outflows are largely unaffected except for incremental collection costs. The bank remains operationally solvent as long as its overall operating cash inflows exceed its cash outflows. Capital serves as a buffer because it reduces obligated outflows. Banks can defer dividends on preferred and common stock without being in default. Interest payments on bank debt, by contrast, are mandatory. Banks with sufficient capital can, in turn, issue new debt or stock to replace lost cash inflows and buy time until any asset problems are corrected. Thus, the greater a bank's equity capital, the greater the magnitude of assets that can default before the firm is technically insolvent, and the lower the bank risk.

Bank Capital Provides Ready Access to Financial Markets. Adequate bank capital minimizes operating problems by providing ready access to financial markets. As long as a bank's capital exceeds the regulatory minimums, it can stay open and has the potential to generate earnings to cover losses and expand. FDICIA demonstrates that banks with the greatest capital-to-risk asset ratios will have the greatest opportunities to operate without restraint and to enter new businesses. Capital enables the bank to borrow from traditional sources at reasonable rates. Consequently, depositors will not remove their funds and asset losses will be minimized. Any losses that arise can be charged against current earnings or, ultimately, against equity.

Analysts generally attribute failures to bad management and argue that well-managed banks should be allowed to operate with low capital-to-asset ratios. In these studies, banks with low capital-to-asset ratios do not exhibit any greater tendency toward insolvency compared with banks with higher capital ratios. Other researchers attribute failures to liquidity problems and generally ignore capital. When depositors withdraw their funds, a bank must either liquidate assets from its portfolio or replace the deposit

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[10] Many of the largest U.S. financial institutions were not only bailed out by the federal government during the financial crisis, but Eric Holder, U.S. Attorney General, did not prosecute any senior officers at any of these institutions famously stating, "I am concerned that the size of some of these institutions becomes so large that it does become difficult for us to prosecute them when we are hit with indications that if you do prosecute, if you do bring a criminal charge, it will have a negative impact on the national economy, perhaps even the world economy" which has become known as these institutions being **Too Big To Jail**.

outflows with new borrowings. Forced asset sales can be accomplished only through lowering asset prices. These losses, in turn, would be charged against equity, bringing the bank closer to insolvency. Most banks, therefore, rely on substitute debt sources. If, however, the volume of required financing is large, the bank must pay an interest premium, which reduces current earnings and depresses potential equity.

Uncertainty regarding the link between capital and liquidity problems and bank failure reflects a misunderstanding of accounting versus economic value. What is important is the market value of bank capital, not its accounting value. As long as the market value is positive, banks can issue debt to offset liquidity problems. This is true regardless of whether accounting capital is positive or negative. If the market value of capital were negative, no private lender would extend credit. Failures, then, are tied directly to market values, not accounting values.

Regulatory interference confuses the true purpose of capital. When regulators guarantee bank debt or create artificial capital, they improve liquidity. The intent is to postpone problems until the firms are self-sufficient. Capital, as such, is meaningless to the firm's continued operation. Capital serves the same purpose as federal guarantees when regulatory assistance is not openly provided.

Capital Constrains Growth and Reduces Risk. By limiting the amount of new assets that a bank can acquire through debt financing, capital constrains growth. As indicated in Exhibit 12.13, regulators impose equity capital requirements as a fraction of aggregate bank assets. If banks choose to expand loans or acquire other assets, they must support the growth with additional equity financing. Because new equity is expensive, expected asset returns must be high to justify the financing. This restriction is extremely important because many bank failures in the 1980s were linked to speculative asset growth financed by brokered deposits. Rigid capital requirements reduce the likelihood that banks will expand beyond their ability to manage their assets successfully and thus serve to reduce risk.

How Much Capital Is Adequate?

The issue of bank capital adequacy has long pitted regulators against bank management. Regulators, concerned primarily with the safety of banks, the viability of the insurance fund, and the stability of financial markets, prefer more capital. This reduces the likelihood of failure and increases bank liquidity. Bankers, on the other hand, generally prefer to operate with less capital. As indicated in Chapter 3, the smaller a bank's equity base, the greater its financial leverage and equity multiplier. High leverage converts a normal return on assets (ROA) into a high return on equity (ROE). Exhibit 12.8 illustrates this point. Suppose that the manufacturing firm and commercial bank each earn 1 percent on assets during the year. The firms' equity multipliers (ratio of total assets to stockholders equity) equal 2.5 and 12.5, respectively. This difference in leverage produces a 2.5 percent ROE for the manufacturer that equals only one-fifth of the 12.5 percent ROE for the bank. Alternatively, the manufacturer must generate an ROA equal to five times that for the bank, 5 percent in this example, to produce the same ROE. Leverage thus improves profitability when earnings are positive.

Whether a specific bank's capital is adequate depends on how much risk the bank assumes. Banks with low-quality assets, limited access to liquid funds, severe mismatches in asset and liability maturities and durations, or high operational risk should have more capital. Low-risk firms should be allowed to increase financial leverage.

The regulatory agencies periodically assess specific bank risks through on-site examinations. A thorough review includes an evaluation of the bank's asset quality—particularly the probability of defaults on interest and principal payments in the loan portfolio—loan review policies, interest rate risk profile, liquidity profile, cash management and internal audit procedures, and management quality. The FDIC rates banks according to the Uniform Financial Institutions Rating System, which encompasses six general categories of performance, labeled CAMELS: C = capital adequacy, A = asset quality, M = management quality, E = earnings, L = liquidity, and S = sensitivity to market risk. The FDIC numerically rates every bank on each factor, ranging from the highest quality (1) to the lowest quality (5). It also assigns a composite rating for the bank's entire operation. A composite ranking of 1 or 2 indicates a fundamentally sound bank, while a ranking of 3, 4, or 5 signifies a problem bank with some near-term potential for failure.

The Effect of Capital Requirements on Bank Operating Policies

Regulatory efforts to increase capital impose significant restrictions on bank operating policies. Many large banks with access to national markets can issue common stock, preferred stock, or subordinated capital notes to support continued growth and are relatively unaffected by minimum capital ratios. Smaller banks, however, do not have the same opportunities. They lack a national reputation, and investors generally shy away from purchasing their securities. These banks often rely instead on internally generated capital and find their activities constrained by a deficiency in retained earnings.

Limiting Asset Growth

Minimum capital requirements restrict a bank's ability to grow. Additions to assets mandate additions to capital for a bank to continue to meet minimum capital-to-asset ratios imposed by regulators. Each bank must limit its asset growth to some percentage of retained earnings plus new external capital.

Consider the \$100 million bank in Exhibit 12.9 that just meets the minimum 8 percent total capital requirement. Initially, the bank has \$8 million in capital, of which \$4 million is undivided profits and \$4 million is other capital. Various effects of planned asset growth are shown in the following columns of data, which represent projections of balance sheet and income statement data for the upcoming year. The bank's initial plan, designated as Case 1, calls for 8 percent asset growth with a projected 1.07 percent ROA and 40 percent dividend payout rate. In this scenario, the bank would have \$108 million in assets and \$693,360 in retained earnings for the year. The 8 percent target capital ratio would just be met.

Suppose that profitable credit opportunities are available to generate 12 percent asset growth within acceptable risk limits. The last three columns of data identify three distinct strategies for growing and still meeting minimum capital requirements. One option (Case 2) is for the bank to generate a higher ROA. This bank would need \$1,075,200 in additional retained earnings to support the \$112 million in assets:

$$\text{Undivided profits} = \text{Total assets} \times \text{ROA} \times (1 - \text{dividend payout rate})$$

$$\$1{,}075{,}200 = \$112{,}000{,}000 \times 0.016 \times (1 - 0.40)$$

Because competition prevents banks from raising yield spreads on high-quality loans, they can achieve higher returns only by acquiring riskier assets or generating greater fee income from services. This sample bank would have to increase its ROA by 53 basis points to 1.6 percent if it did not change its dividend policy or obtain additional capital externally. If banks substitute riskier loans for lower-yielding and less-risky assets, the

EXHIBIT 12.9 **Maintaining Capital Ratios with Asset Growth: Application of Equations 12.1 and 12.3**

Ratio	Initial Position	Case 1 Initial 8% Asset Growth	Case 2 12% Growth: ↑ ROA	Case 3 12% Growth: ↓ Dividend	Case 4 12% Growth: ↑ External Capital
Asset growth rate (percent)		8.00%	12.00%	12.00%	12.00%
Asset size (millions of $)	100.00	108.00	112.00	112.00	112.000
ROA (percent)*		1.07%	1.60%	1.07%	1.07%
Dividend payout rate (percent)		40.00%	40.00%	10.28%	40.00%
Undivided profits (millions of $)	4.0000	4.6934	5.0752	5.0752	4.7190
Total capital less undivided profits (millions of $)	4.0000	4.0000	4.0000	4.0000	4.3562
Total capital/total assets (percent)	8.00%	8.00%	8.00%	8.00%	8.00%

Application of Equation 12.3

Case 1: 8% asset growth, dividend payout = 40%, and capital ratio = 8%.
What is ROA?

$$0.08 = \frac{\text{ROA}(1 - 0.40 + 0)}{0.08}$$

Solve for ROA = 1.07%

Case 2: 12% asset growth, dividend payout = 40%, and capital ratio = 8%.
What is the required ROA to support 12% asset growth?

$$0.12 = \frac{\text{ROA}(1 - 0.40 + 0)}{0.08}$$

Solve for ROA = 1.60%

Case 3: ROA = 1.07%, 12% asset growth, and capital ratio = 8%.
What is the required dividend payout ratio (DR) to support asset growth?

$$0.12 = \frac{0.0107(1 - \text{DR}) + 0}{0.08}$$

Solve for DR = 10.28%

Case 4: ROA = 0.99%, 12% asset growth, capital ratio = 8%, and dividend payout = 40%.
What is the required increase in external capital to support 12% asset growth?

$$0.12 = \frac{0.0107(1 - 0.40) + \Delta\text{EC}/\text{TA}_1}{0.08}$$

Solve for ΔEC/TA = 0.32% ΔEC = \$356,200

*ROA = Return on assets

Note: Equations 12.1 and 12.3 appear on the following pages.

benefit from increased profits may be offset by future loan losses or higher capital requirements.

A second option is for the bank to increase retained earnings by decreasing dividends (Case 3). In this scenario, the bank must lower its 40 percent payment rate to 10.28 percent with the same 1.07 percent ROA, to leave capital ratios unchanged. This option is often unattractive because any unanticipated dividend reduction encourages shareholders to sell stock, which lowers share prices immediately. It would then be extremely difficult and costly to issue stock any time in the near future. The final option (Case 4) is to finance part of the asset growth with new capital, such as new common stock or perpetual preferred stock. Here the growth in retained earnings would total \$719,040, so \$356,200 in new external capital would be needed. Such equity is considerably more expensive than debt if the bank actually has access to the stock market.

In practice, a bank would likely pursue some combination of these strategies, or may simply choose not to grow. If the bank in this example decides not to alter its initial policies, asset growth is restricted to 12.5 (100/8) times the addition to retained earnings. In other words, each dollar of retained profits can support \$12.50 in new assets.

The relationship for internally generated capital can be summarized by the following constraints.[11] Let:

TA = total assets
EQ = equity capital
ROA = return on assets
DR = dividend payout rate
EC = new external capital

and the subscripts refer to the beginning of the period (1) or the end of the period (2) Capital constraints require that the asset growth rate equal the rate of growth in equity capital:

$$\Delta TA/TA_1 = \Delta EQ/EQ_1 \tag{12.1}$$

Recall that new capital comes from two sources: internally, or retained earnings, and externally, such as via new stock issues. Equation 12.1 can be restated as providing the following sustainable growth rate in assets when there is no new external capital:

$$\begin{aligned}\Delta TA/TA_1 &= (EQ_2 - EQ_1)/EQ_1\\ &= \frac{EQ_1 + ROA(1-DR)\times TA_2 + \Delta EC - EQ_1}{EQ_1}\\ &= \frac{ROA(1-DR) + \Delta EC/TA_2}{[EQ_2 - ROA(1-DR)\times TA_2 - \Delta EC]/TA_2} \qquad \textbf{(12.2)}\\ \Delta TA/TA_1 &= \frac{ROA(1-DR) + \Delta EC/TA_2}{EQ_2/TA_2 - ROA(1-DR) - \Delta EC/TA_2}\end{aligned}$$

The above relationship can be approximated by:

$$\Delta TA/TA_1 = \frac{ROA(1-DR) + \Delta EC/TA_2}{EQ_1/TA_1} \tag{12.3}$$

The numerator equals the sum of internally generated capital, ROA times the earnings retention rate, and additions to equity from external sources.

Equation 12.3 demonstrates the effect of minimum equity capital ratios on asset growth, earnings requirements, dividend payout rates, and new stock issues. For example, a bank that does not plan on issuing new stock and targets an 8 percent capital ratio, a 1.2 percent ROA, and a 35 percent dividend payout rate, can increase assets by no

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[11] See the discussion by Bernon (1978). A simple approximation to Equation 12.2 is $\Delta TA/TA_1 = (ROA[1-DR])/(TA2/EQ2)$, or the rate of asset growth equals the product of ROA and the earnings retention rate, divided by the leverage ratio.

more than 9.75 percent. Hence, banks without access to the capital markets can essentially grow only at the rate of growth in equity from retained earnings. If, on the other hand, the bank also obtains new external capital equal to 0.32 percent of the original assets ($320,000), asset growth can again equal 12 percent, with a 1.07 percent ROA, an 8 percent equity-to-asset ratio, and a 40 percent dividend payout rate. Equation 12.3 is applied at the bottom of Exhibit 12.15 using the data for each case.

Changing the Capital Mix

Banks that choose to grow faster than the rate allowed with internally generated capital alone must raise additional capital externally. Here, large banks operate with a competitive advantage over smaller banks. In particular, large banks can obtain capital nationally through public offerings of securities. Their name recognition is high, and investors willingly purchase the instruments of quality organizations. Small banks, by contrast, can generally only issue capital securities to a limited number of investors, such as existing shareholders, bank customers, and upstream correspondent banks. Limits to growth are far more rigid. One solution often pursued by small bank shareholders is to sell their stock to a holding company with greater access to funding sources.

Changing Asset Composition

Banks may respond to RBC requirements by changing their asset composition. Managers that are risk averse may shift assets from high-risk categories, such as commercial loans with a 100 percent risk weight, to lower-risk categories. The natural consequence is that while required RBC declines, potential profitability declines as well. The fear among regulators, however, is that other banks facing higher capital requirements may actually shift assets into higher-risk categories or off-balance sheet commitments in pursuit of extraordinary returns. This would increase the overall risk profile of the banking industry in contrast to what the regulators desire.

Pricing Policies

One of the advantages of RBC requirements is that they explicitly recognize that some investments are riskier than others are. The riskiest investments require the greatest equity capital support. Banks have been forced to reprice assets to reflect these mandatory equity allocations. For example, if a bank has to hold capital in support of a loan commitment, it should raise the fee it charges to compensate for the greater cost of providing that service as compared with the time when capital was not required. In fact, all off-balance sheet items should now be priced higher. Remember that equity is expensive. Thus, a bank should also raise loan rates on it highest-risk assets that require the greatest capital relative to other asset yields.

Shrinking the Bank

Historically, banks tried to circumvent capital requirements by moving assets off the books. Interest rate and product deregulation encouraged banks to transfer risks off the balance sheet by creating contingent liabilities that produce fee income but do not show up as assets in financial reports. Because off-balance sheet activity increases risk, bank regulators included off-balance sheet items in the base when calculating risk-weighted assets. In today's banking environment, the greater a bank's off-balance sheet commitments, the greater are its capital requirements. In actuality, regulators examine a bank's off-balance sheet exposure and may selectively request additional capital above the risk-based standards when the exposure is deemed to be great.

Alternatively, banks can meet the new standards by shrinking in size. As such, existing capital represents a higher fraction of the smaller asset base. The problem is that a shrinking bank has difficulty generating earnings growth and thus paying shareholders a reasonable risk-adjusted return. Not surprisingly, banks with capital problems often look to merge with stronger banks and may only survive as part of another firm.

Characteristics of External Capital Sources

Internally generated capital can support asset growth at a rate implied by Equations 12.1 and 12.3. Banks that choose to expand more rapidly must obtain additional capital from external sources, a capability determined by asset size. Large banks tap the capital markets regularly, but small banks must pay a stiff premium to obtain capital, if it is available at all. While there are many different types of capital sources, they can be grouped into one of five categories: subordinated debt, common stock, preferred stock, trust preferred stock, and leasing arrangements. Each carries advantages and disadvantages.

Subordinated Debt

For the past 30 years, banks have been able to use subordinated debt to meet capital requirements. This debt constitutes capital because of its relatively long maturities and funding permanence. It does not qualify as Tier 1 or core capital because it eventually matures and must be replenished, unlike common equity. It also imposes an interest expense burden on the bank when earnings are low. Subordinated debt must possess several specific features before the regulators accept it as capital. First, debt holders' claims must be subordinated to depositors' claims. If the bank fails, insured depositors are paid first, followed by uninsured depositors, then subordinated debt holders. Second, only debt with an original weighted average maturity of at least seven years qualifies as capital.

Subordinated debt offers several advantages to banks. Most importantly, interest payments are tax deductible, so the cost of financing is below that for equity sources. Because they are debt instruments, shareholders do not reduce their proportionate ownership interest, and earnings are not immediately diluted. Furthermore, this type of debt generates additional profits for shareholders as long as earnings, before interest and taxes, exceed interest payments. Thus, shareholders may receive higher dividends, and greater retained earnings may increase the capital base. Fixed-rate debt accentuates this profit potential.

Subordinated debt also has shortcomings. Interest and principal payments are mandatory and, if missed, constitute default. In addition, many issues require sinking funds that increase liquidity pressures as banks allocate funds to repay principal. Finally, from the regulators' perspective, debt is worse than equity because it has fixed maturities and banks cannot charge losses against it. Subordinated debt and equity, however, protect depositors and the FDIC equally.

Some subordinated debt pays variable rates that fluctuate with selected interest rate indexes. These securities subsequently trade close to par, as the yield changes when market rates change. Banks can pay initial rates below those for comparable fixed-rate debt because they are assuming the interest rate risk. Many bank holding companies also issue mandatory convertible debt in the form of either equity commitment notes or mandatory convertible notes. Both types require that banks issue common stock, perpetual preferred stock, or other primary capital securities to redeem the convertible debt. The average convertible debt issue carries floating rates, matures in more than 10 years, and contains an option for the debtor to redeem the security anytime after four years.

Contingent Convertible Capital

Many analysts and regulators believe that contingent convertible capital (CoCos) might serve a useful role in protecting banks and the FDIC insurance fund. CoCos are hybrid instruments that originally take the form of debt in terms of structure, but automatically convert to common equity when certain conditions are met, particularly when the issuing bank's regulatory capital falls below certain minimum levels. As such, CoCos can help absorb bank losses prior to insured deposits being exposed. CoCos potentially help a bank meet minimum capital requirements but retain some of the financial advantages of debt until conversion.

Common Stock

Common stock is preferred by regulators as a source of external capital. It has no fixed maturity and thus represents a permanent source of funds. Dividend payments are also discretionary, so that common stock does not require fixed charges against earnings. Losses can be charged against equity, not debt, so common stock better protects the FDIC.

Common stock is not as attractive from the bank's perspective due to its high cost. Because dividends are not tax deductible, they must be paid out of after-tax earnings. They are also variable in the sense that shareholders expect per-share dividend rates to rise with increases in bank earnings. Transactions costs on new issues exceed comparable costs on debt, and shareholders are sensitive to earnings dilution and possible loss of control in ownership. Most firms wait until share prices are high and earnings performance is strong before selling stock. A positive feature of the Tax Reform Act of 1986 is that it makes common stock relatively more attractive to a firm than before. By lowering corporate marginal income tax rates, the act increased the cost of tax-deductible interest on debt relative to the nondeductible dividend cost of common stock.

Issuing common stock is frequently not a viable alternative for a bank that needs capital. If the current share price is far below book value, new issues dilute the ownership interests of existing shareholders. Stocks of the largest banks are traded in national markets with substantial liquidity. Bank managers attempt to increase share prices through strong earnings, consistent dividend policy, and adequate disclosure of performance to security analysts. Even with these efforts, however, stock prices often fall with adverse economic conditions or market disfavor with the industry. At these times, other capital sources are less expensive.[12] When stock prices are low, many large banks issue debt that is convertible into common stock. Investors accept lower interest payments in lieu of the option to convert the security into common stock. The conversion price is normally set 20 to 25 percent above the share price at the time of issue so that eventual conversions are not as costly.

Small bank stocks are traded over the counter, with far fewer annual transactions. Still, a market for new issues does exist within local communities. Banks can often sell new shares to existing stockholders or current customers. Share prices are less volatile, but sensitive to deviations in current versus historical earnings.

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[12] Many large holding company banks raise new equity by issuing securities via private placements outside the United States. They can lower underwriting fees by as much as 25 percent and shorten the length of time to place an issue.

Preferred Stock

Preferred stock is a form of equity in which investors' claims are senior to those of common stockholders. As with common stock, preferred stock pays nondeductible dividends out of after-tax dollars. One significant difference is that corporate investors in preferred stock pay taxes on only 20 percent of dividends. For this reason, institutional investors dominate the market. New issues are effectively restricted to large, well-known banking organizations that are familiar to institutional investors, while smaller banks are excluded.

Since 1982, preferred stock has been an attractive source of primary capital for large banks. Most issues take the form of adjustable-rate perpetual stock. The dividend rate changes quarterly according to a Treasury yield formula. Investors earn a return equal to some spread above or below the highest of the three-month Treasury bill rate and the 10- or 20-year constant maturity Treasury rates. The size of the spread and whether it is above or below the base yield reflects the perceived quality of the issuing bank.

Investors are attracted to adjustable-rate preferred stock because they earn a yield that reflects the highest point on the Treasury yield curve under all market conditions. This removes guesswork as to whether short-term yields will move more or less than long-term yields and whether they will all move in the same direction. Unlike fixed-rate issues, these securities trade close to par and thus are more liquid. They effectively represent three-month securities and have been sold to individuals as well as corporations.

Preferred stock has the same disadvantages as common stock, but there are instances when it is more attractive. First, if a bank's common stock is priced below book value and has a low price-to-earnings ratio, new equity issues dilute earnings. This earnings dilution is less with perpetual preferred stock than with common stock, so that the cost of common shares is relatively higher. Second, aggregate dividend payments on preferred stock will be less than dividends on common stock over time for any bank that regularly increases common stock dividends. Cash flow requirements on perpetual preferred shares will also be lower because no sinking fund allocations are required to repay principal.

Trust Preferred Stock

A recent innovation in capital financing is the introduction of **trust preferred stock**, which is a hybrid form of equity capital at banks. It is attractive because it effectively pays dividends that are tax deductible and is considered Tier 1 capital. To issue the securities, a bank or bank holding company establishes a trust company. The trust company sells preferred stock to investors and loans the proceeds of the issue to the bank. Interest on the loan equals dividends paid on the preferred stock. This loan interest is tax deductible such that the bank effectively gets to deduct dividend payments on the preferred stock. As a bonus, the preferred stock counts as Tier 1 capital under the RBC guidelines. In addition, the bank can miss a dividend payment and not be forced into bankruptcy. The net effect is that trust preferred stock costs less than common equity, but has the same value for regulatory purposes. Not surprisingly, most large banks, as well as a few community banks, have issued trust preferred stock.

TARP Capital Purchase Program[13]

The Troubled Asset Relief Program's Capital Purchase Program (TARP-CPP), introduced in 2008, allowed financial institutions, or their holding companies, to sell preferred stock that qualified as Tier 1 capital to the Treasury. Foreign-controlled financial institutions did not qualify.

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[13] See TARP Capital Purchase Program, Senior Preferred Stock and Warrants, *Summary of Senior Preferred Terms,* Department of the Treasury, www.treas.gov/press/releases/reports/document5hp1207.pdf.

Qualified institutions could issue senior preferred stock equal to not less than 1 percent of risk-weighted assets and not more than the lesser of $25 billion, or 3 percent, of risk-weight assets. The senior preferred stock paid 5 percent per annum for five years and 9 percent thereafter. In 2014, many of the banks with outstanding TARP preferred stock saw their required dividend payments rise to this much higher level. Generally, the dividends are cumulative and senior to other dividends. The senior preferred shares are non-voting unless the dividends are not paid in full for six dividend periods. If the dividends are not paid, the senior preferred stockholders will have the right to elect two directors and the right will end when dividends are paid in full. The Treasury received warrants to purchase 15 percent of the common stock of the institution. Exhibit 12.10 lists the largest 25 financial institutions receiving TARP funds and the amounts they received. Most of these institutions eagerly pursued this type of capital given the difficulties in raising external capital during that time. For example, in September 2008, Regions Bank reported almost $ 115.5 billion in risk-weighted assets, which would have allowed it to qualify for approximately $3.47 billion in TARP funds. However, Regions did not announce it would take TARP funds until October 2008—when its total risk-weighted assets were higher and it qualified for more capital. Most of these institutions repaid their TARP preferred stock by 2014.

The senior preferred stock could not be redeemed for a period of three years from date of issue except with the proceeds from a qualified equity offering. After the third anniversary of issue, the senior preferred stock could be redeemed in whole or in part at the discretion of the institution. While TARP funds provided needed capital, the program did make the government (taxpayers) owner of all institutions that accepted the funding. One condition of the agreement allowed the government to change any and all terms at its discretion until the funds are repaid. Such a provision potentially presents serious problems for many managers.

Leasing Arrangements

Many banks enter into sale and leaseback arrangements as a source of immediate capital. Most transactions involve selling bank-owned headquarters or other real estate, and simultaneously leasing it back from the buyer. The terms of the lease can be structured to allow the bank to maintain complete control of the property, as if the title never changes hands, yet receive large amounts of cash at low cost. Lease rates run 1 to 2 percent below rates on subordinated debt. A sale-leaseback transaction effectively converts the appreciated value of real estate listed on the bank's books at cost to cash. The price appreciation is taxed at normal income tax rates, with most of the gain flowing to the bottom line as increased earnings. The transaction can be effected quickly when a buyer is located, and avoids the high placement costs of stocks and bonds.[14]

Capital Planning

Capital planning is part of the overall asset and liability management process. Bank management makes decisions regarding the amount of risk assumed in operations and potential returns. The amount and type of capital required is determined simultaneously with the expected composition of assets and liabilities and forecasts of income and expenses. The greater the assumed risk and asset growth, the greater the required capital.

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[14] If the sale conforms to FASB Statement No. 13, the operating lease does not require capitalization and the transaction further provides off-balance sheet financing.

EXHIBIT 12.10 **The 25 Largest TARP Fund Recipients (November 2008)**

Rank by Amount	Institution	Amount $ (millions)	Announcement Date
1	American International Group	$40,000	November 12, 2008
2	Citigroup	$25,000	October 12, 2008
3	J.P. Morgan Chase	$25,000	October 12, 2008
4	Wells Fargo	$25,000	October 12, 2008
5	Bank of America	$15,000	October 12, 2008
6	Goldman Sachs Group	$10,000	October 12, 2008
7	Merrill Lynch	$10,000	October 12, 2008
8	Morgan Stanley	$10,000	October 12, 2008
9	PNC Financial Services Group	$7,700	October 12, 2008
10	U.S. Bancorp	$6,600	November 12, 2008
11	Capital One Financial	$3,550	October 12, 2008
12	Regions Financial	$3,500	October 12, 2008
13	SunTrust Banks	$3,500	October 12, 2008
14	Fifth Third Bancorp	$3,400	October 12, 2008
15	BB&T	$3,100	October 12, 2008
16	Bank of New York Mellon	$3,000	October 12, 2008
17	KeyCorp	$2,500	October 12, 2008
18	Comerica	$2,250	October 12, 2008
19	State Street	$2,000	October 12, 2008
20	Marshall & Ilsley	$1,700	October 12, 2008
21	Northern Trust	$1,500	October 12, 2008
22	Huntington Bancshares	$1,400	October 12, 2008
23	Zions Bancorp	$1,400	October 12, 2008
24	Fannie Mae	$1,000	September 12, 2008
25	Freddie Mac	$1,000	September 12, 2008

Source: *Time*, www.time.com/time/includes/charts/trap_chart_1112.html.

Capital planning begins with management generating pro forma balance sheets and income statements for the next several years. The bank projects the dollar funding available from alternative deposit and nondeposit sources and the likely asset composition, given the bank's product mix and expertise. Assuming various interest rate scenarios and projections of noninterest income and expense, management forecasts earnings. Asset growth in excess of that financed with new debt or internally generated capital must be financed with external capital. Once a bank recognizes that it needs to obtain additional capital externally, it evaluates the costs and benefits of each source.

The planning process can be summarized in three steps:

1. Generate pro forma balance sheets and income statements for the bank.
2. Select a dividend payout.
3. Analyze the costs and benefits of alternative sources of external capital.

The first step provides an estimate of how much capital is needed to finance assets. Total equity capital required equals the residual between expected assets and expected debt. The amount of qualifying primary and secondary capital must be at least equal to the regulatory minimums. If management chooses to shrink the bank by liquidating assets, it may find that total capital required declines. Typically, additional equity capital is needed. Step 2 identifies how much capital will be generated internally and what amount of external capital is necessary. Dividend payments reduce the amount of retained earnings and add pressure for external capital funding. The third step involves evaluating alternatives. Management should project bank needs over several years so that it can develop a long-term plan. To be flexible, it should not rely extensively on any single source of capital in the short run, so that it can retain that option in future years. If, for example, a bank is leveraged to the maximum, it may be forced to issue new stock at a time when its share price is low. Chapter 10 introduces quantitative measures of the costs of different capital components.

Applications

Bank capital planning used to be a simple process. Management projected asset growth and retained earnings to show that capital ratios would be strong. Today, capital plans are typically an outgrowth of sophisticated asset and liability management planning models. They are carefully scrutinized by regulators to verify that those essential assumptions regarding asset quality, loan losses, and net interest margins are realistic. The output itself is the same pro forma balance sheet and income statement data presented in traditional performance reports. (See Chapter 3.)

Capital planning can be illustrated using the reporting framework of Exhibit 12.9. Consider a bank that has exhibited a deteriorating profit trend; its classified assets and loan loss provisions are rising, and earnings prospects are relatively bleak, given the economic environment. Assume as well that federal regulators who recently examined the bank indicated that the bank should increase its primary capital-to-asset ratio from its current 7 to 8.5 percent within four years.

The planning process consists of generating pro forma balance sheets and income statements over the next four years. Because regulators closely examine historical earnings and are keenly aware of asset problems, the initial pro forma statements should incorporate recent earnings trends slowly, moving the bank toward peer bank averages for key ratios. Often bankers conclude that their banks will meet capital guidelines easily because they overstate earnings. Regulators quickly point out the deficiencies and recommend substantial adjustments.

Suppose that the hypothetical bank reported the summary performance measures listed in Exhibit 12.11 for 2014. Because of asset-quality problems, the $80 million bank reported an ROA of just 0.45 percent, less than one-half its average over the past five years. The current capital ratio is 7 percent, or 1.5 percent less than the regulatory target. During each of the past five years, the bank paid $250,000 in common dividends.

The first part of Exhibit 12.11 simply extrapolates historical asset growth of 10 percent through 2018, assuming that earnings slowly rise to where ROA equals 0.75 percent in the fourth year. Under these conditions and the assumed continued dividend payout, the bank's total capital ratio would decrease to 6.1 percent by 2018. This is clearly unacceptable under the regulatory directive.

The following three parts of the exhibit identify different strategies for meeting the required 8.5 percent capital ratio by 2018 and present summary performance measures. The second section examines the impact of shrinking the bank. The quickest way to increase a capital ratio is to reduce the denominator, or shrink the bank's asset base. Shrinkage can normally be achieved by reducing the bank's loan exposure and letting high-cost purchased liabilities run off. In this example, the bank gradually reduces its assets by $1 million per year until 2018, when the capital ratio reaches 8.54 percent. The capital ratio increases continuously because the denominator (total assets) is falling while the numerator (capital) is rising with the growth in retained earnings.

EXHIBIT 12.11 Capital Planning: Forecast Performance Measures for a Bank with Deficient Capital Ratios

	2014	2015	2016	2017	2018
Historical 10% growth in assets: $250,000 in dividends					
Total assets	$80.00	$88.00	$96.80	$106.48	$117.13
Net interest margin	4.40%	4.40%	4.50%	4.60%	4.70%
ROA	0.45%	0.45%	0.60%	0.65%	0.75%
Total capital	$5.60	$5.75	$6.08	$6.52	$7.15
Capital ratio	7.00%	6.53%	6.28%	6.12%	6.10%
Shrink the bank, reduce assets by $1 million a year: $250,000 in dividends					
Total assets	$80.00	$79.00	$78.00	$77.00	$76.00
Net interest margin	4.40%	4.40%	4.50%	4.60%	4.70%
ROA	0.45%	0.45%	0.60%	0.65%	0.75%
Total capital	$5.60	$5.71	$5.92	$6.17	$6.49
Capital ratio	7.00%	7.22%	7.59%	8.02%	8.54%
Slow growth, $2 million increase in assets each year: no dividends					
Total assets	$80.00	$82.00	$84.00	$86.00	$88.00
Net interest margin	4.40%	4.40%	4.50%	4.60%	4.70%
ROA	0.45%	0.45%	0.60%	0.65%	0.75%
Total capital	$5.60	$5.97	$6.47	$7.03	$7.69
Capital ratio	7.00%	7.28%	7.71%	8.18%	8.74%
Slow growth, $2 million increase in assets each year: $250,000 in dividends, $800,000 external capital injection in 2017					
Total assets	$80.00	$82.00	$84.00	$86.00	$88.00
Net interest margin	4.40%	4.40%	4.50%	4.60%	4.70%
ROA	0.45%	0.45%	0.60%	0.65%	0.75%
Total capital	$5.60	$5.72	$5.97	$7.08	$7.49
Capital ratio	7.00%	6.97%	7.11%	8.23%	8.51%

Note: Figures are in millions of dollars.

A bank can also increase its capital by cutting its dividend payments. The third section projects the bank's capital position assuming slow asset growth at $2 million annually while eliminating the $250,000 dividend payment. Retained earnings increase more than total assets, producing a capital ratio of 8.74 percent in 2018, which exceeds the target.

The final alternative proposes that the bank grow slowly and maintain its dividend, but issue $800,000 in common stock to meet its capital requirement. In this case, the bank would wait until its earnings position had improved sufficiently, 2008 in this pro forma, before issuing external capital. Again, the projected capital ratio just exceeds the regulatory target by 2018.

In practice, a bank's asset and liability management committee will consider numerous other alternatives by varying assumptions until it determines the best plan. What is best depends on a comparison of the costs of each alternative. Eliminating dividends, for example, reduces stock prices and makes it extremely difficult and costly to raise external capital later. If the bank plans to add capital externally, it must carefully measure placement costs and their subsequent impact on share prices. For instance, if a bank issues subordinated debt, it must estimate the direct transactions costs and set aside a portion of future cash flows to service the debt. The same would apply to common stock issues and dividend payments.

Depository Institution Capital Standards

Effective December 1991, Congress passed the FDICIA with the intent of revising bank capital requirements to emphasize the importance of capital and authorize early regulatory intervention in problem institutions. The act also authorized regulators to measure interest rate risk at banks and require additional capital when risk is deemed excessive. The focal point of the act is the system of **prompt regulatory action**, which divides banks into categories, or zones, according to their capital positions and mandates action when capital minimums are not met. These minimum capital ratios apply through 2014 for small banks.

As shown in Exhibit 12.12, there are five capital categories, with the first two representing well-capitalized and adequately capitalized banks. Because of their strong capital positions, **well-capitalized banks** are not subject to any regulatory directives regarding capital. For this reason, most banks make every effort to meet the 6 percent, 10 percent, and 5 percent minimum ratios. **Adequately capitalized banks** also have strong capital, but are restricted from obtaining brokered deposits without FDIC approval. While this provision may not seem too restrictive, it has the potential to create problems. Today, regulators designate any bank deposit liability as a brokered deposit if the issuing bank pays an above-market rate. The deposit does not have to arise via a broker. Suppose that a bank competes in a three-bank community and all banks currently pay 2 percent on interest checking accounts. If the two competitors lower their rates to 1.25 percent, the bank finds that it is paying a 75 basis-point premium. Regulators may now label these interest checking accounts as brokered deposits and disallow them (or make the bank pay a lower rate). Does this make sense?

Banks that fall into one of the bottom three categories prompt some explicit regulatory action. **Undercapitalized banks** are institutions that do not meet at least one of the three minimum capital requirements. **Significantly undercapitalized banks** have capital that falls significantly below at least one of the three standards. Finally, **critically undercapitalized banks** do not meet minimum threshold levels for the three capital ratios.

Exhibit 12.12 documents the specific definitions and associated regulatory actions as summarized by the Federal Reserve Board of Governors in late 1997. The top panel lists the minimum capital ratios that a bank must meet to qualify in each category or zone. A bank must meet each of these ratios simultaneously. The bottom panel lists mandatory and discretionary provisions within each classification. Note the restrictive nature of the mandatory actions. A bank that is undercapitalized must limit its asset growth, suspend dividends, and offer a capital restoration plan, among other requirements. For a bank that is significantly undercapitalized, regulators can specify deposit rates and the pay of bank officers—decisions that senior management normally makes in the general course of business operations. Critically undercapitalized banks are near failure and treated accordingly. Once a bank reaches this stage, regulators can place it under receivership within 90 days. A review of the top panel reveals that such banks can have positive tangible equity capital equal to almost 2 percent of assets, be technically solvent, and still be closed by regulators.

Changes to Capital Standards Under Basel III

In response to the recent financial crisis, the Basel Committee on Banking Supervision agreed on a series of principles to "strengthen global capital and liquidity rules" that is known as Basel III. These standards will be implemented by the G20 countries over fairly

EXHIBIT 12.12 Capital Categories and Prompt Regulatory Action under FDICIA

A. Minimum Capital Requirements across Capital Categories

	Total Risk-Based Ratio		Tier 1 Risk-Based Ratio		Tier 1 Leverage Ratio	Tangible Equity Ratio[††]
1. Well capitalized	≥10%	and	≥6%	and	≥5%	
2. Adequately capitalized	≥8%	and	≥4%	and	≥4%*	
3. Undercapitalized	≥6%	and	≥3%	and	≥3%[†]	
4. Significantly undercapitalized	<6%	or	<3%	or	<3%	> 2%
5. Critically undercapitalized						≥ 2%

B. Provisions for Prompt Corrective Action

Category	Mandatory Provisions	Discretionary Provisions
1. Well capitalized	None	None
2. Adequately capitalized	1. No brokered deposits, except with FDIC Approval	None
3. Undercapitalized	1. Suspend dividends and management fees 2. Require capital restoration plan 3. Restrict asset growth 4. Approval required for acquisitions, branching, and new activities 5. No brokered deposits	1. Order recapitalization 2. Restrict interaffiliate transactions 3. Restrict deposit interest rates 4. Restrict certain other activities 5. Any other action that would better: carry out prompt corrective action
4. Significantly undercapitalized	1. Same as for Category 3 2. Order recapitalization§ 3. Restrict interaffiliate transactions§ 4. Restrict deposit interest rates§ 5. Pay of officers restricted	1. Any Zone 3 discretionary actions 2. Conservatorship or receivership if fails to submit or implement plan or recapitalize pursuant to order 3. Any other Zone 5 provision, if such action is necessary to carry out prompt corrective action
5. Critically undercapitalized	1. Same as for Category 4 2. Receiver/conservator within 90 days§ 3. Receivership if still in Category 5 four quarters after becoming critically undercapitalized 4. Suspend payments on subordinated debt§ 5. Restrict certain other activities	

*Three percent or above for composite one-rated banks and savings associations that are not experiencing or anticipating significant growth.

[†] Under 3 percent for composite one-rated banks and savings associations that are not experiencing or anticipating significant growth.

[††] Tangible equity equals core capital elements plus cumulative perpetual preferred stock, net of all intangibles except limited amounts of purchased mortgage servicing rights.

[§] Not required if primary supervisor determines action would not serve purpose of prompt corrective action or if certain other conditions are met.

Source: FDIC, Quarterly Banking Profile, www.fdic.gov.

lengthy time periods and have the general impact of increasing capital requirements (decreasing financial leverage). In the United States, the final rules implementing Basel III were approved in July 2013 with many of the requirements effective in 2014 or later. Importantly, Basel III also provides formal standards that set minimum liquidity requirements. While some Basel III rules only apply to the largest banking organizations, bank regulators have the power to impose them on other banks if their capital and liquidity are determined to be inadequate relative to the risks exhibited.

The capital rules increase the minimum capital requirements for all banks and, in some cases, redefine what constitutes regulatory capital. The rules also increase specific risk weights for certain types of assets that are deemed to be risker than the previous risk-weighting scheme suggested. Specifically, with the full implementation of Basel III capital standards, the minimum capital ratios presented earlier will increase to those listed in Exhibit 12.13. The increases reflect a capital conservation buffer of 2.5 percent eventually. A banking organization must hold capital above the minimum including the conservation buffer if it wants to avoid any limitation on what it can pay out to stockholders in the form of cash dividends and, in some cases, what it can pay as discretionary bonuses to executives.[15] Exhibit 12.14 presents the minimum ratios across the different prompt corrective action categories. Note that the minimums are generally higher than those prevailing before Basel III.

The biggest change in what constitutes regulatory capital is the focus on common equity as the 'best' form of capital. Thus, the new CET1 ratio was created. The CET1 calculation subtracts goodwill and other intangibles from common equity. In addition, banking organizations with $15 billion or more in consolidated assets must phase out trust preferred stock as Tier 1 capital over time and limit the use of deferred tax assets, mortgage servicing assets, and minority interest as capital. For bank organizations with more than $250 billion in assets or more than $10 billion in foreign exposure, unrealized gains and losses on AFS securities are included in accumulated other comprehensive income (AOCI), which is part of CET1 capital. Other banks have the choice of opting-out of this requirement by January 2015. Finally, when calculating risk-weighted assets, risk weights for high-volatility commercial real estate loans, all past due loans, and selected securitization exposures were increased substantially.

Remember that regulatory capital standards that put more emphasis on the amount of common equity required generally lower financial leverage. As such, the new capital requirements will put pressure on bank returns on equity. Lower returns, in turn, will increase a bank's cost of capital, thereby making it more expensive and difficult to raise

EXHIBIT 12.13 Minimum Capital Thresholds for Prompt Corrective Action under Basel III

	Total Capital RWA	Tier 1 Capital RWA	Tier 1 Leverage Ratio	CET1
Well capitalized	≥10%	≥8%	≥4%	≥6.5%
Adequately capitalized	≥8%	≥6%	≥4%	≥4.5%
Undercapitalized	<8%	<6%	<4%	<4.5%
Significantly undercapitalized	<6%	<4%	<4%	<3.0%

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[15] The allowable dividend and bonus payout is limited to 60 percent of retained income (earnings) if the banking organization's capital conservation buffer (above the regulatory minimum) is between 1.875 percent and 2.5 percent; 40 percent if the capital conservation buffer is above 1.25 percent up to 1.875 percent; and 20 percent if the capital conservation buffer is above 0.625 percent up to 1.25 percent. The organization can make no payout if the capital conservation buffer is 0.625 percent or below.

EXHIBIT 12.14 **Phase-in Capital Requirements for Minimum Adequately Capitalized Requirements: 2015–2018**

	2015	2016	2017	2018	2019
Common equity Tier 1 capital ratio	4.5%	4.5%	4.5%	4.5%	4.5%
Capital conservation buffer	0.0	0.625%	1.25%	1.875%	2.5%
Minimum CET1 ratio plus buffer	4.5%	5.125%	5.75%	6.375%	7.0%
Tier 1 capital ratio	6.0%	6.0%	6.0%	6.0%	6.0%
Minimum Tier 1 capital ratio plus buffer	6.0%	6.625%	7.25%	7.875%	8.5%
Total capital ratio	8.0%	8.0%	8.0%	8.0%	8.0%
Minimum total capital ratio plus buffer	8.0%	8.625%	9.25%	9.875%	10.5%
Leverage	4.0%	4.0%	4.0%	4.0%	4.0%

capital externally (issue new stock to investors). Finally, the requirements will force banks to raise loan rates, cut operating expenses, or find new sources of fee income to cover the higher cost of capital. If they raise loan rates, ceteris paribus, they will see a reduction in lending. The primary benefit of higher capital (and liquidity) requirements is to reduce the systemic risk of the financial system.

The impact of FDICIA is much broader than these provisions suggest. Clearly, problem or undercapitalized institutions must obtain capital to remain in business. This often requires entering into a merger or acquisition because it is difficult to enter the primary markets and issue new capital. Similarly, bank managers know that if they maintain strong capital positions the regulators will let them operate without much restriction. Of course, the capital standards in Exhibit 12.13 are minimums. If the regulators believe that risk is above average for any reason, they can impose additional requirements.

Summary

In response to the financial crisis, bank regulators have placed increased importance on bank capital. While capital is a lagging indicator of performance, banks with too little capital relative to risks assumed in their operations are subject to poor performance and ultimately failure. Not surprisingly, many banks have increased their capital in anticipation of stricter rules and the need to avoid regulatory sanctions. Higher capital, in turn, lowers the potential ROE given the lower financial leverage.

This chapter examines the role that capital serves at banks, how regulators determine a bank's capital adequacy, what constitutes bank capital, and strategies that banks can follow to meet their growth and performance objectives. It examines the current risk-based regulatory capital standards and those under Basel III.

Questions

1. What are the advantages and disadvantages of using financial leverage? Answer from the banker's point of view and then from the bank regulator's point of view.
2. Provide the general outline of existing RBC requirements. Is there a difference between default risk, interest rate risk, and liquidity risk?

3. Explain how capital reduces banking risks. Discuss the importance of cash flows and economic (market) value rather than accounting value.
4. Many analysts argue that RBC requirements should force banks to raise loan rates. Explain this by assuming that a bank's management sets loan rates to earn a 16 percent ROE. How does the allocation of equity to a loan affect loan pricing?
5. Suppose that a bank wants to grow during the next year but does not want to issue any new external capital. Its current financial plan projects a ROA of 1.25 percent, a dividend payout rate of 35 percent, and an equity-to-asset ratio of 8 percent. Calculate the allowable growth in the bank's assets supported by these projections. What growth rate could be supported if the bank issued additional common stock equal to 1 percent of bank assets, with the same earnings projections?
6. Many regulators would like to see bank capital requirements raised. Consider a proposal to increase the minimum Tier 1 and total capital ratios to 9 percent and 12 percent, respectively. What impact would this have on bank risk? Would small banks and large banks have equal opportunity in meeting these requirements? What impact would this have on banking industry consolidation?
7. Regulators put great pressure on banks to reduce their common dividend payments when asset problems appear. Discuss the costs and benefits of cutting dividends.
8. Two competing commercial banks situated in the same community have comparable asset portfolios, but one operates with a total capital ratio of 10 percent, while the other operates with a ratio of 12 percent. Compare the opportunities and risk profiles of the two banks.
9. Explain why increased regulatory capital requirements lead to a greater consolidation of banking firms via mergers and acquisitions.
10. RBC requirements may induce bank managers to change their asset composition. Explain why. Determine how a shift from any of the following should affect a bank's required capital. How will each shift affect the bank's profit potential?
    a. From consumer loans to 1–4 family mortgages
    b. From U.S. agency securities to construction loans
    c. From FNMA-sponsored mortgage-backed securities to municipal revenue bonds
11. A bank has decided it must raise external capital. Discuss the advantages and disadvantages of each of the following choices:
    a. Subordinated debt at 7.7 percent
    b. Preferred stock at a 10 percent dividend yield
    c. Common stock
12. What is the leverage capital ratio and why do regulators specify a minimum for it?
13. FDICIA imposes increasingly severe operating restrictions on undercapitalized banks (those in Zones 3, 4, and 5). Explain why these restrictions are appropriate. Describe how managers should respond to these restrictions if they manage an undercapitalized bank.
14. Some analysts believe that the new Basel III minimum capital requirements are excessive and will reduce bank profitability, ceteris paribus. Summarize these arguments.
15. What is the capital conservation buffer and what impact will it have on bank performance and risk?

Problems

I. First Student Bank. First Student Bank (FSB) has the following balance sheet:

Assets		**Liabilities and Equity**	
Cash	$100	Transactions accounts	$700
Treasury bills (30 days)	$190	CDs	$220
Treasury bonds (5 years)	$30	Subordinated debt	$7
Repos	$10	Preferred stock	$5
Student tuition loans	$500	Retained earnings	$48
Student home mortgages	$100	Common stock	$5
Building and furniture	$110	Surplus	$15
Loan loss reserves	$(40)		
Total	$1,000	Total	$1,000

The bank is only two years old and is desperately trying to break into the local market for student loans. Consequently, it has followed the policy of guaranteeing tuition loans for three additional years to every student who promptly paid off his or her first-year loan. This policy has been a success, and the bank has signed agreements guaranteeing $800 in loans. The bank has also tried to encourage the building of 1–4 family homes near campus. The bank is willing to lend money on these properties and to commit to repurchasing the homes when the students graduate. The repurchase price is settled at the time the mortgage is written, such that the whole package is expected to be profitable for the bank. Currently, the bank has obligated itself to spend $75 to repurchase homes.

1. This is a student-owned-and-run bank and does not operate in international markets. Does it need to comply with the RBC rules?
2. How many dollars of common equity capital does this bank have? How many dollars of Tier 1 capital does it have?
3. How many dollars of total capital does this bank have?
4. Categorize the bank's assets by risk category. How many dollars of Category 1 assets, Category 2 assets, and so on, does the bank have?
5. How many dollars of contingencies does this bank have (after applying the appropriate conversion factor)?
6. How many dollars of risk-weighted assets does FSB own?
7. Does FSB have adequate Tier 1 capital? Adequate total capital?

II. One-Year Bank Growth. Consider a bank with $500 million in assets and $30 million in total capital. Its *minimum* total capital-to-asset ratio must equal 6 percent. At the beginning of the year, senior management and the board of directors project that the bank will likely earn 0.86 percent on assets, will pay a 30 percent dividend, and will not obtain any external capital. In this environment, how large can the bank grow by the end of the year?

1. Assume that the bank would like to grow its assets by 15 percent during the year. If the dividend rate is 30 percent and no external capital is obtained, what must the bank's ROA equal?

2. Assume that the bank wants to grow assets by 15 percent with an ROA of 0.85 percent, and will not obtain external capital. What dividend payout rate will support 15 percent growth? What are the costs and benefits of changing dividends in this direction?
3. What increase in external capital is necessary to support 15 percent asset growth with ROA equal to 0.85 percent and a dividend payout rate of 30 percent?

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13 Overview of Credit Policy and Loan Characteristics

Loans are the dominant asset at most depository institutions. They also generate the largest share of operating income and represent the institution's greatest risk exposure. Loan officers are among the most visible bank employees and a bank's loan policies will often have a dramatic impact on how fast a community grows and what types of businesses develop.

Over time, increased competition among commercial banks, savings institutions, credit unions, finance companies, farm credit banks, and investment banks has led to changes in lending policies and loan portfolios. Following World War II through the 1970s, commercial banks controlled commercial lending in the United States. The credit environment during the 1980s and early 1990s consisted of too many high-risk loans, historically high loan losses, and aggressive pricing, which produced low-risk-adjusted returns. Not surprisingly, this was a period of significant bank failures. Depository institutions in the aggregate reduced the size of their loan portfolios and bought securities instead.

The late 1990s and early to mid-2000s saw rapid growth in lending, especially real estate, home equity, and consumer loans. This was generally a period of strong economic growth and low loan losses. It was also a period of strong real estate markets. Real estate loans at commercial banks, in the aggregate, increased from a long-term average of about 25 percent of an institution's loan portfolio to about 55 to 56 percent of total loans in 2007–2008. Real estate loans have fallen as a percent of total loans at commercial banks since 2009.

Other lenders, including mortgage bankers, joined the real estate craze when the Federal Reserve dramatically lowered the Fed funds rate to between 1 and 1.75 percent in 2001–2003. This set off an unprecedented refinancing boom in which competition in the mortgage industry became intense. As the competition increased and the quality of new borrowers declined, lenders focused their efforts on variable-rate products as well as "exotic" products such as interest-only (IO), no-documentation, zero-down-payment loans, and pick-a-pay mortgages (option ARMs). The subprime meltdown of 2007–2008 demonstrated that these products had been underpriced, as the risks had not been well understood. As a result, many borrowers defaulted on their loans, and many large mortgage lenders, including Washington Mutual and Countrywide Financial, were forced into bankruptcy or were acquired.

Under provisions of the Act, the Consumer Financial Protection Bureau (CFPB) created a qualified mortgage (QM) defined by an "Ability-to-Repay" rule. For a mortgage to be classified as QM, a lender cannot charge up-front fees or points in excess of 3 percent of the loan, the maturity cannot be longer than 30 years and the borrower's monthly debt payments cannot exceed 43 percent of gross monthly income. A mortgage may also qualify as QM if a small lender makes the mortgage and holds it in portfolio and if it fits the purchase or guarantee requirements of a GSE, such as Fannie Mae or Freddie Mac. Lenders that make QM loans are presumed to meet reasonable underwriting standards such that QM loans are safe harbored whereby lenders are protected from borrower lawsuits. The intent is to standardize mortgages so that borrowers can understand the terms and not take out loans they cannot afford. QM rules went into effect in January 2014.

Depository institutions pursue many different lending strategies and concentrate on niches in which they restrict new loans to well-defined markets where they have specialized experience. At one end, some larger depository institutions have gravitated toward investment banking, securities underwriting, and originating loans then securitizing them by selling them to other investors and earning a profit from servicing fees. Other depository institutions see loan growth as their primary path to long-term survival, and they aggressively court new consumer and commercial business. Many hope to eventually be allowed to make an equity investment in some of the companies to which they currently lend.

This chapter provides an overview of the credit process and the types of credit extended by commercial banks. It describes recent problems depository institutions have faced in certain credit areas and issues related to default risk and interest rate risk.

Recent Trends in Loan Growth and Quality

Commercial banks extend credit to different types of borrowers for many different purposes. For most customers, bank credit is the primary source of available debt financing. For most depository institutions, good loans are the most profitable assets. As with any investment, extending loans to businesses and individuals involves taking risks to earn high returns. Returns come in the form of loan interest, fee income, and investment income from new deposits. Depository institutions also use loans to cross-sell other fee-generating services.

The most prominent assumed risk is credit risk. Many factors can lead to loan defaults. An entire industry, such as energy, agriculture, or real estate, can decline because of general economic events. Firm-specific problems may arise from changing technology, labor strikes, shifts in consumer preferences, or bad management. Individual borrowers find that their ability to repay closely follows the business cycle as personal income rises and falls. Loans as a group thus exhibit the highest charge-offs among depository institution assets, so depository institutions regularly set aside substantial reserves against anticipated losses.

Interest rate risk also arises from credit decisions. Loan maturities, pricing, and the form of principal repayment affect the timing and magnitude of a bank's cash inflows. Floating-rate and variable-rate loans, for example, generate cash flows that vary closely with variable borrowing costs. Fixed-rate balloon payment loans, by contrast, generate fewer cash inflows. Longer-term consumer loans need to be funded with stable deposits to reduce exposure to rate changes.

Loans are the dominant asset in most depository institutions' portfolios, representing on average 50 to 75 percent of total assets. Loan composition varies greatly among depository institutions depending on size, location, trade area, and lending expertise. Exhibit 13.1 summarizes proportionate differences among general loan categories for different-sized commercial banks and savings institutions at the end of December 2013. Although lending practices can and do vary significantly for similar-sized commercial banks, several characteristics stand out. First, the ratio of net loans to assets is greatest at 63.9 percent for commercial banks with $1 billion to $10 billion in assets, followed closely by commercial banks in the $100 million to $1 billion asset category with a comparable ratio of 62.1 percent. With the recession during the financial crisis, the ratio of net loans to assets is down significantly from pre-recession levels. For example, in 2007 average net loans for banks in both of these two size categories exceeded 70 percent of total assets. This is most likely a result of two distinct factors. First, banks were very aggressive lenders prior to the crisis and second, there are simply fewer qualified borrowers post the financial crisis.

Banks with more than $10 billion in assets have, on average, reduced their dependence on loans relative to smaller banks, with net loans comprising only 49.9 percent of total assets. This is not surprising as many of the largest institutions focus on non-credit products and services that generate noninterest income as their primary source of revenue. Real estate loans represent the largest single loan category for all banks and was the fastest-growing category prior to the financial crisis of 2008 (see Exhibit 13.4). Interestingly, most of the reduction in the net loans to total assets ratio was a result of a drop in real estate loans since 2007.

In terms of the mix, residential 1–4 family loans (mostly mortgage products) contribute the largest amount of real estate loans for the largest and smallest banks (asset size less than $100 million and assets size greater than $10 billion). Commercial real estate (CRE) loans, on the other hand, make up the largest real-estate concentration for mid-sized banks (those with asset sizes between $100 million and $10 billion). Commercial and industrial loans represent the second highest concentration of loans at commercial banks and third highest concentration at savings institutions, while loans to individuals are greatest for banks with more than $10 billion assets. Farm-related loans make up a significant portion of the smallest banks' loans, but are negligible elsewhere. Finally, other loans and leases, which include loans to other financial institutions, lease receivables and international loans, are significant only at the largest banks.

As demonstrated in Chapter 5, there are different types of depository institutions and different banking business models. Some institutions focus on small- or large-business lending, particularly lending for CRE, while others focus on deposit gathering. A few large firms target mortgage lending, investment banking activities, credit card processing, and related activities in addition to loans. In 2013, Wells Fargo originated over 30 percent of new mortgages versus other U.S. lenders.

Because most financial institutions make loans to different types of borrowers, it is difficult to characterize their business model beyond having a transactions or relationship focus. Recently the FDIC began categorizing commercial banks and savings institutions into one of nine categories according to the institutions' asset lending concentrations: credit card banks, international banks, agricultural banks, commercial lenders, mortgage lenders, consumer lenders, other specialized banks with assets of less than $1 billion, all other banks with assets of less than $1 billion, and all other banks with assets of greater than $1 billion.

Exhibit 13.2 demonstrates key differences in loan concentrations, loan charge-offs, and aggregate returns across these asset concentrations at the end of 2013. The vast majority of FDIC-insured institutions are classified as commercial lenders. Agricultural banks and banks with no clear asset concentration (all others less than $1 billion) are a distant second. Interestingly, in 2013 only four banks specialized in international lending, and only

EXHIBIT 13.1 Commercial Bank and Savings Institution Loans as a Percentage of Total Assets, December 2013

	<$100 Million	$100 Million to $1 Billion	$1 to $10 Billion	>$10 Billion	All Commercial Banks	All Savings Institutions
Number of institutions reporting	**1,814**	**3,522**	**450**	**90**	**5,876**	**936**
Net loans and leases	**55.15%**	**62.13%**	**63.91%**	**49.88%**	**52.08%**	**60.57%**
Plus: Loan Loss Allowance	0.96%	1.06%	1.05%	0.90%	0.93%	0.90%
Total loans & leases	56.11%	63.18%	64.96%	50.78%	53.01%	61.47%
Plus: Unearned income	0.02%	0.03%	0.03%	0.01%	0.01%	0.04%
Loans and leases, gross	56.13%	63.21%	64.99%	50.79%	53.02%	61.51%
All real estate loans	37.04%	46.96%	44.11%	22.48%	26.35%	44.10%
Real estate loans in domestic offices:	37.04%	46.96%	44.10%	21.90%	25.86%	44.10%
Construction and land development	2.31%	4.22%	3.86%	0.91%	1.43%	1.38%
Commercial real estate	11.68%	20.51%	20.49%	4.80%	7.42%	9.10%
Multifamily residential real estate	1.08%	2.29%	3.25%	1.24%	1.49%	5.60%
1-4 family residential	15.25%	16.19%	15.16%	14.83%	14.97%	27.86%
Farmland	6.71%	3.75%	1.33%	0.12%	0.56%	0.17%
Real estate loans in foreign offices:	0.00%	0.00%	0.01%	0.58%	0.48%	0.00%
Farm loans	**6.94%**	**2.87%**	**0.97%**	**0.17%**	**0.50%**	**0.24%**
Commercial and industrial loans	**7.54%**	**9.17%**	**11.92%**	**11.41%**	**11.26%**	**5.73%**
To non-U.S. addressees	0.01%	0.04%	0.32%	2.08%	1.76%	0.40%
Loans to individuals	**3.82%**	**2.92%**	**5.18%**	**10.18%**	**9.14%**	**9.92%**
Credit cards	0.05%	0.18%	1.78%	5.28%	4.55%	6.63%
Related Plans	0.05%	0.10%	0.23%	0.47%	0.42%	0.18%
Automobile loans	1.76%	1.13%	2.06%	2.59%	2.43%	2.04%
Other loans to individuals	1.96%	1.51%	1.11%	1.83%	1.74%	1.07%
Total other loans and leases *	**0.78%**	**1.29%**	**2.81%**	**6.55%**	**5.78%**	**1.52%**
Loans to foreign governments & official institutions	0.00%	0.00%	0.01%	0.05%	0.04%	0.00%
Obligations of states & political subdivisions in the U.S.	0.34%	0.51%	1.08%	0.85%	0.84%	0.12%
Other loans	0.18%	0.39%	1.18%	3.82%	3.30%	1.13%
Lease financing receivables	0.24%	0.30%	0.37%	0.88%	0.78%	0.23%
Loans to depository institutions and acceptances of other banks	0.03%	0.10%	0.17%	0.96%	0.82%	0.03%
Memoranda:						
Commercial real estate loans not secured by real estate	0.15%	0.17%	0.29%	0.60%	0.54%	0.14%
Loans secured by real estate to non-U.S. address	0.00%	0.08%	0.14%	0.60%	0.52%	0.01%
Restructured loans and leases, total	0.49%	0.65%	0.57%	0.70%	0.68%	0.55%
Construction and land development real estate loans	2.31%	4.22%	3.86%	0.91%	1.43%	1.38%
Total loans & leases in foreign offices	0.00%	0.01%	0.14%	4.70%	3.91%	0.00%

Source: FDIC, Quarterly Banking Profile, www.fdic.gov.

EXHIBIT 13.2 Credit Risk Diversification and Lending Concentrations by Asset Concentration Groups: December 2013

	All Institutions	Credit Card Institutions	International Banks	Agricultural Banks	Commercial Lenders	Mortgage Lenders	Consumer Lenders	Other Specialized <$1 Billion	All Other <$1 Billion	All Other >$1 Billion
Number of institutions reporting	6,812	16	4	1,532	3,377	588	55	406	772	62
All real estate loans	51.5%	0.0%	36.7%	59.4%	61.5%	89.9%	23.6%	68.9%	76.0%	50.7%
Construction and development	2.7%	0.0%	0.4%	3.0%	4.6%	1.8%	0.4%	5.0%	4.2%	1.7%
Nonfarm nonresidential	14.1%	0.0%	2.8%	17.0%	23.9%	7.8%	1.6%	25.0%	19.0%	9.6%
Multifamily residential real estate	3.3%	0.0%	3.7%	1.8%	5.0%	3.1%	0.2%	2.2%	2.0%	1.5%
Home equity loans	6.5%	0.0%	6.9%	1.3%	6.3%	5.6%	6.3%	2.2%	3.2%	8.6%
Other 1-4 family residential	23.2%	0.0%	18.3%	14.9%	20.7%	71.3%	15.0%	31.1%	42.3%	28.7%
Commercial and industrial loans	20.3%	7.5%	20.8%	12.7%	23.2%	2.9%	5.7%	12.8%	8.8%	22.3%
Loans to individuals	17.1%	91.7%	19.9%	4.0%	8.2%	2.4%	70.0%	12.2%	8.0%	13.6%
Credit card loans	8.8%	88.2%	12.8%	0.3%	1.1%	0.2%	17.1%	1.1%	0.1%	2.5%
Other loans to individuals	8.4%	3.5%	7.1%	3.7%	7.1%	2.1%	52.9%	11.1%	7.8%	11.1%
All other loans and leases (including farm)	11.1%	0.7%	22.6%	23.9%	7.0%	4.8%	0.7%	6.1%	7.2%	13.4%
Profit and risk ratios										
Return on equity	9.6%	23.1%	9.6%	10.3%	7.7%	8.6%	12.3%	14.0%	7.5%	9.3%
Return on assets	1.1%	3.4%	0.9%	1.2%	0.9%	1.0%	1.2%	1.9%	0.9%	1.1%
Equity capital ratio	11.2%	14.7%	9.3%	11.0%	11.8%	11.6%	9.5%	13.5%	11.3%	11.5%
Net charge-offs to loans and leases	0.7%	3.2%	1.0%	0.1%	0.4%	0.4%	0.8%	0.5%	0.3%	0.5%

Source: FDIC, Quarterly Banking Profile, www2.fdic.gov/qbp/index.asp.

Asset Concentration Group Definitions (Groups are hierarchical and mutually exclusive):

Credit card lenders—Institutions whose credit card loans plus securitized receivables exceed 50 percent of total assets plus securitized receivables.

International banks—Banks with assets greater than $10 billion and more than 25 percent of total assets in foreign offices.

Agricultural banks—Banks whose agricultural production loans plus real estate loans secured by farmland exceed 25 percent of total loans and leases.

Commercial lenders—Institutions whose commercial and industrial loans, plus real estate construction and development loans, plus loans secured by commercial real estate properties exceed 25 percent of total assets.

Mortgage lenders—Institutions whose residential mortgage loans plus mortgage-backed securities exceed 50 percent of total assets.

Consumer lenders—Institutions whose residential mortgage loans, plus credit card loans, plus other loans to individuals exceed 50 percent of total assets.

Other specialized <$1 billion—Institutions with assets of less than $1 billion, whose loans and leases are less than 40 percent of total assets.

All other <$1 billion—Institutions with assets of less than $1 billion that do not meet any of the definitions above; they have significant lending activity with no identified asset concentrations.

All other >$1 billion—Institutions with assets of greater than $1 billion that do not meet any of the definitions above; they have significant lending activity with no identified asset concentrations.

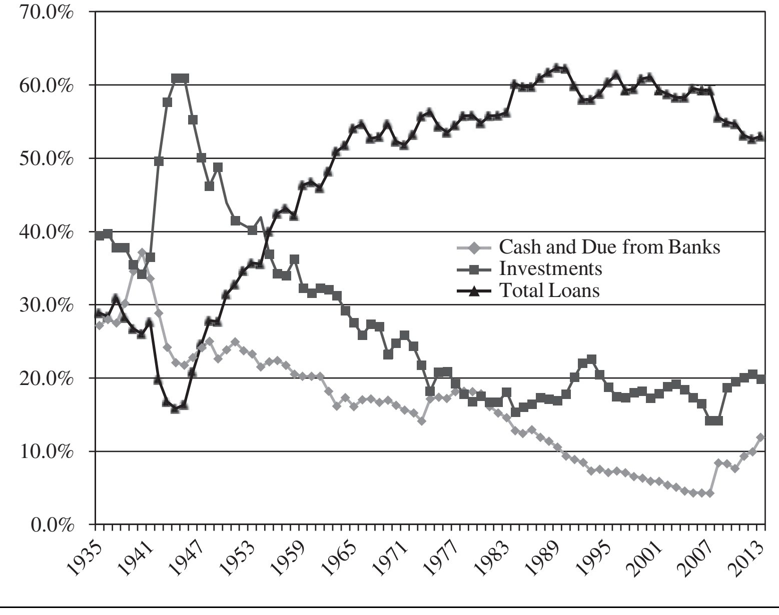
16 institutions concentrated on credit card lending. Even though the commercial lending concentration makes up the majority of institutions, this group also makes a wide variety of loans. By contrast, credit card banks have concentrated portfolios, as loans to individuals comprise almost 91.7 percent of assets.

Banks with different asset concentrations exhibit sharply different risks and returns. Credit card banks reported the highest ROAs, on average, and the highest charge-off rates in 2013. Due to the high credit risk of credit card loans, on average, and the high relative interest rates charged, credit card banks reported an average ROA that was 250 and 150 basis points higher than the ROAs for commercial lenders and consumer lenders, respectively. This occurred even though net charge-offs were 310 and 240 basis points higher, respectively—clear evidence of the risk-return trade-off in banking.

These static comparisons, however, mask several important trends in depository institution lending. First, loans vary with the business cycle. Exhibit 13.3 demonstrates that loans, as a percentage of total assets, have grown sharply since the late 1940s, with only slight dips during recession years, and peaked around 1990. Since 1990, banks have largely substituted lower-risk investment securities for loans, particularly beginning in late 2007 as several of the larger banks reduced their credit exposures following the onset of the financial crisis. Similarly, the composition of loans tilted dramatically toward real estate lending since 1985. Exhibit 13.4 shows the dramatic increase in real estate loans as a percentage of total loans: from a historical average of about 25 percent of total loans in 1985 to almost 60 percent by the end of 2008, with a corresponding decline in commercial and industrial lending and a general decline in other types of lending. Many institutions reduced their mortgage real estate concentrations since 2008 as a direct result of mortgage problems during this period.

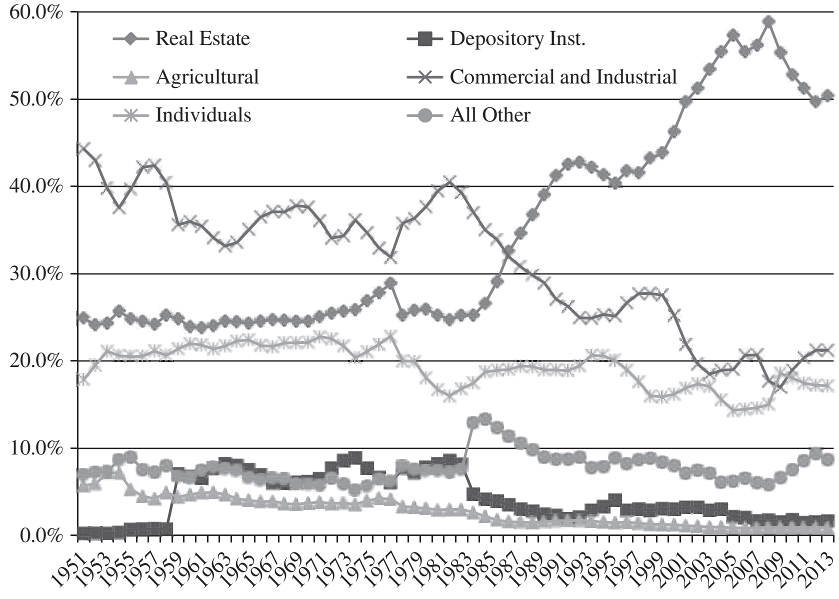
Problem loans and loan losses also vary with the business cycle. Exhibits 13.5 and 13.6 compare noncurrent loan rates and net loan charge-off rates, respectively, across

EXHIBIT 13.3 **Importance of Loans, Investment Securities, and Cash Assets at Commercial Banks, 1935–2013**



Source: FDIC, historical statistics, www.fdic.gov.

EXHIBIT 13.4 **Change in Composition of Commercial Bank Lending over Time: 1951–2013**



Source: FDIC, Quarterly Banking Profile, www.fdic.gov.

types of loans from the mid-1980s through 2013. **Noncurrent loans** are loans and leases past due 90 days or more and still accruing interest, plus all loans and leases in a nonaccrual status.[1] **Net losses (net charge-offs)**, in turn, represent the dollar amount of loans that are formally charged off as uncollectible minus the dollar value of recoveries on loans previously charged off. Exhibits 13.5 and 13.6 document the credit problems, particularly around the recessions of 1990, 2000, and 2008 where the fraction of noncurrent loans to total loans increased sharply. By the late 1990s, loan losses were at historically low levels with the exception of loan losses with consumer loans, which have remained high. The sharp increase following 2007 reflects the serious asset quality problems at banks brought about by the recent financial crisis.

Loan performance also varies among different types of loans. The late 1980s and early 1990s were difficult times for the banking industry, as noncurrent loans for "all categories" jumped dramatically from 1986 to 1987 as a direct result of the sharp fall in energy prices, agricultural problems, the overbuilding of CRE, and the Tax Reform Act of 1986. In Texas this was called the triple threat: oil, agriculture, and real estate. Foreign loan problems and charge-offs followed a few years later. Loan losses on real estate loans and consumer loans soared during and after the onset of the financial crisis in 2008. While conditions have improved since 2010, loan delinquency rates have remained well above historical norms for real estate and consumer loans, and charge-offs have remained high as well for single-family residential mortgages.

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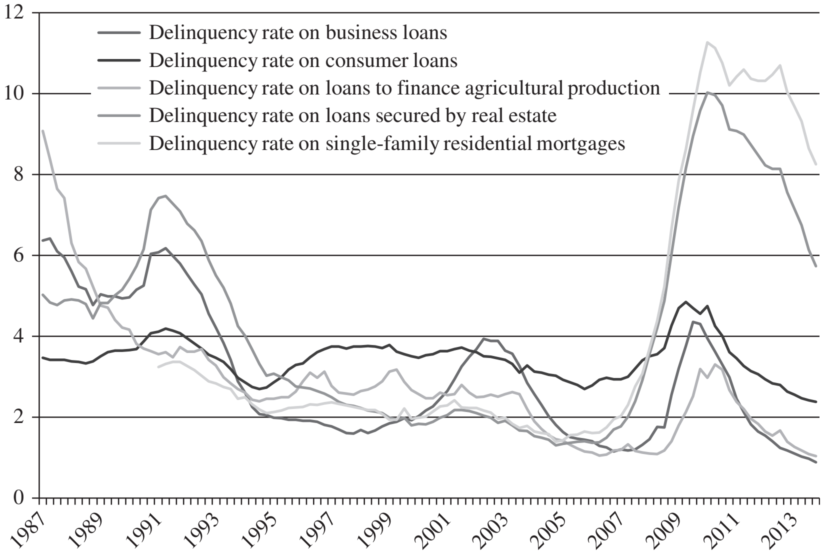
[1] Nonaccrual loans and leases are those (a) that are maintained on a cash basis because of deterioration in the financial position of the borrower, (b) where full payment of interest and principal is not expected, or (c) where principal or interest has been in default for a period of 90 days or more, unless the obligation is both well secured and in the process of collection.

EXHIBIT 13.5 **Noncurrent Loans as a Percentage of Total Loans, All FDIC-Insured Institutions, 1987–2013**



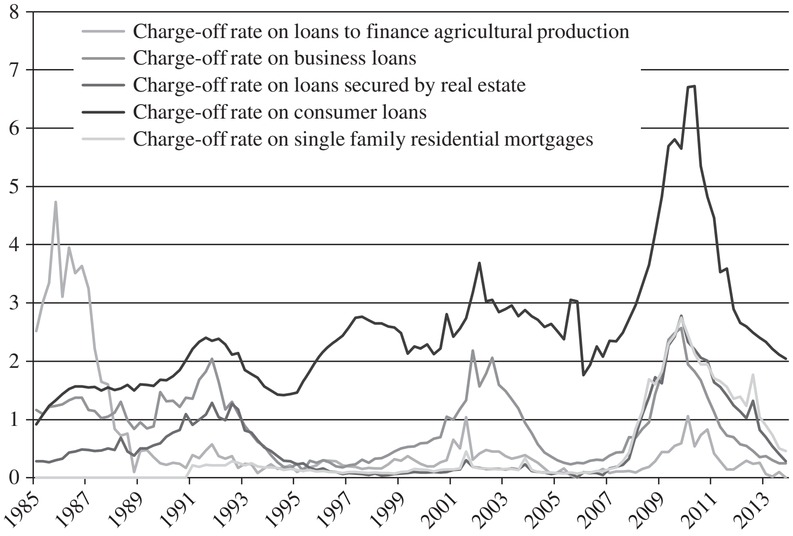
Note: Noncurrent loan rates represent the percentage of loans that are past due 90 days or more, or are in nonaccrual status.
Source: FDIC, Quarterly Banking Profile, www.fdic.gov.

A significant portion of the increase in loan losses prior to the financial crisis of 2008 could be attributed to credit card losses and the dramatic increase in personal bankruptcies. Generally, credit card charge-offs increase during economic downturns and decrease when economic conditions are strong. Exhibit 13.7 shows the sharp increase in credit card charge-off rates around the recessions in 1990, 2001, and 2008–2009. Personal bankruptcy filings tend to follow the same pattern, as individuals who lose their jobs and see earnings fall are more likely to declare bankruptcy. Legislation also affects the pace of bankruptcies, as demonstrated when the number of bankruptcies increased in 2005 to 655,000, just before Congress passed bankruptcy reform legislation that made it more difficult for individuals to walk away from their debts and avoid repayment. As a result of the recent financial crisis, bankruptcies increased foreclosures, and the recession of 2008–2009. Since 2013, credit card charge-offs and personal bankruptcies appear to have fallen to their long-run historical averages.

Impact of Loan Competition

Many quality borrowers have access to funding sources other than those provided by depository institutions. Agricultural borrowers can use the federal Farm Credit System (FCS) banks. Small businesses can borrow via the U.S. Small Business Administration (often with the assistance of banks). Larger firms can borrow directly in the money and capital markets by issuing commercial paper or long-term bonds.

EXHIBIT 13.6 Net Charge-offs by Loan Type at U.S. Commercial Banks, 1985–2013



Source: FDIC, Quarterly Banking Profile, www.fdic.gov.

Prior to the recent financial crisis, many large institutions followed an originate-to-distribute (OTD) model in which they originated loans with standardized features and securitized them, effectively generating fees from loan origination rather than interest income from holding loans in portfolio. If they could successfully sell the loans without recourse, they would be subject to less credit, liquidity, and interest rate risk. Unfortunately, as we observed in the subprime lending crisis of 2007–2009, many shadow banks pursued the OTD model so aggressively that they made loans to many borrowers who were unable to repay them. Thus, “No Doc” and liar loans came into being. The more formal names are Alt-A or stated income loans in which the lender did not obtain documentation on a borrower’s income but instead relied on whatever the borrower verbally reported as income (if not true, the borrower was lying when stating income) when making a credit decision.[2] Similarly, the largest institutions, such as Citigroup, would originate such No Doc or liar loans and put them into structured investment vehicles (SIVs) and financed with short-term commercial paper so they could move the loans off-balance sheet and thereby reduce their required capital. As the loans fell into default, the SIVs didn’t have sufficient revenues to service their debt payments on the commercial paper so that Citigroup and other SIV creators had to move the loans back onto their balance sheets.[3] Ultimately, Citigroup and others were forced to charge off significant amounts of these loans.

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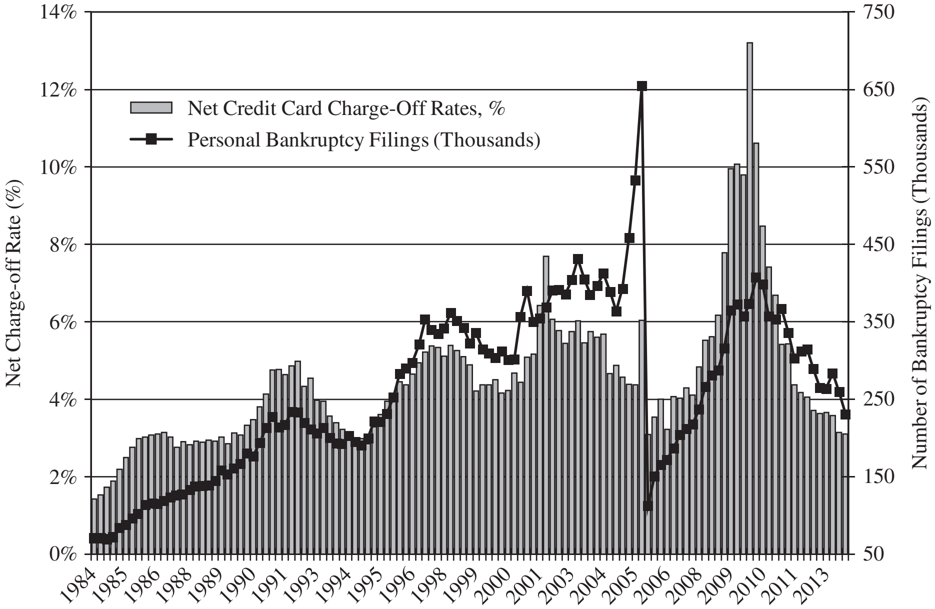
[2] Some of these loans were also pejoratively labeled NINJA loans for which a borrower when asked for financial status would reveal ‘No Income, No Job and No Assets,’ but still see the lender approve the loan.

[3] Citigroup and others could have made loans to the SIVs under letter of credit agreements, but they would have been required to hold capital against such loans so they simply took the problem loans back.

EXHIBIT 13.7 Credit Card Charge-Off Rates and Personal Bankruptcy Filings: 1985–2013



Source: Bankruptcies—Administrative Office of the United States Courts; Charge-Off Rates—Commercial Bank Call Reports; FDIC Quarterly Banking Profile, www.fdic.gov.

Today's widespread use of credit scoring by lenders and the securitization of consumer and small-business loans puts additional pressure on interest rates. Credit scoring, which is discussed in Chapter 15 for consumer loans, is a statistical process that assigns a score to a borrower based on characteristics of the borrower that indicate a high or low likelihood of loan repayment. Widespread use of credit scoring standardizes the perceived quality of different types of loans, such as pools of mortgages, credit card receivables, home equity loans, and small-business loans. As more lenders originate these loans and securitize them, the supply of credit increases. This lowers market interest rates, ceteris paribus. The use of credit scoring models is effective, but the data must be verified. Lenders must also deal with large volumes of loans to justify the investment in and costs associated with credit-scored loans.

The Internet has also led to smaller spreads for more standardized loan products. Many depository institutions, nonbanks, and loan brokers advertise auto loan, credit card, mortgage, and home equity rates, as well as accept and process loan applications on the Internet. Consumers have much greater access to information on loan rates and terms from across the country and can readily shop for the lowest rate and best terms, putting even more pressure on spreads. Internet loan brokers now accept loan applications and process loan requests on the Internet and can even fund the loans using direct deposit transfers to an individual's bank account. The following Contemporary Issues box, "Competitors Come in Many Forms," summarizes recent changes in the competitive landscape.

CONTEMPORARY ISSUES

Competitors Come in Many Forms

Competition for banking services comes in many forms. In addition to traditional competitors (such as credit unions and consumer finance companies), competition also comes from credit card companies (American Express and Discover Card), brokerage companies (Fidelity Investments and Raymond James) and insurance companies (State Farm and Allstate) which either operate banks directly or offer many banking services such as prepaid cards or both. Pawn shops, payday lenders, check-cashing services, and new and used car dealers also offer many of the same loan products as banks. Pawn shops not only buy and sell used goods, they also make loans, often at very high rates of interest, using a customer's personal property as collateral. Payday lenders and check-cashing services will lend money, again at very high rates, awaiting the customer's next paycheck. Check-cashing services charge fees, mostly to those without a bank account, to cash payroll and third-party checks.

New and used car dealers not only offer to sell automobiles but will arrange financing for the car buyer as well. When a car dealer "arranges" financing for the customer, he or she fills out a relatively uniform credit application and sends this to one of several underwriters in town, such as a local commercial bank, Ford Motor Credit, GM Financial, and other credit corporations from Toyota, Nissan, and so on. Typically, the dealer will accept the best rate from the first few underwriters who respond to the application sent out. Most often, the rate the underwriter will lend money for on the credit application is below the rate the dealer quotes the customer, so it is in the borrower's best interest to search for lower cost financing. Alternatively, an individual can go online and immediately find numerous automobile lenders who will accept applications online and approve them (as deemed appropriate) without ever meeting the car buyer. A recent web scan revealed loan rates offered by CarsDirect, myAutoloan, and Lending Tree, among others, to be highly "competitive." Many borrowers have similarly determined that they can get loans via quicken.com faster and with much less red tape because banks are highly regulated. Today, most companies accept debit and credit cards for payment of monthly bills such as water and electricity. Most of these same companies allow customers to pay their bills online or by using their phone. Wal-Mart has been particularly aggressive in getting into the banking business via its Bluebird card. Bluebird is a prepaid debit and credit card offered in a partnership with Wal-Mart and American Express. Although Wal-Mart was denied a banking charter in the United States, it was able to purchase a bank and initiate traditional banking activities in both Mexico and Canada.

Measuring Aggregate Asset Quality

The credit quality data presented above may not accurately reflect the quality of individual assets and the likelihood of default. It is extremely difficult to assess individual asset quality using aggregate quality data such as the percentage of charge-offs and past-due loans. In fact, many firms that buy depository institutions are surprised at the acquired institution's poor asset quality even though they conducted a due diligence review of the acquired institution prior to the purchase. Different types of assets and off-balance sheet activities have different default probabilities. Loans typically exhibit the greatest credit risk. Depository institutions evaluate their portfolio credit risk by asking three basic questions: What is the historical loss rate on loans and investments? What are expected losses in the event of a default? How is the bank prepared to weather the expected losses and potential unknown future losses? Changes in general economic conditions and a firm's operating environment alter the cash flow available for debt service. These conditions are difficult to predict. Therefore, historical charge-offs and past-due loans might understate (or overstate) future losses depending on the *future* economic and operational conditions of the borrower.

For example, the 1990s were a period of exceptional economic growth, and depository institutions experienced some of the lowest charge-off rates they had seen in recent times. For example, examining aggregate charge-off and past-due data on commercial and real estate loans for just the five-year period 1995–1999 shown in Exhibits 13.5 and 13.6 might be misleading due to the exceptional economic times of that period. During that period, loan losses were quite low but obviously picked up during the 2000s. The past doesn't necessarily repeat itself. Banks do not intentionally make bad loans. Loans go bad as a result of many factors, including changes in economic conditions or the operating environment in which the firm works. Loans booked today, generally, do not have problems until later when conditions change. Hence, data on historical losses and past-due loans will only be a good representation of the quality of the loan portfolio if similar conditions exist in the future. One must use historical data cautiously, as it may not represent the current quality of the loan portfolio.

Similarly, an individual's ability to repay debts varies with changes in employment and personal net worth. For this reason, banks perform a credit analysis on each loan request to assess a borrower's capacity to repay. Unfortunately, loans tend to deteriorate long before accounting information reveals any problems. In addition, many banks enter into off-balance sheet activities, such as loan commitments, guarantee offers, and derivative contracts. The prospective borrowers and counterparties must perform, or the bank may take a loss. These risks can be substantial, but are difficult to measure from published historical data.

There are several other sources of credit risk that may not be well represented in the bank's aggregate historical credit risk data. **Concentration risk** exists when banks lend in a narrow geographic area or concentrate their loans in a certain industry. This risk is not fully reflected in their balance sheet or measured by historical charge-off data. This lack of diversification could dramatically affect a significant portion of a bank's portfolio if economic factors negatively affect the geographic or industry concentration. As shown in Exhibit 13.4, the banking industry significantly increased its concentrations in real estate loans in recent years. Consequently, for institutions with high concentrations in real estate, a downturn in real estate values could have a pronounced effect on the institutions' credit quality. Although the data presented in Exhibit 13.1 show that larger commercial banks (more than $10 billion in assets) generally have a smaller proportion of their portfolio in real estate, we know from the subprime mortgage crisis of 2008-2009 that some of the very largest institutions had significant exposures to the mortgage market in their investments and off-balance sheet activities. Obviously, these concentrations were a contributing factor to the crisis. Larger institutions also have the advantage of greater geographic diversification. Unfortunately, broader diversification cannot always insulate banks from a crisis involving an entire industry, such as housing.

Depository institutions with high loan growth rates often assume greater risk, because credit analysis and review procedures are less rigorous. In many instances the loans perform temporarily, but losses eventually increase. Thus, high loan growth rates, particularly when the loans are generated externally through acquisitions or the entering of new trade areas, often lead to future charge-offs.

Finally, institutions that lend funds in foreign countries take country risk. **Country risk** refers to the potential loss of interest and principal on international loans due to borrowers in a country refusing to make timely payments, as per a loan agreement. In essence, foreign governments and corporate borrowers may default on their loans due to government controls over the actions of businesses and individuals, internal politics that may disrupt payments, general market disruptions, and problems that arise when governments reduce or eliminate subsidies used as a source of repayment. Depository institutions have historically experienced substantial losses on certain international loans consistent with deteriorating economic conditions in the underlying countries.

The Credit Process

Experienced lending organizations have the required expertise, experience, and customer focus to make them the preferred lender for many types of loans. Lending is not just a matter of making the loan and waiting for payment. Loans must be monitored and closely supervised to prevent losses. This requires an administrative staff for which depository institutions are well suited.

There are two important parts to good lending: assessing the borrower's commitment to repay the loan and evaluating the borrower's ability to pay the loan. Many experienced lenders suggest that assessing the borrower's commitment to pay is most critical and should be answered first, before considering the ability to pay the loan. Meaning, if you lend money for a borrower to buy a car, you would rather be paid back than repossess a broken down car!

When measuring a borrower's commitment or desire to pay the loan, the lender attempts to measure the borrowers' character, the viability or quality of what the loan proceeds will be used for, as well as the borrower's history in paying prior debts. The borrower's character must be that of a truthful person who is committed to repaying the loan under all circumstances. The purpose of the loan is also critical, not only as a measure of the borrower's commitment to pay, but how the proceeds are used will also affect the borrower's ability to pay. For example, borrowing money from a bank to gamble in Las Vegas could be a negative indicator of the borrower's commitment to pay, as well as an indicator of a much higher rate of default! Finally, the borrower's past history of paying debts would be a good indicator of future payment behavior.

A borrower's ability to pay the loan must be evaluated as well. Even well-intentioned borrowers can only accommodate a finite level of debt. The borrower's ability to pay can be assessed by factors such as total income, total debt, total assets and the value of the collateral relative to the risk of what the loan will be used for.

Many consumer loans are fairly standardized; e.g., mortgages, credit card, and automobile loans. Most consumers have a credit file and associated credit score which is used as an objective method of assessing a borrower's ability to pay. A credit score is a numerical value assigned by the credit agency to assess a borrower's past performance in paying their debts. By examining a borrower's credit file and credit score, a somewhat objective assessment can be made across borrowers. Hence, credit scores are used to standardize the lending process.

Although a borrower's credit file will contain most of the debts, it rarely contains all of the assets or an accurate measure of income. Hence, most experts suggest that credit scores don't measure a borrower's ability to pay, but rather the commitment to pay based on the borrower's history of payments.

The fundamental objective of commercial and consumer lending is to make profitable loans with minimal risk. Management should target specific industries or markets in which lending officers have expertise. The somewhat competing goals of loan volume and loan quality must be balanced with the bank's liquidity requirements, capital constraints, and rate of return objectives. The credit process relies on each bank's systems and controls that allow management and credit officers to evaluate risk and return trade-offs.

The credit process includes three functions: business development and credit analysis, underwriting or credit execution and administration, and credit review (see Exhibit 13.8). Each function reflects the bank's written loan policy as determined by the board of directors. A **loan policy** formalizes lending guidelines that employees follow to conduct bank business. It identifies preferred loan qualities and establishes procedures for granting, documenting, and reviewing loans.[4] Specific elements within each function are listed in the exhibit.

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[4] In their periodic examinations, regulators evaluate each bank's written loan policy to see if existing loans conform to management's objectives and acceptable guidelines.

EXHIBIT 13.8 The Credit Process

Business Development and Credit Analysis	Credit Execution and Administration	Credit Review
• Market research • Advertising, public relations • Officer call programs • Obtain formal loan request • Obtain financial statements, borrowing resolution, credit reports • Financial statement and cash-flow analysis • Evaluate collateral • Line officer makes recommendation on accepting/rejecting loan	• Loan committee reviews proposal/recommendation • Accept/reject decision made, terms negotiated • Loan agreement prepared with collateral documentation • Borrower signs agreement, turns over collateral, receives loan proceeds • Perfect security interest • File materials in credit file • Process loan payments, obtain periodic financial statements, call on borrower	• Review loan documentation • Monitor compliance with loan agreement: – Positive and negative loan covenants – Delinquencies in loan payments – Discuss nature of delinquency or other problems with borrower • Institute corrective action: – Modify credit terms – Obtain additional capital, collateral, guarantees – Call loan

Management's **credit philosophy** determines how much risk the bank will take and in what form. A bank's **credit culture** refers to the fundamental principles that drive lending activity and how management analyzes risk. There can be large differences between banks in their lending philosophy. The following labels describe three potentially different credit cultures: values driven, current-profit driven, and market-share driven.

Credit Culture	Characteristics of the Culture
VALUES DRIVEN ***Conservative***	• Focus is on credit quality with strong risk management systems and controls. • Primary emphasis is on bank soundness and stability and a consistent market presence. • Underwriting is conservative and significant loan concentrations are not allowed. • Typical outcome is lower current profit from loans with fewer loan losses.
CURRENT-PROFIT DRIVEN ***Moderately Aggressive***	• Focus is on short-term earnings. • Primary emphasis is bank's annual profit plan. • Management is often attracted to high-risk and high-return borrowers. • Outcome is typically higher profit in good times, followed by lower profit in bad times when loan losses increase.
MARKET-SHARE DRIVEN ***Aggressive***	• Focus is on having the highest market share of loans among competitors. • Primary emphasis is on loan volume and growth with the intent of having the largest market share. • Underwriting is very aggressive and management accepts loan concentrations and above-average credit risk. • Outcome is that loan quality suffers over time, while profit is modest because loan growth comes from below-market pricing and greater risk taking.

EXHIBIT 13.9 **20 Essentials of Good Banking Fostered by a Strong Credit Culture**

1. Commitment to excellence
2. Philosophical framework for day-to-day decision making
3. Sound value system that will cope with change
4. Uniform approach to risk taking that provides stability and consistence
5. Development of a common credit language
6. Historical perspective on the bank's credit experience
7. Bank comes first and ahead of every profit center
8. Candor and good communication at all levels
9. Awareness of every transaction's effect on the bank
10. A portfolio with integrity and an appreciation of what properly belongs in it
11. Accountability for decisions and actions
12. Long-term view as well as a short-term view
13. Respect for credit basics
14. Reconciliation of market practice with common sense
15. Use of independent judgment and not the herd instinct
16. Constant mindfulness of the bank's risk-taking parameters
17. Realistic approach to markets and budgeting
18. An understanding of what the bank expects and the reasons behind its policies
19. Credit system with early-warning capabilities
20. Appreciation that in risk-taking there are no surprises, only ignorance

Source: Henry P. Mueller, "Risk Management and the Credit Culture—Necessary Interaction," Journal of Commercial Lending, May1993. Copyright 1993 by Robert Morris Associates. Reprinted with permission from the *Journal of Commercial Lending*.

Exhibit 13.9 documents elements of a strong values-driven credit culture that encourages management to maintain asset quality amid pressures to chase bad deals. This credit culture is set and enforced by the chief executive officer. Most of the elements address the systematic approach to risk taking that forces loan officers to focus on long-term performance, consider a wide range of possible outcomes, and be accountable for actual earnings and loss performance.

Business Development and Credit Analysis

Where would a depository institution be without customers? Business development is the process of marketing bank services to existing and potential customers. With lending, it involves identifying new credit customers and soliciting their banking business, as well as maintaining relationships with current customers and cross-selling noncredit services. Every bank employee, from tellers handling drive-up facilities to members of the board of directors, is responsible for business development. Each employee regularly comes into contact with potential customers and can sell bank services. To encourage marketing efforts, many banks use cash bonuses or other incentive plans to reward employees who successfully cross-sell services or bring new business into the bank.

The normal starting point for any business development effort is market research. Management should establish targets for loan composition and identify areas of potential business. The research may formally analyze economic conditions, local demographic trends, and customer surveys. Alternatively, it may simply evolve from normal customer contacts and the development of a communications link with local businesses about forthcoming opportunities. The purpose is to forecast the demand for bank services. The second step is to train employees regarding what products are available, what products customers are likely to need or want, and how they should communicate with customers about these needs. Finally, the bank should effectively market and make customers aware of its products and services. The most obvious means is through effective advertising and public relations. Many depository institutions also incorporate formal officer call programs, in which lending officers make regular face-to-face contact with current and potential borrowers. Borrowers are often hesitant to reveal personal details or business financial backgrounds. Before doing so, they like to know and trust the bank official with whom they are dealing.

Call programs require constant personal contact with potential borrowers, either through civic groups and trade associations or direct appointments. Formal programs involve bank-determined numerical objectives and officer implementation of customer contact procedures. The numerical objectives often stipulate a minimum number of calls each month. Some are directed at current customers, while others target potential customers identified through research. The calling officer establishes the personal contact, makes the call, and files a report. After each call, the officer logs the date and time of the meeting and the issues discussed, and notes the opportunities for obtaining new business. Typically, officers must call on new customers several times before an opportunity develops. The bank is essentially positioning itself for the times when customers become dissatisfied with their prior bank relationship or qualify as good credits.

Credit Analysis. Once a customer requests a loan, bank officers analyze all available information to determine whether the loan meets the institution's risk-return objectives. Credit analysis is essentially default risk analysis in which a loan officer attempts to evaluate a borrower's ability and willingness to repay. Eric Compton identified three distinct areas of commercial risk analysis related to the following questions:[5]

1. What risks are inherent in the operations of the business?
2. What have managers done or failed to do to mitigate those risks?
3. How can a lender structure and control its own risks in supplying funds?

The first question forces the credit analyst to generate a list of factors that indicate what could harm a borrower's ability to repay. The second recognizes that repayment is largely a function of decisions made by a borrower. Is management aware of the important risks and has it responded? The last question forces the analyst to specify how risks can be controlled so the bank can structure an acceptable loan agreement.

Traditionally, key risk factors have been classified according to the five Cs of good credit:

- *Character* refers to the borrower's honesty and trustworthiness. An analyst must assess the borrower's integrity and subsequent intent to repay. If there are any serious doubts, the loan should be rejected.
- *Capital* refers to the borrower's wealth position measured by financial soundness and market standing. Can the firm or individual withstand any deterioration in its financial position? Capital helps cushion losses and reduces the likelihood of bankruptcy.
- *Capacity* involves both the borrower's legal standing and management's expertise in maintaining operations so the firm or individual can repay its debt obligations. A

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[5] The discussion is based on Compton (1985).

business must have identifiable cash flow or alternative sources of cash to repay debt. An individual must be able to generate income.

- *Conditions* refer to the economic environment or industry-specific supply, production, and distribution factors influencing a firm's operations. Repayment sources of cash often vary with the business cycle or consumer demand.
- *Collateral* is the lender's secondary source of repayment or security in the case of default. Having an asset that the bank can seize and liquidate when a borrower defaults reduces loss, but does not justify lending proceeds when the credit decision is originally made.

Golden and Walker further identify the five Cs of *bad* credit, representing things to guard against to help prevent problems:[6]

- *Complacency* refers to the tendency to assume that because things were good in the past, they will be good in the future. Common examples are an over-reliance on guarantors, reported net worth, or past loan repayment success because things have always worked out in the past.
- *Carelessness* involves poor underwriting typically evidenced by inadequate loan documentation, a lack of current financial information or other pertinent information in the credit files, and a lack of protective covenants in the loan agreement. Each of these makes it difficult to monitor a borrower's progress and identify problems before they become unmanageable.
- *Communication* ineffectiveness refers to when a bank's credit objectives and policies are not clearly communicated. This is when loan problems can arise. Management must effectively communicate and enforce loan policies, and loan officers should make management aware of specific problems with existing loans as soon as they appear.
- *Contingencies* refer to lenders' tendency to play down or ignore circumstances in which a loan might default. The focus is on trying to make a deal work rather than identifying downside risk.
- *Competition* involves following competitors' behavior rather than maintaining the bank's own credit standards. Doing something because the bank down the street is doing it does not mean it's a prudent business practice.

The formal credit analysis procedure includes a subjective evaluation of the borrower's request and a detailed review of all financial statements. Credit department employees may perform the initial quantitative analysis for the loan officer. The process consists of the following practices:

1. Collecting information for the credit file, such as the borrower's credit history and payment performance
2. Evaluating management, the company, and the industry in which it operates; that is, making an evaluation of internal and external factors
3. Spreading financial statements; that is, conducting a financial-statement analysis
4. Projecting the borrower's cash flow and thus its ability to service the debt
5. Evaluating collateral or the secondary source of repayment
6. Writing a summary analysis and making a recommendation

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[6] From Sam Golden and Harry Walker (1993).

Using this data, the credit analyst should prepare and assimilate the formal credit file. The credit file contains background information on the borrower, including call report summaries, past and present financial statements, pertinent credit reports, and supporting schedules such as an aging of receivables, a breakdown of current inventory and equipment, and a summary of insurance coverage. If the customer is a previous borrower, the file should contain copies of past loan agreements, cash-flow projections, collateral agreements and security documents, any narrative comments, and copies of all correspondence with the customer provided by prior loan officers. As discussed above, one of the most important aspects of lending is determining the customer's *commitment to repay the loan*. Although this is critically important, it is difficult to measure. Information in the credit file will give the credit officer documentation on the customer's repayment history.

Next, the credit analyst uses the credit file data to spread the financial statements, project cash flow, and evaluate collateral.[7] An evaluation of management, the company, and industry is also needed to ensure the soundness of the loan. The last step is to submit a written report summarizing the loan request, loan purpose, and the borrower's comparative financial performance with industry standards, and to make a recommendation.

The loan officer evaluates the report and discusses any errors, omissions, and extensions with the analyst. If the credit (loan) does not satisfy the bank's risk criteria, the officer notifies the borrower that the original request has been denied. The officer may suggest procedures that would improve the borrower's condition and repayment prospects and encourage the borrower to present another proposal if circumstances improve. If the credit satisfies acceptable risk limits, the officer negotiates specific preliminary credit terms including the loan amount, maturity, pricing, collateral requirements, and repayment schedule.

Many small commercial banks do not have formal credit departments and full-time analysts to prepare financial histories. Loan officers personally complete the steps outlined above before accepting or rejecting a loan. Often loan requests are received without detailed information on the borrower's condition. Financial statements may be handwritten or unaudited and may not meet generally accepted accounting principles. Yet the borrower may possess good character and substantial net worth. In such instances, the loan officer works with the borrower to prepare a formal loan request and obtain the best financial information possible. This may mean personally auditing the borrower's receipts, expenditures, receivables, and inventory.

Credit Execution and Administration

The process by which the formal credit decision is made varies by bank. It depends on many factors, such as the bank's organizational structure, bank size, number of employees and length of experience, and even the types of loans made. The formal decision can be made individually, by an independent underwriting department, by a loan committee, or through the use of a combination of these methods. Formally, a bank's board of directors has the final say over which loans are approved. In most financial institutions, however, lending authority is delegated to management and lending officers within certain parameters. Lending officers typically have independent authority to approve loans up to some fixed dollar amount. Junior officers at a large bank might have authority to approve loans no larger than $100,000, while senior lending officers might independently approve loans up to $500,000.

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[7] This detailed data analysis is discussed in Chapter 14 for commercial loans and Chapter 15 for consumer loans; several examples are given.

A **loan committee**, made up of the bank's senior loan officers and sometimes a board member, will formally review larger loans. This committee reviews each step of the credit analysis as presented by the loan officer and supporting analysts and makes a collective decision. Loan committees meet regularly to monitor the credit approval process and asset-quality problems when they arise. When required, the board of directors, or a bank's director loan committee, reviews the decision and grants final approval.

Many larger banks employ a centralized underwriting department. **Centralized underwriting** uses a relationship manager (RM) who sources new business and manages existing relationships within the portfolio. On new credit requests, the RM advises the client on the information required to process the request, evaluates and prescreens the request when the information is received, and if the request has a good probability of approval, prepares the package and sends it to the loan center. Credit specialists in central underwriting make the final loan decision, but some banks allow for market overrides if the RM can mitigate the reasons for decline. Most large banks use computer software to quantitatively spread and evaluate the credit requests. Approvals from the computer system can be considered one of the required signatures in some banks' approval process. The RM's signature is the second required signature (up to the officer's authority).

Once a loan has been approved, the officer notifies the borrower and prepares a **loan agreement**. This agreement formalizes the purpose of the loan, the terms, repayment schedule, collateral required, any loan covenants, and finally, what conditions bring about default by the borrower. Conditions of default may include events such as late principal and interest payments, the sale of substantial assets, a declaration of bankruptcy, and the breaking of any restrictive loan covenant. The officer then checks that all loan documentation is present and in order. The borrower signs the agreement along with other guarantors, turns over the collateral if necessary, and receives the loan proceeds.

Documentation: Perfecting the Security Interest. Documenting all aspects of the loan agreement and the bank's formal claim over collateral are essential to preventing or minimizing losses. A critical feature of executing any loan involves perfecting the bank's security interest in collateral. A security interest is the legal claim on property that secures payment on a debt or performance of an obligation. When the bank's claim is superior to that of other creditors and the borrower, its security interest is said to be *perfected.*[8]

Because there are many different types of borrowers and collateral, there are different methods of perfecting a security interest. In most cases, the bank requires borrowers to sign a security agreement that assigns qualifying collateral to the bank. This agreement describes the collateral and relevant covenants or warranties. Formal closure may involve getting the signature of a third-party guarantor on a loan agreement or having a key individual assign the cash value of a life insurance policy to the bank. In other cases, a bank may need to obtain title to equipment or vehicles. Whenever all parties sign a security agreement and the bank holds the collateral, the security interest is perfected. When the borrower holds the collateral, the bank must file a financing statement with the state that describes the collateral and the rights of the bank and borrower. It must be signed to establish the bank's superior interest.

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[8] The Uniform Commercial Code (UCC) establishes what documentation is required to obtain a security interest in commercial lending. The UCC applies in every state, although various states have revised certain conditions. Each lending officer must understand what conditions apply wherever the bank conducts business.

Losses are a normal part of lending. They can be totally eliminated only by taking no credit risk. Banks have many procedures that help limit their loss exposure. The primary strategic tool is to have a formal loan policy that establishes exposure limits to any single borrower or group of borrowers. Such maximum exposures will not put the bank at risk of failure if the entire exposure goes unpaid. Other specific procedures include position limits, risk rating loans, and loan covenants.

Position Limits. Position limits are the maximum allowable credit exposures to any single borrower, industry, or geographic locale. Regulators define a **loan concentration** as any exposure that exceeds 25 percent of capital. Although some banks define acceptable exposures as a percentage of assets, risk exposure should always be expressed as a percentage of the bank's equity capital. For example, if exposure to a certain industry is 400 percent of equity capital, the bank is putting four times its net worth at risk. The size of the exposure indicates the amount of the bank's equity capital that it is willing to put at risk. It should be lower for single borrowers and industries with the greatest loss potential. The objective is to avoid catastrophic losses.

In December of 2006, regulators issued guidance on CRE concentrations due to the significant growth in commercial bank's exposure to real estate loans. Although regulators consider 25 percent of capital a concentration, they issued the following guidance on real estate exposures for monitoring purposes:

- Total loans for construction, land development, and other land loans equal to 100 percent or more of total capital; or
- Total CRE loans equal to 300 percent of total capital (excluding owner-occupied CRE) and CRE loans increased by 50 percent or more within the past 36 months.

Commercial banks' loan exposures to real estate grew from about 25 percent of total loans in 1983 to approximately 57 percent of total loans in 2006. These real estate concentrations were obviously one of many catalysts to the financial crisis of 2008. Exhibit 13.10 documents the number of FDIC-insured institutions whose construction, land development, and other land loans exceeded the 100 percent threshold. At the Beginning of 2008, the figure exceeded 2,300. Note the sharp drop in the number of banks that exceeded the 100 percent threshold through 2013 as banks attempted to reduce their concentrations and thus their potential exposure to falling CRE property values.

Risk Rating Loans. Another procedure for limiting risk is for a depository institution to strategically grade individual loans and counterparties. Risk grading involves evaluating characteristics of the borrower and loan to assess the likelihood of default and the amount of loss in the event of default (LIED). The grades may be assigned subjectively or by formal quantitative credit scoring models.[9] The new Basel risk-based capital standards require a much finer risk grading system for depository institutions.[10] Loans are rated from low risk to high risk and vary sharply across industries, types of borrowers, different regions of the United States, and different countries. Obviously, charge-offs will be higher for the highest-risk loans, and banks must price these loans much higher relative to their costs.

Loan Covenants. Once an institution lends funds to a customer, the bank and borrower effectively become partners. The bank wants the customer to repay the debt and

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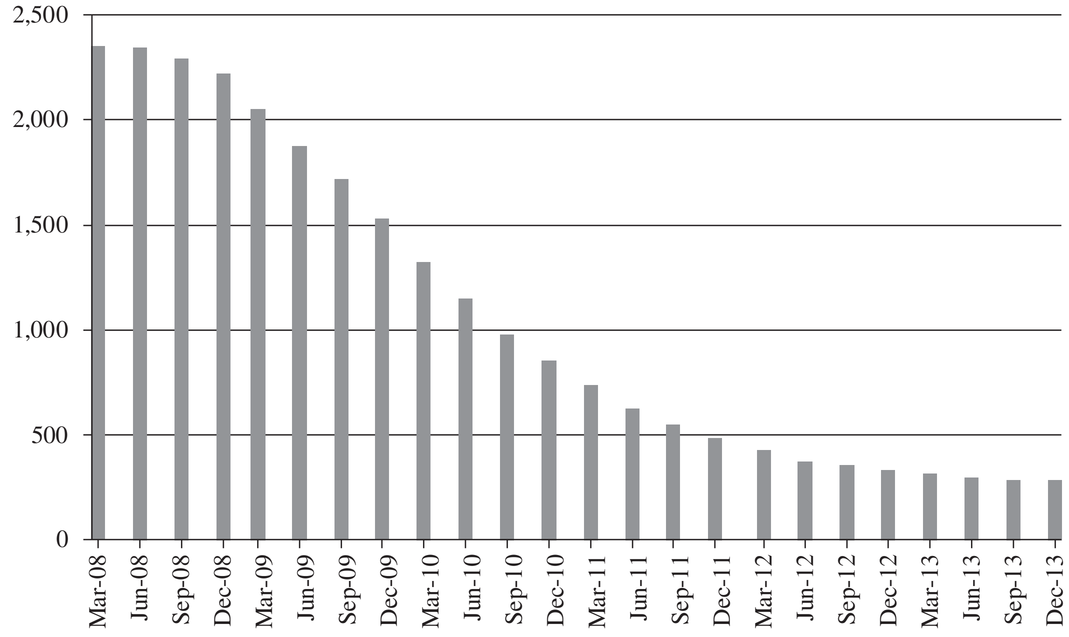
[9] Chapter 14 introduces a risk rating scale for commercial loans.

[10] See Chapter 12 for a discussion of risk-based capital standards.

EXHIBIT 13.10 **Number of Institutions with Construction Loan Concentrations: 2008–2013 (Construction Loans Exceed Total Capital)**



Source: FDIC Quarterly Banking Profile, Graph Book, 2013.

purchase other bank services. The customer looks to the bank to provide useful accounting, financial, and tax advice.

Both the bank and borrower should recognize this partnership when negotiating credit terms. Still, it is important that each party protects its interests. For this reason, the bank often includes covenants in the loan agreement. Covenants may either be *negative*, indicating financial limitations and prohibited events, or *positive (affirmative)*, indicating specific provisions to which the borrower must adhere. The intent is to protect against substantive changes in the borrower's operating environment that damage the bank's interests. Most covenants address target financial ratios, limitations on asset sales, and maintenance of management quality. Exhibit 13.11 provides a partial list of covenants. The first three negative covenants, for example, attempt to limit discretionary cash payments by a firm. If effective, more cash is available for debt service. The first affirmative covenant prevents management from altering a firm's balance sheet adversely. Others stipulate actions that will protect the bank if key personnel die or performance deteriorates.

Loan Review

The loan review effort is directed at reducing credit risk as well as handling problem loans and liquidating assets of failed borrowers. Effective credit management separates loan review from credit analysis, execution, and administration. The review process can be divided into two functions: monitoring the performance of existing loans and

EXHIBIT 13.11 Sample Loan Covenants

Negative

- Capital outlays cannot exceed $3 million annually
- Cash dividends cannot exceed 60% of periodic earnings
- Total officers' salaries cannot exceed $500,000 annually
- No liens on assets beyond existing liens
- No mergers, consolidations, or acquisitions without bank approval
- No sale, lease, or transfer of more than 10% of existing assets
- No change in senior management
- No additional debt without bank approval

Affirmative

- Borrower must maintain following financial ratios:
  Current ratio >1.0
  Days receivables outstanding <50 days
  Inventory turnover >4.5 times
  Debt to total assets <70%
  Net worth >$1 million
  Fixed charge coverage >1.3 times
  Cash flow from operations >dividends + current maturities of long-term debt
- Certified financial statements must be provided within 60 days of end of each fiscal year
- Borrower will maintain $500,000 key man life insurance policy on company president, with bank named as beneficiary
- Bank will be allowed to inspect inventory, receivables, and property periodically
- Borrower must pay all taxes and government fees, unless contested in good faith, and comply with all laws
- Borrower must inform bank of any litigation or claim that might materially affect its performance
- Borrower must maintain all property in good condition and repair

handling problem loans. Many banks have a formal loan review committee, independent of loan officers, that reports directly to the chief executive officer and directors' loan committee. Loan review personnel audit current loans to verify that the borrower's financial condition is acceptable, loan documentation is in place, and pricing meets return objectives. If the audit uncovers problems, the committee initiates corrective action. Removing the problem may simply involve getting signatures on omitted forms or filing required documents with the state. If the borrower has violated any loan covenants, the loan is in default. The bank can then force the borrower to correct the violation or it can call the loan; that is, request immediate payment. Calling a loan is normally a last resort and done only when the borrower does not voluntarily correct the problem. It allows the bank to request full payment before repayment prospects worsen.

The problem is much more serious when the borrower's financial condition deteriorates. These loans are classified as *problem loans* and require special treatment. In many cases, the bank has to modify the terms of the loan agreement to increase the probability of full repayment. Modifications include deferring interest and principal payments, lengthening maturities, and liquidating unnecessary assets. The bank may also request additional collateral or guarantees and ask the borrower to contribute extra capital. The purpose is to buy time until the borrower's condition improves. Banks often assign a separate loan work-out specialist to problem loans, rather than traditional loan officers, because they are liquidation oriented and frequently involved in intense negotiations.

Characteristics of Different Types of Loans

This section describes the basic characteristics of commercial bank loans. Although there are many ways to classify loans, the analysis focuses on the use of loan proceeds and maturity. Each type of loan has different features that necessitate different repayment schemes, collateral, and loan covenants. The Uniform Bank Performance Report (UBPR) classifies loans into one of six types: real estate loans, commercial loans, individual loans, agricultural loans, other loans and leases in domestic offices, and loans and leases in foreign offices.[11]

Real Estate Loans

The UBPR defines **real estate loans** as domestic-office loans secured by real estate. In particular, real estate loans are generally classified into seven subcategories:

- construction and development loans,
- CRE,
- multifamily residential real estate,
- 1–4 family residential,
- home equity,
- farmland, and
- other real estate loans.

Exhibit 13.1 indicates that real estate loans represent a high percentage of total loans at most commercial banks. They are classified separately from commercial and consumer loans, because the collateral is some form of real property, and the loans are subject to different risks and regulations.

During prosperous times, short-term real estate loans are among the most profitable investments and are extremely attractive to growth-oriented banks. Depository institutions also extend long-term mortgage credit to residential homeowners or to holders of commercial property. Real estate loans can be highly speculative, however, if banks lend against properties that do not generate predictable cash flows. Many commercial banks, savings and loans, insurance companies, and pension funds, in fact, have owned (repossessed) significant amounts of real estate that are not producing sufficient cash to service debt. The real estate underlying these loans is quite often commercial property built under the assumption that lease rates and occupancy would quickly rise. If these assumptions do not materialize, the bank ends up with the property that it can sell only at depressed prices, so the bank keeps it on the books to avoid taking losses.

Commercial Real Estate Loans. Commercial real estate loans are generally short-term loans consisting of construction and real estate development loans, land development loans, and commercial properties loans, such as shopping centers and office buildings. Many banks lend heavily to businesses for new building construction and land development. **Construction loans** represent interim financing on commercial, industrial, and multifamily residential property. A bank extends credit to a builder to pay for the materials and labor necessary to complete a project. Funds are usually disbursed on an irregular basis, such as upon the completion of certain phases of the

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[11] Information on the UBPR can be found in Chapter 3 and on the Internet at www.ffiec.gov.

construction process (foundation poured, framed, dry-wall, etc.) or on the basis of the actual supplier and subcontractor bills presented to the banker. The builder repays the entire loan when the project is completed, and permanent (long-term) financing is arranged. Construction loans are interim loans. **Interim loans** provide financing only for a limited time until permanent financing is arranged; for example, long-term mortgage or direct financing from insurance companies or pension funds. **Land development loans** finance the construction of roads and public utilities in areas where developers plan to build houses. Land development loans are also interim loans, as the developer repays the loan as homeowners or investors buy lots. Maturities on these loans normally range from 12 months to two years but are often extended when developers cannot find permanent financing. Interest rates on interim loans can be high for some borrowers but are typically priced at a floating rate over prime or other base rate. The bank may also charge an *origination fee* to make the original loan.

The credit analysis of construction and land development loans follows that described in Chapter 14.[12] There are, however, peculiar features of these projects that deserve mention. Most importantly, these loans may be extremely risky. Individual projects, such as the construction of an office building in a metropolitan area's downtown business district, are often quite costly. Few banks choose to assume that risk alone, so most enter into joint financing agreements. The primary source of repayment is permanent financing provided by a third party. If this is not forthcoming, the bank must look either to the developer's cash flow from other projects or, ultimately, the outright sale of the building. If the developer defaults on the loan before construction is completed, the bank must pay for someone else to finish the project. Banks prefer a project in which customers have already committed to lease space and the developer has arranged for a takeout commitment. A **takeout commitment** is an agreement whereby a different lender, such as a life insurance company or pension fund, agrees to provide long-term financing after construction is finished. The construction loan is speculative when the builder does not have a commitment or the ultimate owner of the structure is not known.

Most banks attempt to limit their risk by working closely with a select group of developers and by requiring third-party appraisals of projects. A bank that makes a construction loan essentially underwrites the developer. Maintaining a close working relationship allows the bank to assess whether the developer can complete a specific project and has cash flow from other projects to cover losses if this one fails. Third-party appraisals provide an estimate of the project's value at completion and offer assurance that the structure's value can cover loan payments in the event of default.[13]

The quality of these loans closely follows the business cycle. Banks try to compensate for high default risk by requiring up-front fees and pricing construction loans at substantial markups over their funding costs. It is not uncommon, for

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[12] The financial statements of developers differ markedly from those of most nonfinancial businesses. Analysts must be familiar with how specific firms allocate costs for projects under construction and how they report gross profit. Generally accepted accounting principles allow builders to estimate profit on unfinished projects. An analyst must know what portion of gross profit can be attributed to completed contracts and should compare this with past estimates to assess the efficiency of the builder's historical profit estimates.

[13] Unfortunately, there is no guarantee that appraisals are meaningful. Appraisers are not regulated, and many instances of abuse are known. Since the financial crisis, banks have been required to follow precise rules in getting appraisals. Banks are required to develop lists of approved appraisers, the loan originator cannot select the appraiser and the bank is required to validate the reasonableness of the appraisal. See the Interagency Appraisal and Evaluation Guidelines (2010).

example, for a bank to charge an origination fee of 1 percent of the loan and float the interest rate at 4 percent over the bank's base rate. Interest rate risk is lessened because interest income varies with changes in the level of interest rates. Still, if the structure is not sold or adequately leased, cash flows will not cover debt service requirements.

Residential Mortgage Loans. For the average depository institution, real estate loans are dominated by long-term mortgages, primarily on single-family houses. A **mortgage** is a legal document through which a borrower gives a lender a lien on real property as collateral against a debt. The borrower gets to use the property as long as the scheduled interest and principal payments are met. If the borrower defaults, the lender can exercise the lien and claim the property. Generally a borrower has the right of redemption, whereby foreclosure is prevented if the debt is repaid within a reasonable time after default.

Banks can make conventional mortgages or mortgages insured by the Federal Housing Authority or Veterans Administration. These last two carry long maturities and require small down payments by borrowers. They are costly in terms of officer time, because management must complete considerable paperwork before the loans are officially approved.

The **1–4 family residential mortgage loans** are attractive investments when priced correctly, but holding long-term fixed-rate mortgages in the bank's portfolio creates a negative funding GAP position for most depository institutions. Banks are also subject to pre-payment risk and extension risk with long-term fixed-rate mortgages.[14] If a depository institution's relatively short-term CDs and money market certificate rates increase, the depository institution can find its mortgages earning less than it pays for funds. For this reason, most banks securitize (package and sell) the majority of fixed-rate mortgages they make. Although fixed-rate mortgages are popular with borrowers, banks prefer to hold adjustable-rate mortgage (ARM) loans on their books.[15] Most mortgage lenders now offer borrowers a choice between fixed-rate and ARMs. Because borrowers assume interest rate risk with rate-sensitive mortgages, mortgage lenders offer inducements, such as lower initial rates and caps on how high the rate might go, to increase their attractiveness.

The credit analysis of single-family residential mortgages resembles that of any consumer loan. Most mortgages are *amortized* with monthly payments, including both principal and interest. Because of the long maturity, mortgage lenders look carefully at the borrower's cash flow, character, and willingness to repay. The evaluation concentrates on three significant features of the loan: the appraised property value, the borrower's down payment, and the borrower's cash flow relative to required interest and principal payments. Mortgage lenders assume less credit risk when the down payment is high and debt service payments are small relative to the buyer's income.

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[14] See Chapters 7 and 8 for more details about interest rate risk and funding GAP. A negative funding GAP means that the bank has fewer rate-sensitive assets than rate-sensitive liabilities. Hence when interest rates increase, the cost of bank funds increases more than the yields on the longer-term assets. The value of equity typically falls as well because longer-term securities are more sensitive to changes in interest rates than shorter-term securities.

[15] Many types of ARMs have evolved. Some tie the interest rate to an index that changes when the general level of rates changes. Others establish rates that change according to a fixed schedule. Principal payments may likewise be indexed to inflation.

CONTEMPORARY ISSUES

The Impact of the 2008 Financial Crisis on the Mortgage Market

Many experts suggest the financial crisis of 2008 was the result of a perfect storm of factors. Many factors came together by the late 2000s to produce the crisis. One of those was the residential housing and mortgage markets. The late 1990s and early to mid 2000s was a period of great economic prosperity. The residential housing market was booming, and some economists began suggesting there was a bubble in housing. As demand increased and prices of homes escalated, some lenders relaxed lending standards .

The "old rule" of mortgage lending said borrowers could qualify for a home loan of 2.5 times their gross income if they put 20 percent down. That meant someone who was earning $100,000 per year could afford a $250,000 home if he or she put $50,000 down. Considering that the median price of a house in 2006 reached about $1 million in San Francisco, over $700,000 in San Diego, $500,000 in Boston, and $375,000 in Las Vegas, this old rule put many homes out of reach for most people living in these areas. Because the economy was doing quite well in the early 2000s, we saw this rule *stretched* all the way to three and four times gross income, lenders relying on self-stated income rather than documented income, loans requiring IO payments, 100 percent financing, and even cash out refinancing. In retrospect, these were bad ideas.

While lenders were lowering standards on mortgage loans, the Federal Reserve was also lowering interest rates. These factors became the precursor to the subprime mortgage crisis of 2008. The housing market was already somewhat overheated by the early 2000s, and then ultra-low interest rate policies from the Fed meant that over 80 percent of mortgage loans were refinanced from 2002–2005—some even multiple times. When rates subsequently increased, the refinancing boom slowed. As mortgage companies sought out new sources of growth, they increasingly made loans to less-qualified borrowers. Because rates were increasing, mortgage companies began to offer "nontraditional" mortgage products, and less-qualified borrowers often found themselves holding adjustable-rate and gimmick mortgages that could only be repaid if housing values rose significantly.

Although the growth in subprime lending was a significant cause of the mortgage crisis in 2008, it was the general lowering of lending standards that had the greatest impact. Liquidity dried up near the end of 2007, and mortgage lenders who had previously originated mortgage loans or made commitments to borrowers found it difficult, if not impossible, to sell these packages of subprime mortgages into the secondary market. Many lenders were, therefore, unable to fund their commitments. In fact, in 2012 private issuers of mortgage backed securities (MBS) only accounted for less than 5 percent of the total issuances of MBSs.

Government-sponsored entities Fannie Mae and Freddy Mac dominated the mortgage market in 2005, with 70 percent of MBSs issued. By 2006, their share of the MBS issuance was down to about 40 percent, with privately-issued MBSs climbing to about 55 percent of the market. Fannie and Freddy lost market share to private issuers of MBSs as private issuers lowered lending standards and dramatically increased their demand for MBSs. Unfortunately, in response to this loss in market share, Fannie and Freddy significantly expanded their issuance of subprime and Alt-A (no doc or low doc) loans in 2006 and 2007 to recapture market share. They were successful, as their share of MBS issuance exceeded 70 percent in 2008, and, by 2013, over 94 percent of all mortgages originated were securitized by government entities using taxpayer funds to guarantee investors against default risk.

The Secondary Mortgage Market. Real estate lending is popular, in part, due to the growth of the secondary mortgage market. The growth in the number of players in the mortgage banking business that originate and service mortgages increased dramatically during the early 2000s, as well as a somewhat newly developed segment in the market for *subprime*, or higher-risk, mortgage borrowers. During this time, there was also a significant growth in *nontraditional* mortgage products such as variable-rate, zero-down, IO, reverse mortgages and payment options.

Several factors came together to reverse these trends. In particular, the end result of the financial crisis of 2008 meant that private (nongovernment) issuers of mortgage securitizations became almost nonexistent (see Contemporary Issues: The Impact of the 2008 Financial Crisis on the Mortgage Market). A backlash in mortgage-lending standards has made it much more difficult to qualify for a mortgage now than ever before. In fact, mortgage originations peaked in 2005 with a total of $2.9 billion in mortgage loans (of which $1.5 billion were purchase mortgages and $1.4 billion were refinance mortgages).

The **secondary mortgage market** involves the trading of previously originated residential mortgages. Lenders that originate mortgages can either sell them directly to interested investors or package them into mortgage pools. With a mortgage pool, the original lender issues long-term securities that evidence a claim on the mortgages in the pool. Investors in the securities receive the interest and principal payments on the underlying mortgages net of servicing fees. In most cases, the pool originator collects the mortgage payments from home buyers, keeps a portion as a servicing fee, pays the relevant property taxes, and apportions the remainder to insurers and holders of the securities.

Because risk-based capital requirements require depository institutions to hold capital against most assets on its books, many mortgage lenders follow a strategy of originating mortgages for the purpose of securitizing them; that is, selling them in packages to other investors. Their earnings come from origination and servicing fees. New rules from the Dodd–Frank Wall Street Reform Act and the Consumer Financial Protection Bureau, however, could significantly alter the landscape for securitizing mortgage loans. These new rules will govern how much of the risk of newly issued mortgage loans financial institutions must retain. The Dodd–Frank Act required banks to retain 5 percent of mortgages they originated, but certain types of qualified mortgage loans were exempted from this requirement. Qualified mortgages would be those that meet the "ability to pay" test. Chapter 16 documents recent growth in the secondary mortgage market, including the nature of securities created by the securitization process.

Home Equity Loans. The Tax Reform Act of 1986 phased out the deductibility of interest on consumer debt when computing federal income taxes, except for mortgages. As might be expected, lenders quickly packaged home equity loans that soon substituted for many traditional forms of consumer borrowing. **Home equity loans** are actually a second mortgage secured by real estate so that any interest payments meet the requirement for tax deductibility. **Second mortgages** are usually shorter-term than first mortgages, such as for 3 to 10 years, and have a subordinated claim to the first residential mortgage. Most depository institutions now offer **home equity lines of credit (HELOC)** that are structured similarly to direct installment loans or direct credit lines in which an individual has a credit limit and can borrow up to the limit for any purpose.

From the lender's perspective, home equity loans are fully secured and thus low risk. In reality, the loans have encouraged many consumers to spend beyond their normal ability to generate income so that borrowers do default on the loans. Because the claims of the home equity loan are secondary to the first mortgage, it is more difficult for the lender holding the second mortgage to bring about foreclosure. With declining property values in 2007–2008, lenders tightened standards because of concern over their risk exposure and the economic downturn. For example, it was quite common for banks to reduce the amount of credit available under a HELOC or eliminate the loan entirely under the premise that the property no longer supported the initial appraised value and thus the original maximum credit limit.

Equity Investments in Real Estate. For many years government regulations prevented commercial banks from owning real estate except for their corporate office or property involved in foreclosure. State-chartered savings and loan associations and insurance companies, by contrast, have long been able to take equity positions in real estate projects. This enabled them to charge lower loan rates in exchange for unlimited profit potential from price appreciation. Federal regulators want depository institutions to engage in these more speculative real estate activities only through separate subsidiaries, if at all. The Gramm–Leach–Bliley Act of 1999 allowed for commercial banks and savings institutions to enter into the merchant banking business, and many states have passed laws permitting state-chartered commercial banks to invest in real estate, in many cases restricting the dollar investment to a fixed percentage of assets.

Commercial Loans

There are as many types of commercial loans as there are business borrowers. The UBPR defines *commercial loans* as "domestic-office commercial and industrial loans, loans to depository institutions, acceptances of other banks, and obligations (other than securities) of states and political subdivisions." Commercial loans are made to businesses to assist in financing working capital needs (accounts receivable and inventory), plant and equipment needs, and other legitimate business purposes. Commercial banks lend large amounts to manufacturing companies, service companies, farmers, securities dealers, and other financial institutions. The loans may finance short-term uses, such as temporary working capital needs and construction expenses in which the borrower has obtained a commitment for long-term financing from another lender, or long-term uses, such as new equipment purchases and plant expansion.

Short-term business loans often take the form of **loan commitments** or **line of credit** agreements. These loans may be formal or informal and operate much like a credit card arrangement. A bank and borrower agree in advance that the customer can draw against the line as needed up to some maximum credit limit. The borrower determines the timing of borrowings and the actual amount. The obvious advantage to the borrower is flexibility. For example, the firm may only need temporary financing as it accumulates inventory prior to its major sales period. Once sales occur, it can repay the loan. These loans also take up less of the loan officer's time. Bankers must, however, still complete a detailed analysis before extending credit. Prior to formal approval, the loan officer evaluates the purpose and repayment prospects and negotiates the size of the commitment, the term the commitment is outstanding, any fees or compensating balance requirements, and the interest rate charged.

Because many commercial loans are used to finance current assets (primarily accounts receivable and inventory), the following discussion analyzes normal working capital requirements and several types of loans associated with this type of financing. The previous section addressed CRE loans, and the following sections analyze the general features of term commercial loans and agricultural loans. Often, commercial and industrial loans are linked to CRE loans, with the only real distinguishing characteristic being whether the loans are secured by real estate or other assets of the company.

Working Capital Requirements. A company's **(net) working capital** equals its current assets minus its current liabilities. For most firms, working capital is positive, suggesting that current assets are financed partially by current debt and partially by long-term debt and equity. If current assets are liquidated, the proceeds from the sale of the current assets will exceed current liabilities. Working capital, therefore, is a net liquidity measure.

Consider the daily average balance sheet information in Exhibit 13.12 for Simplex Corporation, which has $300 in net working capital ($1,280–$980). Implicitly, $300 of long-term debt and equity is financing $300 of cash, receivables, and inventory, and the firm's current assets cover its current liabilities. Note that $450 of the current liabilities are notes payable to a bank, indicating short-term financing currently provided for operating purposes.

Virtually all businesses must invest in current assets to operate. Manufacturers purchase materials to produce goods that are often sold on credit. Retail firms purchase display merchandise and often rely on credit sales to stimulate business. Service companies need operating cash and small inventories of supplies. Each type of business relies on different financing methods depending on its operating policies and growth. If the financing needs are truly short term, a working capital loan is appropriate.

The bottom of Exhibit 13.12 and Exhibit 13.13 summarizes the normal *working capital cycle* for a manufacturing firm using the data for Simplex Corporation. This cycle compares the timing difference between converting current assets to cash and making cash payments on normal operating expenses. Supplementary income statement data are provided in Exhibit 13.12 and used to calculate the timing difference. All sales are assumed to be credit sales, and the data are viewed in daily average terms.

The flow of cash in the operating cycle begins by the firm accumulating operating cash to put in cash drawers and pay wages and salaries. After minimum levels of operating cash are accumulated, the firm then invests in inventory by purchasing materials that are converted into finished goods. Accounts receivable appear when the firm sells the inventory on credit. Finally, the receivables revert to cash as customers pay off their credit purchases. Many factors influence how long it takes to complete the cycle, including the complexity of the production process, the terms of credit sales, and the firm's collection efforts on outstanding receivables. The longer it takes to produce a finished good, sell it, and collect on the sale, the longer the firm has to wait to get its cash investment back. If a timing difference exists between the number of days in the asset cycle and cash payments on liabilities, a loan may be necessary to help a firm manage the mismatch in cash flows.

In most industries, the cash-to-cash asset cycle takes longer than the comparable cycle for nonbank current liabilities. The **cash-to-cash asset cycle** measures how long the firm must finance operating cash, inventory, and accounts receivable from the day of first sale. The **cash-to-cash liability cycle** essentially measures how long a firm obtains interest-free financing from suppliers in the form of accounts payable and accrued expenses to finance the asset cycle.[16] Firms use trade credit to finance materials purchases (inventory) temporarily, but must normally pay their suppliers within 30 days to receive any discounts. Even when they can ride suppliers longer, they still pay down accounts payable well before their current asset cycle is completed. Firms may also be able to accrue expenses rather than make immediate cash payments, but the deferment period is quite short. The net effect is that most businesses receive cash from the sale of goods long after they have paid suppliers, associated labor costs, and other operating expenses. After the firm has utilized all of its available trade credit, the remaining timing discrepancy will be financed with bank credit or long-term debt.

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[16] Actually the term "interest-free" may not be totally correct. If discounts for early payment are offered and not taken, the effective interest cost of paying late (after the discount period) could be quite high.

EXHIBIT 13.12 Balance Sheet and Income Statement Data for Simplex Corporation

Cash-to-Cash Cycle

Assets		Liabilities and Equity		Selected Income Start Data	
Cash	80	Accounts payable	400	Net sales	9,125
Accounts receivable	700	Accrued expenses	80	COGS	6,100
Inventory	500	Notes payable—bank	450	Operating expenses	2,550
Current assets	1,280	CM LTD	50	Purchases*	6,430
Fixed assets	1,220	Current liabilities	980	Average Daily:	
Total assets	2,500	LTD	550	Sales	25.00
		Equity	970	COGS	16.71
		Total liabilities and equity	2,500	Operating expenses	6.99
				Purchases	17.62

Working Capital Cycle†

Current Assets	Days	Current Liabilities	Days
Days cash	3.20	Days accounts payable	22.71
Days accounts receivable	28.00	Days accruals	11.45
Days inventory	29.92		
Asset Cycle	61.12	**Liability Cycle**	34.16

Difference in cash-to-cash cycles = 26.96
Working capital needs = 26.96 × 16.71 = 450.58

*Prior period inventory was 170.

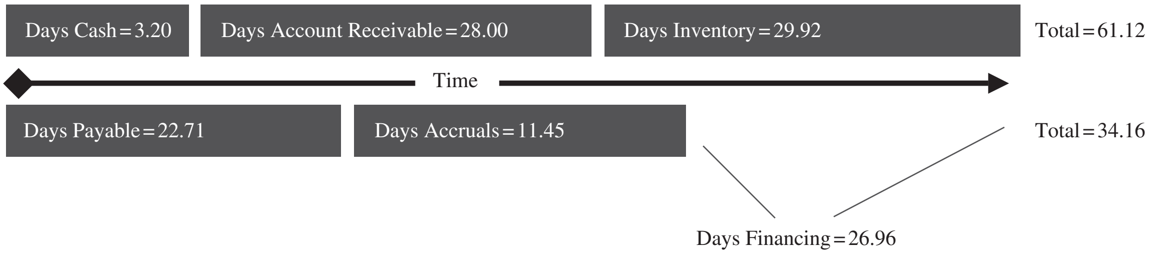
†Ratio definitions:
Days cash = cash / (sales / 365) = 80 / 25.00 = 3.20
Days receivables = accounts receivable / (sales / 365) = 700 / 25.00 = 28.00
Days inventory = inventory / (COGS / 365) = 500 / 16.71 = 29.92
Days payables = accounts payable / (purchases / 365) = 400 / 17.62 = 22.71
Days accruals = accruals / (operating expenses / 365) = 80 / 6.99 = 11.45

Source: The authors.

This cash-to-cash comparison is demonstrated at the bottom of Exhibits 13.12 and 13.13. In Exhibit 13.12, the days cash-to-cash for assets indicates that it takes over 61 days for Simplex's current assets to turn over. In comparison, the company rides its suppliers for an average of almost 23 days and defers operating expenses for just over 11 days. Notes payable to the bank and long-term debt finance this 27-day deficiency in the underlying cash flows.

One procedure for estimating working capital loan needs is to multiply the number of days' deficiency between the asset and liability cash-to-cash cycle by the firm's average daily cost of goods sold. In this example, the product equals $450.58 (26.96 × $16.71), which is close to the amount of the notes payable currently outstanding ($450). Of course, this calculation ignores the firm's capital structure. If a company has above-average equity or more long-term debt financing than the norm, working capital financing needs can be met by these more permanent sources of funds. In this case, the estimate based on the above calculation will overstate true short-term funding needs.

EXHIBIT 13.13 **Cash-to-Cash Working Capital Cycle for Simplex Corporation**



Working Capital Financing Needs
= Deficit × Average Daily COGS
= 26.96 × 16.71
= 450.53

Source: The authors.

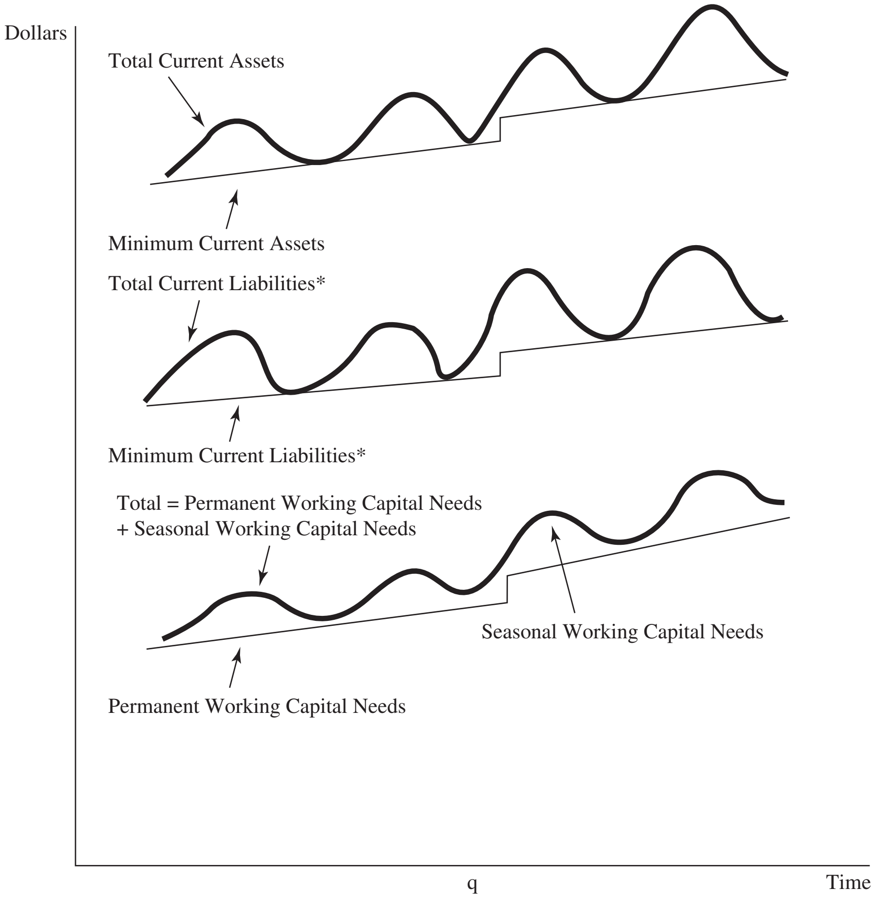
Seasonal versus Permanent Working Capital Needs. Many businesses find that their working capital fluctuates over time. This may be caused by seasonal sales or events, such as an unexpected increase in credit sales relative to cash sales, an increase in inventory resulting from defective materials, or changes in payment patterns to suppliers. Businesses temporarily build up inventories and pay higher operating expenses prior to the peak sales season. Working capital needs rise because accounts payable increase at a slower pace. The deficiency increases further with an increase in receivables, then declines to normal as the firm collects on receivables and inventory contracts.

An important facet of working capital financing is to assess any *seasonal pattern* in inventory accumulation, production, sales, and collection of receivables. If seasonal patterns exist, a lender must obtain interim financial statements that reveal peak holdings of current assets. Consider, for example, a company that manufactures fireworks or a restaurant in a ski resort area. The maximum working capital loan will normally apply during or just preceding the company's peak business activity.

In addition to seasonal needs, most businesses have a normal or *minimum amount of working capital* that persists regardless of unexpected events or seasonal fluctuations. That is to say, most businesses have some minimum level of accounts receivable, inventory, and accounts payable that are a permanent part of the business. One customer's accounts receivable will be paid off but a new receivable will replace it, hence, some dollar amount of accounts receivable will always be with the firm. This base or **permanent working capital** need equals the minimum level of current assets minus the minimum level of current liabilities net of short-term bank credit and current maturities of long-term debt (adjusted current liabilities) throughout each year. It is important that businesses and their lenders recognize this permanent need because it represents the amount of long-term debt or equity financing (capital structure) required to finance current assets. Firms should try to raise funds for these permanent needs with long-term debt or equity, by issuing bonds or shares of capital stock, as depository institutions are reluctant to make term loans for this purpose. Any working capital requirement in excess of this base amount would be financed with short-term credit.

A time series plot of a firm's working capital position helps quantify permanent and temporary needs. It also identifies any seasonal patterns that appear. Exhibit 13.14 shows this concept graphically. The base trend lines, through the minimum amounts of current

EXHIBIT 13.14 Trends in Working Capital Needs



* Current liabilities are net of notes payable and current maturities of long-term debt (adjusted current liabilities).

assets and adjusted current liabilities, designate the permanent components of these balance sheet items. These amounts jump at period q when the firm is assumed to expand its physical plant. The curved lines represent total current assets and total current liabilities. The peak value of current liabilities comes before the peak in current assets, reflecting the fact that receivables growth typically lags behind increases in inventory and trade credit. Permanent working capital needs equal the difference between minimum current assets and adjusted current liabilities. **Seasonal working capital** needs equal the difference in total current assets and adjusted current liabilities less permanent working capital needs. **Peak working capital** needs coincide with the peak level of current assets.

Seasonal Working Capital Loans. Seasonal working capital loans finance a temporary increase in net current assets above the permanent requirement (Exhibit 13.14). A borrower uses the proceeds to purchase raw materials and build up inventories of finished goods in anticipation of later sales. Trade credit also increases but by a smaller amount. Funding requirements persist as the borrower sells the inventory on credit and accounts receivable remain outstanding. The loan declines as the borrower collects on the receivables and stops accumulating inventory.

This type of loan is *seasonal* if the need arises on a regular basis and if the cycle completes itself within one year. It is *self-liquidating* in the sense that repayment derives from sales of the finished goods that are financed. Because the loan proceeds finance an increase in inventories and receivables, lenders try to secure the loan with these assets. Seasonal working capital loans are often unsecured because the risk to the lender is relatively low.

When evaluating seasonal loans, it is necessary to compare the borrower's working capital position over time (Exhibit 13.13). If the lender only obtained year-end historical financial statements when current assets were at seasonal lows, an analysis would demonstrate that the borrower did not need seasonal financing. To estimate maximum seasonal needs, the lender needs comparative statements for periods when current assets are at their highs and lows. The difference in total working capital needs between the two periods equals the maximum seasonal loan requirement. This means that the lender must request interim financial statements. Suppose, for example, that the balance sheet data for Simplex Corporation in Exhibit 13.12 represent the company's minimal seasonal working capital needs. If the peak needs arise four months later when current assets equal $1,800 and current liabilities equal $1,200, the maximum seasonal requirements total $600.

Open Credit Lines. Seasonal loans often take the form of open credit lines.[17] Under these arrangements, the lender makes a certain amount of funds available to a borrower for a set period of time. The customer determines the timing of actual borrowings, or "takedowns." Typically, borrowing gradually increases with the inventory buildup, then declines with the collection of receivables. The lender likes to see the loan fully repaid at least once during each year. This confirms that the needs are truly seasonal.

Often, open credit lines are used to fund a build-up to a new level of permanent working capital or, alternatively, a seasonal working capital need that is later found to be a permanent working capital need. One sign of this is when the company does not *clean up the line*, or fully repay the line, at least once a year. Some open lines will have a one-time conversion provision to convert the open line into a term note (see below). Bankers call this *terming out the line* (see Revolving Credits on next page). Sometimes the loan commitment will also provide for a *conversion fee*, the fee charged to convert to a term loan after a specified period.

The terms of credit lines vary between borrowers and according to whether arrangements are informal or contractual. Informal lines are not legally binding but represent a promise that the lender will advance credit. The customer pays for the service only by paying interest on the funds actually borrowed. A contractual or formal credit line is legally binding even though no written agreement is signed. The lender charges a *commitment fee* for making credit available, regardless of whether the customer actually uses the line. The customer also pays interest on actual borrowings. In both cases, credit lines are renegotiated each year when the lender reassesses the firm's credit needs. Borrowers pay interest at variable rates and often must hold compensating deposit balances with the lender as part of the arrangement.

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[17] Credit lines are used to meet many types of temporary needs in addition to seasonal needs. One popular type is the backup credit line used by large corporations that regularly issue commercial paper. This credit is available to pay investors when commercial paper matures if the corporation does not or cannot roll over its outstanding paper.

Term Commercial Loans. Depository institutions try to match credit terms with a borrower's specific needs. The loan officer estimates the purpose and amount of the proposed loan, the expected source of repayment, and the value of collateral. The loan amount, maturity, and repayment schedule are negotiated to coincide with the projections. Short-term funding needs are financed by short-term commercial loans, while long-term needs are financed by term loans with longer maturities. A mistake often made by the young credit analysts is making a loan for a larger amount or for a longer maturity than is necessary for a "good" customer. If you loan more money than the customer needs, the customer may spend the money unwisely, for example, by purchasing unnecessary assets (i.e., corporate jets) on which the bank does not hold a lien.

Many businesses have credit needs that persist beyond one year. **Term commercial loans**, which have an original maturity of more than one year, are normally used in these cases. Most term loans have maturities from one to seven years and are granted to finance either the purchase of depreciable assets, start-up costs for a new venture, or a permanent increase in the level of working capital. Because repayment comes over several years, lenders focus more on the borrower's periodic income and cash flow rather than on the balance sheet. Chapter 14 examines the traditional credit analysis underlying a term loan—from basic ratio analysis to cash flow projections. Term loans often require collateral, but this represents a secondary source of repayment in case the borrower defaults.

The characteristics of term loans vary with the use of the proceeds. For asset purchases, the loan principal is advanced in its entirety after an agreement is signed. The amount equals the net purchase price on the asset acquired. The maturity is determined by the asset's useful life and the borrower's ability to generate cash to repay principal and interest. The interest charged reflects the bank's cost of funds plus a risk premium to compensate for default risk and interest rate risk. Virtually all term loans use formal loan agreements that stipulate what is expected of each party and provide remedies when the agreement is breached. They are necessary because most term loans are too complex to comprehend over several years, during which time the principals tend to forget the initial negotiated terms.

Loan payments are structured in several forms. Many are scheduled over several years so that the borrower's cash flow is sufficient to cover the interest and principal in each year. Many term loans are repaid on an installment basis and fully amortized. Each periodic payment includes interest plus principal in varying amounts. Other term loans may use equal annual principal payments with interest computed on the declining principal balance. Occasionally, term loans will call for balloon payments of principal. In these cases, the borrower pays only the periodic interest until maturity, when the full principal comes due (balloon or bullet loan), or makes amortized principal and interest payments based on a very long maturity (30 years), with the remaining principal paid at maturity (5 years). The normal source of repayment is cash flow generated from a company's operations.

For new ventures and permanent increases in working capital, banks advance the loan principal as needed. If the borrower needs different amounts over time, a bank usually structures the agreement as a loan commitment during the early stages, then converts the outstanding principal to a term loan. With this type of term loan—often called a revolving credit—repayment still derives from future cash flows, and the agreement is priced at higher yields because of the greater risk.

Revolving Credits. Revolving credits are a hybrid of short-term working capital loans and term loans. They often involve a commitment of funds (the borrowing base) for one to five years. At the end of some interim period, the outstanding principal converts to a term loan. During the interim period, the borrower determines usage much like a credit line. Mandatory principal payments begin once the commitment converts to a term loan. The revolver has a fixed maturity and often requires the borrower to pay a conversion fee at the time of conversion to a term loan. This agreement reduces paperwork and simplifies loan servicing for creditworthy customers, who like its flexibility during the interim period. Revolvers have often substituted for commercial paper or corporate bond issues.

Asset-Based Loans. In theory, any loan secured by a company's assets is an asset-based loan. One popular type of asset-based short-term loan would be those secured by inventories or accounts receivable. Loans to finance leveraged buyouts (LBOs) are also classified in this category. In the case of inventory loans, the security consists of raw materials, goods in process, and finished products. The value of the inventory depends on the marketability of each component if the borrower goes out of business. Commercial banks will lend from 40 to 60 percent against raw materials that are common among businesses and against finished goods that are marketable, and nothing against unfinished inventory. With receivables, the security consists of paper assets that presumably represent sales. The quality of the collateral depends on both the borrower's integrity in reporting actual sales and the credibility of billings.

Even though all loans secured by a company's assets could be considered asset-based loans, asset-based lending today generally refers to loans where substantially more weight is given to the collateral than cash flow when evaluating the loan request. Payoff from collateral liquidation is more likely to occur in an asset-based loan than in other secured loans, hence the need for good estimates of current and future value of the collateral. Asset-based lending grew in the mid-1980s when many of the large Texas commercial banks were lending off the value of proven oil reserves. During this time, many of the banks were lending 60 percent of a "low" price of oil. For example, when oil prices were \$40 a barrel, banks were lending up to \$24 per barrel of reserves. Most of the banks' customers thought they were being extremely conservative. No one believed that the price of oil would ever drop to \$10 a barrel, which it did. When the price of oil dropped this low, all equipment and industries related to the oil industry crashed. One example is that a \$1.6 million drilling rig was only worth \$38,000 after the crash because that was the value of scrap metal!

Making asset-based loans requires a loan officer to examine the asset. For example, the loan officer should examine the inventory on site and personally confirm that the customer's figures for receivables are purged of uncollectible or nonexistent accounts. A bank normally lends against 50 to 80 percent of a borrower's receivables depending on the accounts receivable aging schedule and collection experience. An **accounts receivable aging schedule** is a list of accounts receivable segregated according to the month in which the invoice is dated (invoice aging) or in which the invoice is payable (due date aging). An analyst can quickly determine the volume of past-due accounts and trends in collection experience by comparing the fraction of total receivables in each month over time.

Lenders frequently require lockbox arrangements to assure that borrowers repay receivables loans when payments are received from customers. With a **lockbox**, the borrower requests that its customers mail payments directly to a post office box number controlled by the lender. The lender processes the payments and reduces the borrower's loan balance but charges the borrower for handling the items. Furthermore, because lenders spend more time monitoring asset-based loans, they charge rates above those available on open credit lines. The standard interest pricing is a rate that floats from 2 to 6 percent above a bank's **base rate**.

Highly Leveraged Transactions. During the early 1980s, one growth area in asset-based lending was LBOs. An LBO involves a group of investors, often part of the existing management team, buying a target company and taking it private with a minimum amount of equity and a large amount of debt. Target companies are generally those with undervalued hard assets. The investors often sell off specific assets or subsidiaries to pay down much of the debt quickly. If key assets have been undervalued, the investors may own a downsized company whose earnings prospects have improved and whose stock has increased in value. The investors sell the company or take it public once the market perceives its greater value. If investors misforecast and pay too much, the target company goes bankrupt.

Agricultural Loans

Agricultural loans are similar to commercial and industrial loans in that short-term credit finances seasonal operating expenses, in this case those associated with planting and harvesting crops. Much like working capital loans, the proceeds are used to purchase inventory in the form of seed, fertilizer, and pesticides and to pay other production costs. Farm operators expect to repay the debt when the crops are harvested and sold. Long-term credit finances livestock, equipment, and land purchases. The fundamental source of repayment is cash flow from the sale of livestock and harvested crops in excess of operating expenses. These loans differ, however, because agriculture is perceived to be a vital national industry. The federal government supports agricultural lending through its FCS. Federal agencies involved with agricultural lending include the Farm Credit Administration, the Farm Credit Banks and Associations, and Farmer Mac.

Worldwide events and government policies tend to create a cyclical pattern in agricultural markets. Agricultural lenders and farmers are constantly working through the cycle where commodity prices rise and fall depending on the demand from foreign and U.S. markets and on changes in supply from improved or reduced production. The cycles can be extremely volatile.

Consumer Loans

Nonmortgage consumer loans differ substantially from commercial loans. Their usual purpose is to finance the purchase of durable goods, although many individuals borrow to finance education, medical care, and other expenses. The average loan to each borrower is relatively small. Most loans have maturities from one to four years, are repaid in installments, and carry fixed interest rates. In recent years, most states have removed usury ceilings that set maximum rates depository institutions can charge so that consumer loan rates are now high relative to historical norms. This leads to different risk and return features versus other loans. In general, an individual borrower's default risk is greater than a commercial customer's. Consumer loan rates are thus higher to compensate for the greater losses.

Although most consumer loans carry fixed rates, installment payments increase their rate sensitivity so their average duration is relatively short. Long-term loans, however, may subject depository institutions to considerable interest rate risk. Consumer loans are normally classified as either installment, credit card, or noninstallment credit. Installment loans require a partial payment of principal plus interest periodically until maturity. Other consumer loans require either a single payment of all interest plus principal or a gradual repayment at the borrower's discretion, as with a credit line.

Depository institutions' share of the consumer credit market has fallen over time, but this distinction has been blurred recently with the conversion of many nondepository financial institutions to depository institutions during the financial crisis of 2008; that is, through conversion to financial holding companies, for example, the conversion of Ally to a bank holding company in 2008. Prior to that, Ally was General Motors' consumer finance arm through which GM financed auto loans and mortgages. Other examples of conversions are Goldman Sachs, Metlife, Morgan Stanley, and American Express.

Noninstallment loans are for special purposes in which the individual normally expects a large cash receipt to repay the debt, for example, a temporary bridge loan for the down payment on a house that is repaid from the sale of the previous house. These loans can be quite profitable, but often do not arise in large quantities. The cost of administering the loans can also be high. Chapter 15 discusses additional features of consumer loans and selected credit analysis procedures.

Venture Capital

Due to the high leverage and risk involved, as well as regulatory requirements, depository institutions generally do not participate directly in venture capital (VC) deals. Some large banks, however, do have subsidiaries that finance certain types of equity participations and VC deals, but their participation is limited. **VC** is a broad term used to describe funding acquired in the earlier stages of a firm's economic life. This type of funding is usually acquired during the period in which the company is growing faster than its ability to generate internal financing and before the company has achieved the size needed to be efficient. Generally speaking, VC provides long-term, risk-sharing equity capital or debt to assist non–publicly traded companies with their growth opportunities. VC firms attempt to add value to a business without taking majority control. Although many VC deals are in the form of debt, VC investors often take a minority equity participation in the firm, because owners must sell a minority share in their companies to attract the venture backer. The VC firm will most likely seek a nonexecutive board position and attend monthly board meetings. Often, VC firms not only provide financing but also experience, expertise, contacts, and advice when required.

There are many types of venture financing. Early stages of financing come in the form of *seed* or *start-up capital.* These are highly leveraged transactions in which the VC firm lends money for a percentage stake in the business. Rarely, if ever, do banks participate as VCs at this stage. Later-stage development capital takes the form of *expansion and replacement financing*, *recapitalization* or *turnaround financing*, *buy-out* or *buy-in financing*, and even *mezzanine financing.* Commercial banks do participate in these rounds of financing, but if the company is overleveraged at the onset, the banks will be effectively excluded from these later rounds of financing.

Mezzanine financing became quite popular during the technology boom of the late 1990s and provides a company the funds to continue to grow at a rapid pace. It is usually the second, third, or fourth round of financing. This type of financing is popular because it involves investing in later rounds of financing; the VC firms, therefore, have a track record upon which investors can base their investment decisions. Some VC firms focus on particular industries, while others may focus on specific types of mezzanine financing, such as financing used to take a company public or acquisition financing.

Summary

Lending involves more risk than virtually any other banking activity. Management, therefore, analyzes the nature of risks carefully before extending credit. The credit process includes three functions: business development and credit analysis, credit execution and administration, and credit review. Business development activities concentrate on identifying profitable customers and encouraging credit relationships. Credit analysis is the process of assessing risk and includes a review of financial data and subjective evaluation of the borrower's character. The credit staff formally accepts or rejects a loan request and executes the necessary documents with approvals. Finally, loan officers periodically review each outstanding loan, especially when it comes up for renewal or reaches workout status. At times, loan terms may need to be modified to recognize a change in the borrower's status.

Depository institutions make many different types of loans, which are the dominant asset in most depository institution portfolios. This chapter describes the basic features of short-term working capital loans, asset-based loans, real estate loans, consumer loans, and agricultural loans. It analyzes many banks' efforts to move assets off the balance sheet or directly enter into off-balance sheet activities to supplement earnings.

Questions

1. Discuss the importance of a bank's credit culture in managing credit risk.
2. Describe the basic features of the three functions underlying the credit process at commercial banks.
3. What are the five Cs of credit? Discuss their importance in credit analysis. Describe the five Cs of bad credit introduced in the text.
4. Explain why historical charge-off and past-due data may not represent the bank's current portfolio credit risk.
5. Explain why a large bank may be willing to accept higher average loss rates on loans it is able to credit score.
6. How does a bank make a profit on loans? Discuss the importance of loans in attracting a borrower's other business with a financial institution.
7. Discuss reasons why banks might choose to include the following covenants in a loan agreement:
   a. Cash dividends cannot exceed 60 percent of pretax income.
   b. Interim financial statements must be provided monthly.
   c. Inventory turnover must be greater than five times annually.
   d. Capital expenditures may not exceed $10 million annually.
8. Explain what it means to "perfect the bank's security interest" in collateral. When lending to a small business owner who is an owner/manager, what methods might the bank use to perfect its interest in the collateral of the business?
9. Explain how a company's permanent working capital needs differ from its seasonal working capital needs.
10. Explain how banks move loans off the balance sheet. What motivates different types of off-balance sheet activities? Discuss the risks these actions involve.

11. What motivation encourages commercial banks to make variable-rate mortgages? Why are variable-rate mortgage rates normally below fixed mortgage rates? As the level of rates declines, would you expect banks to increase or decrease the adjustable-rate proportion of their mortgage portfolios?
12. You are considering making a working capital loan to a company that manufactures and distributes fad items for convenience and department stores. The loan will be secured by the firm's inventory and receivables. What risks are associated with this type of collateral? How would you minimize the risk and periodically determine that the firm's performance was not deteriorating?
13. Discuss whether each of the following types of loans can be easily securitized. Explain why or why not.
    a. Residential mortgages
    b. Small-business loans
    c. Pools of credit card loans
    d. Pools of home equity loans
    e. Loans to farmers for production
14. Describe the basic features of the following:
    a. Open credit lines
    b. Asset-based loans
    c. Term commercial loans
    d. Short-term real estate loans
15. Why do firms or individuals involved in farming need to borrow? What type of inventory does a farmer need?
16. What type of receivables does a farmer typically have? What collateral is typically available? In addition to general economic conditions, what should a banker be watchful of before extending credit to a farmer?
17. Many banks compete aggressively for business in consumer credit cards. What is the particular attraction of this type of lending?
18. Suppose that you are considering making a working capital loan to a business customer of your bank. You do the cash-to-cash cycle analysis and determine that the firm's daily average cost of goods sold is $50,000. What does this mean?
19. Describe how each of the following helps a bank control its credit risk:
    a. Loan covenants
    b. Risk rating systems
    c. Position limits
20. Describe what a 'qualified mortgage' is and explain the elements of the ability-to-repay rule.

Problems

LOAN TO BOOK PUBLISHER. Suppose that RSM Publishing Company, a children's book publisher, has approached your bank and wants to borrow $250,000 in working capital. The firm provides you with the following balance sheet and income statement data:

Assets		Liabilities and Equity	
Cash	$50,000	Accounts payable	$166,000
Accounts receivable	$375,000	Accrued expenses	$37,000
Inventory	$510,000	Notes payable	$75,000
Fixed assets	$925,000	Current maturity of long-term debt	$25,000
Total assets	$1,860,000	Long-term debt	$475,000
		Equity	$1,082,000
		Total liabilities and equity	$1,860,000

Sales: $4,622,800
Cost of goods sold: $3,504,100
Operating expenses: $893,000
Purchases: $3,116,000

1. What fraction of the firm's current assets is (implicitly) being funded with long-term debt or equity? What is the significance if this figure is large versus small?
2. Assuming a 365-day year, calculate the firm's asset cash-to-cash cycle, liability cash-to-cash cycle, and days deficiency. Using this information and the procedure described in the text, estimate the firm's working capital loan needs.
3. What general concerns might you have regarding this loan request?
4. Suppose that the typical publishing firm in this industry has just one-half the amount of equity that RSM has. How will this affect key industry ratios and the working capital needs estimated by this procedure, in general?

Activity

Obtain copies of the annual reports for several community banks in your area and at least one large regional or nationwide bank. Compare the size of the loan portfolios as a fraction of total assets. Compare the composition of their loan portfolios. What impact should the differences have on each bank's risk position and earnings? Examine the footnotes to determine the loan loss experience for each type of loan. Why do differences appear?

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14 Evaluating Commercial Loan Requests and Managing Credit Risk

> Though my bottom line is black, I am flat upon my back,
> My cash flows out and customers pay slow.
> The growth of my receivables is almost unbelievable;
> The result is certain—unremitting woe!
> And I hear the banker utter an ominous low mutter,
> "Watch cash flow."
>
> —Herbert S. Bailey Jr., with Apologies to "The Raven" by Edgar Allan Poe[1]

The financial press pays great attention to corporate earnings announcements as indicators of past performance and future growth opportunities. Most analysts, however, recognize that cash-flow information is equally important when evaluating a firm's prospects. Reported earnings and earnings per share can be manipulated by management and may not depict the firm's true ability to meet payment obligations. Debts are repaid out of cash flow, not earnings.

Most firms record credit sales as revenues, even though no cash is immediately generated. A firm with large increases in receivables might report increasing profits but have no cash to cover operating expenses. Similarly, some companies report as income their share of undistributed profits in firms in which they have a limited equity interest, even though no cash is received. In 2001 and 2002, the SEC determined that many telecom companies inappropriately exchanged service rights, which did not affect cash flow, but were reported as sales, thereby increasing reported earnings. During the late 1990s and early 2000s, just prior to declaring bankruptcy at the end of 2001, Enron reported sales growth that put it on track to be the largest company in the United States on the basis of sales. Enron reported the full gross value of derivative contracts as revenue rather than the much smaller commission it received for the trade. In addition, just prior to its failure, Enron booked 10 years' worth of cost savings it forecast it would save clients in the future.

In 2008 Lehman Brothers failed to appropriately disclose "Repo 105" transactions to its investors. A repurchase (repo) transaction is essentially a sale of an asset with a simultaneous agreement to repurchase. Accounting rules generally require the selling entity to book repo transactions as loans when the collateral value is between 98 percent and 102 percent of the repo transaction value. Lehman Brothers used very aggressive accounting methods to report a Repo 105 transaction as a *sale* of assets at the end of

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[1] Cited in R. Green, "Are More Chryslers in the Offing?" *Forbes*, February 2, 1981.

the quarterly reporting period, even though Lehman Brothers planned to repurchase the assets only a few days later. Lehman attempted to circumvent the accounting rules by supplying 105 percent or more of securities value for the repo—effectively over-collateralizing the repo transaction. Lehman "determined" this would allow the firm to show cash proceeds from a sale and pay down debt (rather than report the repo as a loan) when Lehman fully intended to repurchase the assets and increase its debt just after the quarterly reporting period. This made Lehman's financial ratios, including its leverage ratio, look much better than they actually were. These accounting practices dramatically improved the appearance of Lehman Brothers' balance sheet at the end of the quarter! Interestingy, no U.S. accounting firm would bless the deal; hence, Lehman had to obtain an opinion from a European firm under "English" law. Lehman then moved 105 transactions to its European subsidiary.

This chapter provides guidelines for evaluating commercial credit requests. It briefly considers the qualitative aspects of lending, such as the quality of data, the quality of management, the borrower's character and commitment to repay a loan, and the quality of the company's product. These qualitative issues and other economic and industry-specific factors can be as important as the quantitative factors associated with the loan decision. An evaluation of these qualitative factors requires experience and "hands-on knowledge," difficult to acquire in a textbook. Instead, this chapter focuses on a company's ability to repay a loan and related quantitative factors associated with the loan decision. As Bailey's banker advised, "Watch cash flow" is an important motto.

The basic objective of credit analysis is to assess the risks involved in extending credit (making a loan). As used here, risk refers to the volatility in earnings. Lenders are particularly concerned with adverse fluctuations in net income (NI) (or more importantly, cash flow), which hinder a borrower's ability to service or repay a loan. Such risk manifests itself to the bank by a borrower defaulting, or not making timely interest and/or principal payments. Credit analysis assigns a probability to the likelihood of default based on quantitative and qualitative factors. Some risks can be measured with historical and projected financial data. Other risks, such as those associated with the borrower's character and willingness to repay a loan, are not directly measurable. When deciding whether to approve a loan, the bank ultimately compares the various risks with the potential benefits to the bank (income).

This chapter introduces a four-step procedure for analyzing the quantifiable aspects of commercial credit requests. The procedure incorporates an objective and systematic interpretation of management and operations as well as financial data. It focuses on issues that typically arise when determining creditworthiness. The results supplement qualitative information regarding the borrower's character and history of financial responsibility. After analyzing a loan request, a loan officer should have a firm grasp on the answers to the following key questions:

1. What is the character of the borrower, the nature of the loan request, and quality of information provided?
2. What will the loan proceeds be used for?
3. How much does the customer need to borrow?

4. What is the primary source of repayment, and when will the loan be repaid?
5. What is the secondary source of repayment; that is, what collateral, guarantees, or other cash inflows are available?

The first section discusses these questions in detail. The second section introduces an objective evaluation procedure. The final section provides an application and interpretation of the analysis for a hypothetical loan request. The appendices review basic terminology and discuss sources of financial data.

Fundamental Credit Issues

Virtually every business in the United States has a credit relationship with a financial institution. Some firms only use backup credit lines in support of commercial paper issues. Some rely on periodic short-term loans to finance temporary working capital needs. Others primarily use term loans with a maturity beyond one year to finance capital expenditures, new acquisitions, or permanent increases in working capital. Regardless of the type of loan, all credit requests mandate a systematic analysis of the borrower's ability to repay.

When evaluating loan requests, bankers can make two types of errors in judgment. The first is extending credit to a customer who ultimately defaults. The second is denying a loan to a customer who ultimately would repay the debt. In both cases, the bank loses a customer and its profits are less. Many bankers focus on eliminating the first type of error, applying rigid credit evaluation criteria and rejecting applicants who do not fit the mold of the ideal borrower. A well-known axiom in banking is that the only time borrowers can get financing is when they really do not need the funds. Unfortunately, as many bankers have discovered, turning down good loans is unprofitable as well. The purpose of credit analysis is to identify the meaningful, probable circumstances under which the bank might lose. Lenders also use credit analysis to restructure a weak loan application into a good loan when the borrower is strong, but does not fully understand the true borrowing needs.

Character of the Borrower, the Loan Request, and Quality of Data Provided

The foremost issue in assessing credit risk is determining a borrower's commitment and ability to repay debts in accordance with the terms of a loan agreement. An individual's honesty, integrity, and work ethic typically evidence commitment. For a business, commitment is evidenced by the owners and senior management. Bankers who argue that they make many quick credit decisions implicitly state that many potential borrowers are of dubious character. Even if the numbers look acceptable, a bank should lend nothing if the borrower appears dishonest. Whenever there is deception or a lack of credibility, a bank should not do business with the borrower.

It is often difficult to identify dishonest borrowers. The best indicators are the borrower's financial history and personal references. When a borrower has missed past debt service payments or been involved in a default or bankruptcy, a lender should carefully document why, to determine if the causes were reasonable. Borrowers with a history of credit problems are more likely to see the same problems arise later. Similarly, borrowers with a good credit history will have established personal and banking relationships that indicate whether they fully disclose meaningful information and deal with subordinates and suppliers honestly. A loan officer should begin the credit analysis by analyzing the firm's prior banking relationships, dealings with suppliers and customers, and current record from appropriate credit bureaus.

Lenders often look for signals of a borrower's condition beyond basic income statement and balance sheet data. For example, negative signals may appear in the following forms:

- A borrower's name consistently appears on the list of bank customers who have overdrawn their accounts.
- A borrower makes a significant change in the structure of the business, such as a change in accountant or change in key manager or adviser.
- A borrower appears to be consistently short of cash, which might be indicated by frequent requests for small loans or the fact that small balances are kept in checking accounts when net worth is high.
- A borrower's personal habits have changed for the worse; red flags include behavior suggesting drug use, heavy gambling, alcoholism, or marital breakup.
- A firm's goals are incompatible with those of stockholders, employees, and customers.[2]

The nature of the loan request specifically addresses the legitimacy of the loan for the intended purpose. Banks do not want to lend money on highly speculative projects. They generally appreciate borrows with proven records of accomplishment and highly competent management. Financial institutions generally do not like to lend money with high loan to value ratios, for extremely long periods, or on unknown or unproven technologies. They generally do not lend if there is inadequate capital or illiquid principals in the business venture. Some banks will not lend to certain industries either due to a history of unsuccessful ventures or possibly due to a lack of bank staff expertise in the industry.

The quality of data used in the analysis is critical. Many small companies use less sophisticated accounting techniques and their financial statements are unaudited. Audited financial statements are preferred because accounting rules are well established so that an analyst can better understand the underlying factors that affect the entries. Just because a company has audited financial statements, however, does not mean the reported data are not manipulated. Management has considerable discretion within the guidelines of generally accepted accounting principles and thus can "window dress" financial statements to make the results look better. An analyst should review the following to assess accounting data quality:

- Areas of accounting choices in which estimates and judgments are required inputs
- Periods in which a change in account principle, method, or key assumption has occurred
- Extraordinary and discretionary expenditures, as well as nonrecurring transactions
- Income and expense recognition that do not closely track cash flow
- Nonoperating income, gains, and losses

In addition to character and assessment of data quality, a lender must resolve four additional fundamental issues prior to extending credit: the use of loan proceeds, loan amount, source and timing of repayment, and collateral. These issues draw attention to specific features of each loan that can be addressed when structuring the loan agreement terms.

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[2] See Thomas Bennett (1987) for a lender's view of these issues. Conrad Newburgh (1991) presents procedures for evaluating character and maintaining control of the lending agreement.

Use of Loan Proceeds

The range of business loan needs is unlimited. Firms may need cash for operating purposes to pay overdue suppliers, make a tax payment, or pay employee salaries. Similarly, they may need funds to pay off maturing debt obligations or to acquire new fixed assets. Although the question of what the borrowed funds will be used for seems simple enough, frequently a firm recognizes that it is short of cash but cannot identify specifically why.

Loan proceeds should be used for legitimate business operating purposes, including seasonal and permanent working capital needs, the purchase of depreciable assets, physical plant expansion, acquisition of other firms, and extraordinary operating expenses. Speculative asset purchases and debt substitutions should be avoided. The use of the loan proceeds can either enhance the ability of the firm to repay the loan or make it more risky. Financing illegal activities or unprofitable operations can actually increase the losses of the firm and hence reduce the possibility of repayment. The true need and use of the loan proceeds determines the loan maturity, the anticipated source and timing of repayment, and the appropriate collateral.

Many commercial loans are made for working capital purposes. As such, they bridge the gap between the expenditure of funds to purchase raw materials or inventory and pay employees with the sale of those goods on credit and the ultimate collection of the cash on the credit sales. The analyst must determine whether the bank is financing an increase in inventory or receivables or replacing outstanding payables and debt. Banks all too often originate working capital loans as seasonal credits, only to find that they are never fully repaid as anticipated. In this case, the banker discovers that the loan was not a seasonal need but rather a replacement of outstanding payables or financing for a permanent increase in working capital needs. Term loans should be made for permanent increases in working capital needs and asset acquisitions with an economic life beyond one year. These types of loans require a longer repayment schedule. One common pitfall is to focus too much on collateral and end up financing a firm's long-term needs with short-term notes. A careful review of a firm's financial data reveals why a company needs financing.

How Much Does the Borrower Need? The Loan Amount

In many cases, borrowers request a loan before they clearly understand how much external financing is actually needed and how much is available internally. The amount of credit required depends on the use of the proceeds and the availability of internal sources of funds. For example, if a firm wants to finance new equipment, the loan request is typically for the purchase price less the resale value of any replaced assets. For a shorter-term loan, the amount might equal the temporary seasonal increase in receivables and inventory net of that supported by increased accounts payable. With term loans, the amount can be determined via *pro forma analysis*.[3] Borrowers often ask for too little in a loan request and return later for more funds. The lender should not only estimate how much the borrower will need today but also in the future. Inexperienced lenders often make the mistake of failing to recognize that lending only a portion of the funds needed may actually reduce the borrower's ability to pay back the loan. A half-built warehouse will not produce revenue but rather will be a revenue drain. The lender's job is to help

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[3] *Pro forma analysis* is the projecting or forecasting of a company's financial statements into the future. The use of income statement, balance sheet, and cash-flow projections allows an analyst to assess the amount of the loan needed, the purpose of the loan proceeds, when the loan will be paid back, and what collateral is available.

determine the correct amount, such that a borrower has enough cash to operate effectively but not too much to spend wastefully.

Once a loan is approved, the amount of credit actually extended depends on the borrower's future performance. If the borrower's cash flows are insufficient to meet operating expenses and debt service on the loan, the bank will be called upon to lend more and possibly lengthen the loan maturity. If cash flows are substantial, the initial loan outstanding might decline rapidly and even be repaid early. The required loan amount is thus a function of the initial cash deficiency and the pattern of future cash flows.

The Primary Source and Timing of Repayment

Loans are repaid from cash flows. The four basic sources of cash flow are the liquidation of assets, cash flow from normal operations, new debt issues, and new equity issues. Credit analysis evaluates the risk that a borrower's future cash flows will not be sufficient to meet mandatory expenditures for continued operations and interest and principal payments on the loan.

Specific sources of cash are generally associated with certain types of loans. Short-term, seasonal working capital loans normally are repaid from the liquidation of receivables or reductions in inventory. Term loans typically are repaid out of cash flows from operations, specifically earnings and noncash charges in excess of net working capital needs and capital expenditures needed to maintain the existing fixed asset base. A comparison of projected cash flow from operations (CFO) with interest and principal payments on prospective loans indicates how much debt can be serviced and the appropriate maturity. Unless specifically identified in the loan agreement, it is inappropriate to rely on new equity from investors or new debt from other creditors for repayment. Too often, these external sources of cash disappear if the firm's profitability declines or economic conditions deteriorate.

The primary source of repayment on the loan can also determine the risk of the loan. The general rule is not to rely on the acquired asset or underlying collateral as the primary source of repayment. If you lend money for someone to buy 1,000 shares of IBM stock and the borrower has no other source of income to pay you back, the primary source of repayment is the acquired asset. If the stock does well, the borrower makes money and repays the loan. If the stock does poorly, the borrower declares bankruptcy, and you will not be fully repaid. Obviously, this was not a loan but venture capital disguised as a loan. This is not to say that you would never lend money for someone to buy IBM stock or that an acquired asset cannot be expected to help pay back the loan. They are just not the primary source of repayment.

Secondary Source of Repayment: Collateral

It is not by chance that the question of collateral is the last question to be addressed. If something goes wrong, a bank wants all the collateral it can get, but it generally does not want to take possession of the collateral. Taking the collateral means that the borrower is unable to continue operations. If the collateral were inventory or uncollected receivables, why would the bank be better able to liquidate the assets than the managers who know the industry? It is also costly to maintain and sell collateral, and foreclosures do not build long-term relationships with the customers.

Banks can, however, lower the risk of loss on a loan by requiring backup support beyond normal cash flow. This can take the form of assets held by the borrower or an explicit guarantee by a related firm or key individual. Collateral is the security a bank has in assets owned and pledged by the borrower against a debt in the event of default. Banks look to collateral as a secondary source of repayment when primary cash flows are insufficient to meet debt service requirements. Banks should select collateral that will retain its value over the business cycle. Receivables and marketable inventory are preferred because of their liquidity. Plant, equipment, and real estate are also potentially valuable.

Virtually any asset, or the general capacity to generate cash flow, can be used as collateral. From a lender's perspective, however, collateral must exhibit three features. First, its value should always exceed the outstanding principal on a loan. The loan-to-value (LTV) ratio is an important measure of the amount of coverage the lender has with the collateral.[4] For example, lenders generally require an 80 percent LTV ratio on home mortgages before the loan customer can avoid paying for mortgage insurance. The lower the LTV, the more likely the lender (who must take possession of the collateral) can then sell the collateral for more than the balance due and reduce losses. It is not uncommon to find borrowers who are "upside down" on their automobile loans. *Upside down* means that the LTV is greater than 100 percent, or the value of the car is less than the outstanding loan balance. Lenders will rarely make the original loan such that the LTV is greater than 100 percent, but over time, the value of the automobile might fall faster than the balance on the loan. In these cases, the borrower may have a financial incentive to default on the loan. The second required feature of collateral is that a lender should be able to easily take possession of the collateral and have a ready market for its sale. Highly illiquid assets are worth far less because they are not portable and often are of real value only to the original borrower. Finally, a lender must be able to clearly mark collateral as its own. This means that the claim must be legal and clear. Careful loan documentation is required to perfect the bank's interest in the collateral.

When physical collateral is not readily available, banks often look for personal guarantees. They generally rely on the borrower's cash flow to cover debt service with the borrower's net worth in reserve. Banks attempt to protect themselves against adverse changes in a borrower's financial condition by imposing loan covenants in the loan agreement that restrict a borrower's ability to make extreme decisions and thereby alter its fundamental operating profile. When the borrower's cash flow is problematic, a bank can request that the borrower find a cosigner who agrees to assume the debt in the event of default.

Liquidating collateral is clearly a second best source of repayment for three reasons. First, there are significant transactions costs associated with foreclosure. Banks must often allocate considerable employee time and pay large legal expenses that reduce the collateral's net value. Thus, when negotiating loan agreements, the bank should select collateral with a value above the anticipated loan amount. Second, bankruptcy laws allow borrowers to retain possession of the collateral long after they have defaulted. During that time, the collateral often disappears or deteriorates in value. Third, when the bank takes possession of the collateral, it deprives the borrower of the opportunity to salvage the company. The bank must hire new managers or manage the firm temporarily with its own personnel until sale, a poor alternative.

In general, a loan should *not* be approved on the basis of collateral alone. Unless the loan is secured by collateral held by the bank, such as bank CDs, there is risk involved in collection. In most cases, it is essential that lenders periodically examine the quality of collateral to determine whether it truly exists or has deteriorated over time. This involves obtaining new appraisals or on-site inspections of a borrower's inventory, receivables, and operating facilities. Collateral improves the bank's position by lowering

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[4] The LTV ratio is a measure of the current value of the loan divided by the market value of the collateral. Appraisals are often used for market value with real estate loans. Hence, the quality of the appraisal will determine the usefulness of this ratio.

its net exposure, but it does not improve the borrower's ability to generate cash to repay the loan.

In addition to these issues, credit analysis should examine risks that are unique to each loan. Each analysis should identify questions regarding the quality of management, the soundness of the business, sensitivity to economic conditions, the firm's relationship with other creditors, and any other information that is not available in the financial statements.

Evaluating Credit Requests: A Four-Part Process

The purpose of credit analysis is to identify and define the lender's risk in making a loan. There is a four-stage process for evaluating the financial aspects of commercial loans:

1. Overview of management, operations, and the firm's industry
2. Common size and financial ratio analysis
3. Analysis of cash flow
4. Projections and analysis of the borrower's financial condition

During all phases, the analyst should examine facts that are relevant to the credit decision and recognize information that is important but unavailable. The analyst should prepare a list of questions to be presented to the borrower for clarification. Financial calculations, using historical data, should examine the absolute magnitudes of ratios and funds flows and pertinent changes in the magnitudes over time (trend analysis), and compare these measures with industry averages for the firm's competitors. Much of the information is available from the bank's credit files and conversations with the firm's management and chief financial officer. Sources of financial data on comparable firms are described in Appendix I to this chapter.

Financial projections (pro forma) involve making reasonable assumptions about a firm's future sales, working capital needs, capital expenditures, operating expenses, taxes, and dividends. A company may need to borrow funds today (and possibly more in the future), but those funds will be paid back with future cash flows. Projections of the borrower's financial condition are used to forecast cash flows and determine answers to the questions discussed above: how much is needed, what will the funds be used for, what is the primary source of repayment, and when will the funds be repaid? These projected cash flows are formally compared with expected interest and principal payments on all debt obligations and other mandatory cash expenditures. The same ratio analysis can then be performed using the projected data as a check on the reasonableness of the forecasts.

Overview of Management, Operations, and the Firm's Industry

Before analyzing financial data, the analyst should gather background information on the firm's operations, including specific characteristics of the business and intensity of industry competition, management character and quality, the nature of the loan request, and the data quality. Relevant historical developments and recent trends should also be examined.

This evaluation usually begins with an analysis of the organizational and business structure of the borrower. Is it a holding company with subsidiaries or a single entity? Does it operate as a corporation or partnership? Is the firm privately or publicly held? When did the firm begin operations, and in what geographic markets does it now compete? The evaluation should also identify the products or services provided and the firm's competitive position in the marketplace as measured by market share, degree of product differentiation, presence of economies of scale or scope in the cost structure, and the bargaining power of buyers and sellers with whom the firm deals.[5]

The next step is usually to write a brief *Business and Industry Outlook* report. The analyst should examine historical sales growth, the relationship between industry sales and the business cycle, and an implied forecast for the industry. The analyst should also address related questions: How many firms offer competitive products? Are there differences in product quality or life? A logical extension is to evaluate suppliers and the production process. Has the firm contracted for the appropriate raw materials at good prices? How many suppliers can provide the necessary materials? What is the quality of the firm's labor force and employee relations? Are the firm's fixed assets obsolete?

The lender should focus particular attention on management character and quality. The backgrounds of the chief executive, financial, and operating officers should be examined in terms of key individuals' ages, experience in the business, service with the company, and apparent line of succession. Businesses frequently are dominated by one individual even though others hold officer titles. When possible, it is useful to identify the top officers' equity interest in the firm and the type of compensation they receive. This helps identify motivating factors underlying firm decisions.

Finally, the overview should recognize the nature of the borrower's loan request and the quality of the financial data provided. It should indicate the proposed use and amount of credit requested and the borrower's anticipated source of repayment. It should specify whether the financial statements are audited and, if so, the type of opinion issued. A brief discussion of generally accepted accounting principles and audited statements appears in Appendix II to this chapter.

Common Size and Financial Ratio Analysis

Most banks initiate the data analysis using a financial analysis spreadsheet, which arranges the borrower's income statement and balance sheet data into a consistent format for comparison over time and against industry standards. Income statement and balance sheet data for Prism Industries are presented in Exhibits 14.1 and 14.2, respectively. Data for each reporting period are provided in three columns. The first column lists the percentage change in the value from the previous year.[6] The second column contains the actual dollar value of the accounting entry. The third column converts the figure to a common size ratio by dividing by total assets (balance sheet) or net sales (income statement). Comparable peer figures for 2014 are listed in the column labeled Peer Group Ratios.

Prism Industries is a small manufacturer of outdoor storage buildings. Examining Exhibit 14.1 we find that Prism's sales increased by almost 17 percent in 2013. Management indicates that the strong economic environment and its high-quality product have led to the recent success. Although Prism exhibited strong sales growth, its cost of goods sold (COGS) was almost 3 percent higher and its operating expenses almost 2 percent lower than peers—resulting in an almost 1 percent lower profit before taxes as a percent of sales. Examining the balance sheet data presented in Exhibit 14.2 indicates that Prism's accounts receivable increased in 2014 but remained below the industry norms (as a percentage of assets). Inventory actually decreased in 2014 and was below industry norms. Net fixed assets, on the other hand, were well above industry standards in each year. In terms of financing, Prism relied more on stockholders' equity and used less debt.

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[5] Arnold (1988) describes how the intensity of competition affects a firm's business risk. Lenders should incorporate the results of this analysis in their forecasts of sales, costs, and product pricing.

[6] "% Cha" values are the percentage change in the value from the prior period. Calculated as $(X_t/X_{t-1})-1$.

EXHIBIT 14.1 Comparative Income Statement for Prism Industries, 2013–2014

	2013			2014		
	$ 1,000	% of Total	% Cha	$ 1,000	% of Total	Peer Group Ratios
Net sales	**2,400**	**100.0**	**16.7**	**2,800**	**100.0**	**100.0%**
Cost of goods sold	2,050	85.4	16.1	2,380	85.0	82.2%
Gross profit	350	14.6	20.0	420	15.0	17.8%
Selling expenses	195	8.1	7.7	210	7.5	
Depreciation & amortization	42	1.8	21.4	51	1.8	
Other operating expenses	0	0.0	#N/A	40	1.4	
Total operating expenses	237	9.9	27.0	301	10.8	12.5%
Operating profit	*113*	*4.7*	*5.3*	*119*	*4.3*	*5.3%*
Interest expense	38	1.6	−10.5	34	1.2	
All other expenses	7	0.3	71.4	12	0.4	
All other income	9	0.4	22.2	11	0.4	
Total all other expenses (income)	36	1.5	−2.8	35	1.3	1.4%
Profit before taxes	*77*	*3.2*	*9.1*	*84*	*3.0*	*3.9%*
Income taxes	25	1.0	16.0	29	1.0	
Net income	**52**	**2.2**	**5.8**	**55**	**2.0**	
Dividends	15	0.6	33.3	20	0.7	
Retained earnings	37	1.5	−5.4	35	1.3	

Note: Figures are in thousands of dollars. Lease payments are included in other operating expenses and were $2,200 in 2014. Prism's first year of operations was 2013.

Prism used slightly more short-term bank debt and less trade credit (accounts payable) than the industry average. Prism also used somewhat less long-term debt than peer average. Prism appears to have financed much of its growth using internally generated funds; that is, retained earnings.

Common size values of the income statement for Prism are provided in Exhibit 14.1. Examining profitability, we find that Prism's profit before taxes increased in 2014, but it was less profitable than the industry average. Lower profitability is due to a much higher COGS, reflecting either a higher cost of goods or lower markups on finished products. Prism's COGS, as a percentage of sales, fell in 2014 but remains above the industry average. This higher COGS was offset somewhat by Prism's lower operating expenses, but the net effect is that the firm earns proportionately less before taxes than do comparable firms.

Common size ratio comparisons are valuable because they adjust for size and thus enable comparisons across firms in the same industry or line of business. The figures can be distorted, however, if a firm has one balance sheet or income statement item that differs sharply from industry standards. For example, a business that leases fixed assets will report a sharply different asset composition than businesses in an industry

EXHIBIT 14.2 Comparative Balance Sheet for Prism Industries, 2013–2014

	Dec. 31, 2013		Dec. 31, 2014			Peer Group Ratios
	$ 1,000	% of Total	% Cha	$ 1,000	% of Total	
ASSETS						
Cash & marketable securities	85	8.1	5.9	90	8.2	5.5%
Accounts receivable	141	13.4	18.4	167	15.2	18.2%
Inventory	306	29.1	−3.6	295	26.8	29.3%
Prepaid expenses	22	2.1	−18.2	18	1.6	
Current assets	554	52.8	2.9	570	51.8	53.0%
Gross fixed assets	575	54.8	12.2	645	58.6	
Less accumulated depreciation	115	11.0	39.1	160	14.5	
Net fixed assets	460	43.8	5.4	485	44.1	38.2%
Long-term investments	36	3.4	25.0	45	4.1	
Total Assets	**1,050**	**100.0**	**4.8**	**1,100**	**100.0**	**100.0%**
LIABILITIES & EQUITY						
Notes payable—bank	50	4.8	40.0	70	6.4	6.0%
Accounts payable	99	9.4	7.1	106	9.6	11.2%
Accrued expenses	15	1.4	113.3	32	2.9	
Income tax payable	6	0.6	100.0	12	1.1	1.7%
Current maturity—LTD	35	3.3	14.3	40	3.6	3.6%
Current liabilities	205	19.5	26.8	260	23.6	27.5%
Long-term debt (LTD)	280	26.7	−14.3	240	21.8	22.8%
Total liabilities	**485**	**46.2**	**3.1**	**500**	**45.5**	**57.5%**
Common stock—par	325	31.0	0.0	325	29.5	
Retained earnings	240	22.9	14.6	275	25.0	
Stockholders' equity	**565**	**53.8**	**6.2**	**600**	**54.5**	**42.5%**
Total Liabilities & Equity	**1,050**	**100.0**	**4.8**	**1,100**	**100.0**	**100.0%**

Note: Figures are in thousands of dollars; LTD refers to long-term debt. Prism's first year of operations was 2013.

where most firms own fixed assets. To address this issue, analysts should move to the next step, which is to calculate a series of ratios that indicate performance variances.

Most analysts differentiate between at least four categories of ratios: liquidity, activity, leverage, and profitability.[7] **Liquidity ratios** indicate a firm's ability to meet its short-term obligations and continue operations. **Activity ratios** signal how efficiently a firm uses assets to generate sales. **Leverage ratios** indicate the mix of the firm's financing between debt and equity and potential earnings volatility. Finally, **profitability ratios** provide evidence of the firm's sales and earnings performance.

Liquidity and Activity Ratios. Evaluating liquidity risk requires an understanding of a firm's operating cycle. Recall that the typical business buys raw materials or finished goods for resale on credit. It then uses labor and other operating expenses to produce a

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[7] Key ratios are defined in Appendix I. Activity ratios are grouped with liquidity ratios in this discussion.

final product, often paying cash for these services. The product is then sold, typically on credit. Trade credit rarely provides enough financing to cover the time it takes to collect on credit sales. So the proceeds of short-term loans are often used to finance current assets or to reduce other current liabilities. Notes are repaid by systematically reducing inventories following increases in sales and reducing receivables following the collection of credit sales. Measures of net working capital, current and quick ratios, inventory turnover, accounts receivable collection period, days accounts payables outstanding, and the days cash-to-cash cycle, help indicate whether current assets will support current liabilities.

The **current ratio** (current assets/current liabilities) is a gross measure of liquidity. Historically, analysts have viewed a current ratio of about 2.0 to be consistent with adequate liquidity. This means that firms hold twice as much cash, accounts receivable, inventory, prepaid expenses, and other current assets as current liabilities coming due in the next year. Thus, the firm has good ability to pay off the current obligations as they come due. Caution should be exercised here, however, especially when examining the data for smaller firms. A high current ratio could indicate that inventory and/or accounts receivable are high, but this does not mean the firm is liquid unless the inventory and accounts receivable are of high quality. If the firm has obsolete or damaged inventory or overdue accounts receivable, a high current ratio could also indicate a lack of liquidity, hence the need to carefully examine inventory turnover and the days accounts receivable collection period. In addition, prepaid expenses are rarely liquid assets. Faster turnover generally indicates sound inventory levels and good collection of receivables.

A more conservative measure of liquidity is the **quick ratio** $[(\text{cash} + \text{accounts receivable})/\text{current liabilities}]$. By eliminating inventories, prepaid expenses, and other current assets, which are generally less liquid, the quick ratio provides a more conservative measure of aggregate liquidity.

Activity ratios measure the efficiency of the firm as well as the liquidity of current assets. A highly efficient firm, for example, will report a **sales-to-asset ratio** that exceeds industry norms—indicating that its asset base produces proportionately more revenue. A low ratio indicates that the asset mix is not efficient in the sense that too much is allocated to that asset. For example, **days accounts receivable collection period** (accounts receivable/average daily credit sales) indicates the average number of days required to convert accounts receivable into cash. This ratio provides information about a company's credit policy as well as its ability to collect on these accounts. Hence, it is a measure of how efficient the firm is in using this asset as well as how liquid these assets are respectively. **Days inventory on hand** (inventory/average daily COGS) and **inventory turnover** (COGS/inventory) similarly measure the efficiency of the firm in managing its inventory. High days inventory and low turnover relative to industry norms indicate less efficient inventory management and/or less liquidity.

On the other side of the balance sheet, **days accounts payable outstanding** (accounts payable/average daily purchases) measures the firm's efficiency in using trade credit to finance its working capital needs.[8] The greater the days payable, ceteris paribus, the more efficient the firm and the less bank financing needed. Caution is appropriate, however, because all else may not be equal. A high days payable figure may indicate the firm has serious liquidity problems and may be in danger of being "cut off" by its suppliers. If this happens, the need for additional bank debt will increase dramatically. In addition, a high days payable figure may mean that the firm is giving up early payment discounts, and hence using trade credit financing that is more expensive than bank debt.

Financial ratios for Prism are presented in Exhibit 14.3. Current and quick ratios are low and have declined over the last two years. Days accounts receivable is about six days

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[8] Recall the accounting relationship: purchases $=$ COGS $+ \Delta$inventory.

EXHIBIT 14.3 **Financial Ratio Analysis for Prism Industries, 2013–2014**

	2013		2014		Peer Group Ratios	
Liquidity Ratios						
Current ratio	2.70		2.19		2.10	
Quick ratio	1.10		0.99		1.01	
	Days	*Times*	*Days*	*Times*	*Days*	*Times*
Days cash	12.93	28.24×	11.73	31.11×		
Days accounts receivable	21.44	17.02×	21.77	16.77×	28.0	13.0×
Days inventory	54.48	6.70×	45.24	8.07×	48.2	7.6×
Cash-to-cash asset cycle	88.85		78.74			
Days AP outstanding	17.49	20.87×	16.33	22.35×	26.1	14.0×
Days cash-to-cash cycle	71.36		62.41			
Est. W.C. financing needs	$401		$407			
Leverage Ratios	*Percent*	*Times*	*Percent*	*Times*	*Percent*	*Times*
Debt to tangible net worth		0.86×		0.83×		1.4×
Times interest earned		3.03×		3.47×		3.1×
Fixed charge coverage*		3.03×		3.32×		2.4×
Net fixed assets to tangible net worth	81.42%		80.83%		63.0%	
Profitability Ratios						
Return on net worth (ROE)	9.20%		9.17%			
Profit before taxes to net worth	13.63%		14.00%		19.8%	
Return on assets (ROA)	4.95%		5.00%			
Profit before taxes to total assets	7.33%		7.64%		8.3%	
Equity multiplier (leverage = TA/TE)		1.86×		1.83×		2.4×
Income						
Total asset turnover (net sales/TA)		2.29×		2.55×		2.4×
All other income/total assets	0.86%		1.00%			
Expenses						
Net profit margin (NI/net sales)	2.17%		1.96%			
COGS/net sales	85.42%		85.00%		82.2%	
Operating expenses/net sales	9.88%		10.75%		12.5%	
Income taxes to earnings before taxes	32.47%		34.52%			
Sales/net fixed assets		5.22×		5.77×		
Cash-Flow Ratios*						
CFO/(DIV + last CMLTD)		2.33×		2.27×		
CFO/(DIV + last CMLTD + short-term debt)		0.54×		1.00×		

*Lease payments are included in other operating expenses and were $2,200 in 2014.

**CFO, DIV, and CMLTD refer to cash flow from operations, cash dividends, and current maturities of long-term debt, respectively.

shorter than the industry norm, such that receivables turn over almost 17 times a year as compared with the industry norm of 13 times. Days inventory and inventory turnover indicate that Prism was slightly more efficient than peers in 2014 in managing inventory. Days accounts payable is much lower at 16.3 days outstanding in 2014 compared with the industry norm of 26.1 days. This indicates that Prism is not using as much financing from trade creditors as the industry average.

Leverage Ratios. Leverage ratios indicate the mix of the firm's financing between debt and equity and potential earnings volatility resulting from debt financing. The greater a firm's level of debt, the higher its fixed interest payments and the more likely it is to generate insufficient earnings (cash flow) to cover debt payments. Thus, the greater a firm's leverage, the more volatile its net profit (or losses) because certain sales are required to cover fixed interest charges. An analyst should examine a firm's leverage with respect to both the firm's ability to service debt (principal and interest payments) and the amount of debt relative to the size of the firm.

Ratios derived primarily from the income statement, such as times interest earned and fixed charge coverage, measure a firm's ability to service debt or meet interest and lease payments with current earnings. **Times interest earned** [earnings before interest and taxes (EBIT)/interest expense] measures the number of times the company can pay the interest payments on its outstanding debt.[9] The **fixed charge coverage ratio** [(EBIT + lease payments)/(interest expense + lease payments)] ratio measures the number of times the firm can pay interest and other fixed charges (such as lease payments) with current earnings. Obviously, the greater the number of times the firm can cover these required fixed payments, the greater the firm's ability to service existing debt. Prism's earnings coverage of required interest payments increased to 3.47 times, and fixed charge coverage increased to 3.32 times in 2014. This represents good coverage, and both ratios exceed peer group averages.

Ratios derived primarily from the balance sheet, such as debt to total assets and net fixed assets to tangible net worth, can be used to measure the amount of debt relative to the size of the firm. The greater the existing **debt-to-total-assets ratio**, the more limited the firm's future growth potential and the greater the likelihood the firm will be unable to meet future principal payments on the debt. High debt levels restrict a firm's growth because the firm needs additional funds to finance the growth. If the firm is heavily debt ridden, expansion using additional debt may not be possible. **Net fixed assets to tangible net worth** is an indicator of the proportion of the firm's less liquid assets financed by net worth. The greater this ratio, the greater the level of debt financing fixed assets, and the more likely it is that liquidation proceeds will fall short of net worth in the event of failure. Finally, a firm's **dividend payout ratio** (cash dividends/net income) measures the fraction of earnings a firm pays out in cash to stockholders and thus is not retained. The higher the ratio, the lower the retained earnings, which potentially increases future financing needs if the firm were to run into financial problems.

Leverage ratios for Prism Industries are presented in Exhibit 14.3. Debt is only 83 percent of tangible net worth—well below the industry average. Lower levels of debt and greater earnings coverage, times interest earned, and fixed charge coverage confirm the common size analysis of much greater equity and less financial leverage risk.

Profitability Analysis. Basic profitability ratios include the firm's return on equity (ROE), return on assets (ROA), profit margin (PM), asset utilization (AU) (or total asset turnover), and sales growth rate. **ROE** indicates the percentage return to stockholders for each dollar of equity. Prism's ROE fell slightly in 2014 and indicates that stockholders

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[9] EBIT is a proxy for cash flow and equals earnings before interest expense and taxes.

earned only 9.17 percent on funds invested in the firm. This ratio can be decomposed into two components: the average return per dollar of assets invested (ROA) and the equity multiplier (EM):[10]

$$\textbf{ROE}\ (\text{NI/Equity}) = \textbf{ROA}\ (\text{NI/Total assets}) \times \textbf{EM}\ (\text{Total assets/Equity})$$

where NI is net income. **ROA** measures the percentage ROA, while the **EM** measures the degree of financial leverage employed. The greater the return on invested assets, all else being equal, the greater the return to shareholders. By the same token, the greater the degree of leverage (the more debt, rather than equity, is used to finance these assets), the greater the returns to shareholders. Recall, however, that a greater degree of leverage is also an indicator of risk. Very high leverage means that the firm is less likely to meet its debt payment requirements if it has an off year. Prism's lower return to shareholders (ROE) was a result of both lower profit on invested assets (ROA) and much higher equity, hence a lower EM. Prism's ROA was only 5 percent, and its EM was 1.8 times compared with the industry average of 2.4 times.

Recall that NI is simply gross income (sales plus other revenue) minus expenses (COGS, operating expenses, other expenses, and taxes). Hence, ROA can be broken down into **PM**, a measure of expense control, and **AU**, which reveals the gross yield on assets:

$$\textbf{ROA}\ (\text{NI/Total assets}) = \textbf{PM}\ (\text{NI/Sales}) \times \textbf{AU}\ (\text{Sales/Total assets})$$

PM measures aggregate expense control at the firm and actually equals one minus the expense ratio:

$$\begin{aligned}\text{PM} &= (\text{Sales} - \text{Expenses})/\text{Sales}\\ &= 1 - \text{Expenses/Sales}\end{aligned}$$

The major expenses are: COGS, operating expenses, other expenses, and taxes. Hence, we can measure the company's specific strengths or weaknesses in controlling these expenses by decomposing PM and comparing the following common size ratios to industry averages:

$$\begin{aligned}\text{PM} = 1 &- (\text{COGS/Sales}) - (\text{Operating expenses/Sales}) - (\text{Other expenses/Sales})\\ &- (\text{Taxes/Sales})\end{aligned}$$

Finally, **sales growth** figures demonstrate whether the firm is expanding or contracting and provide evidence of industry competitiveness. Examining growth rates for COGS and other expenses and comparing these with sales growth provides an estimate of the relative efficiency of growth.

The profitability ratios presented in Exhibit 14.3 indicate that Prism's profits before taxes were below the industry standard relative to both equity and total assets. Although reported dollar profits increase in 2014 due to the 16.7 percent increase in net sales, Prism's profits before taxes to total assets (similar to ROA) were below industry averages in 2014 due to much higher COGS. Profits before taxes to total assets fell as well in 2014 because Prism's operating expenses increased from 9.9 percent to 10.8 percent of sales. Even though operating expenses increased in 2014, they were still below those of peers, but the significantly higher COGS led to lower profits relative to total assets. This, combined with the higher level of equity, also meant that profit before taxes to tangible net worth was lower.

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[10] This is, of course, the familiar Dupont Analysis introduced in Chapter 3 for banks, now applied to nonfinancial companies.

The analyst should evaluate these ratios with a critical eye, trying to identify firm strengths and weaknesses. All ratios should be evaluated over time to detect shifts in competitiveness and/or firm strategy, and relative to industry standards. The latter comparison indicates where significant deviations occur, both positively and negatively. When reviewing the ratios, the analyst should prepare a list of questions to ask the firm's managers, suppliers, and creditors that fill in information not revealed by the data.

Cash-Flow Analysis

Most analysts focus on cash flow when evaluating a nonfinancial firm's performance. Bank regulators require banks to support credit decisions with cash-flow information for each borrower. This section presents a framework for calculating a firm's CFO that essentially converts a company's income statement to a cash basis. Cash-flow estimates are subsequently compared with principal and interest payments and discretionary cash expenditures to assess a firm's borrowing capacity and financial strength.

Accounting standards mandate that the statement of cash flows be divided into four parts: operating activities, investing activities, financing activities, and cash. The intent is to allow the reader to distinguish between reported accounting profits (NI) and CFO (cash NI), as well as other financing and investing activities that affect cash flow but are not reported on the income statement. The direct method of reporting cash flow converts, or reconciles, the income statement to its cash equivalent.[11]

The **cash-based income statement** presented here is a modified form of a direct statement of cash flows. It is essentially a statement of changes reconciled to cash, which combines elements of the income statement and balance sheet. In general, a statement of changes records changes in balance sheet accounts over a specific time period, indicating the source or use of cash. Its purpose is to indicate how new assets are financed or how liabilities are repaid. Actual funds flows are measured by the absolute differences between balance sheet entries in two different time periods, such as year-end 2014 versus year-end 2013. Recall that the balance sheet is a stock measure. To convert the balance sheet into a flow, we must calculate the change in the stock amount. Because the income statement represents flows over time, income statement data can be combined by adding the revenues and subtracting the expenses that determine NI, as well as subtracting cash dividends for the change in retained earnings on the balance sheet. A generalized cash-based income statement, which identifies the sources of data and nature of calculations, appears as Appendix III.

The key element in the analysis is to determine how much cash flow a firm generates from its normal business activity, that is, CFO. This cash flow must be sufficient to make interest and principal payments on debt. It may differ substantially from reported profits, as in the case of Microstrategy and Enron (see the Contemporary Issues boxes: "Illusory Profits at Microstrategy" and "Revenue Creation at Enron: A Lesson in Creative Accounting"). A cash-based income statement also provides insights into

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[11] Actually, two types of cash-flow statements are used in the industry: the direct and indirect method. The indirect method is required disclosure where the direct method is generally considered optional. The indirect method of cash-flow reporting begins with NI and adjusts for changes in current assets and liabilities to derive CFO. The direct method, by contrast, closely follows the income statement and adjusts each income statement category to produce a cash equivalent; for example, cash sales, cash purchases, cash operating expenses, and so on. This method is most useful to analysts and is widely used in banking. We therefore use the direct cash-flow method in this chapter.

whether a firm has adequately structured its financing. In a normal operating environment, a firm should repay short-term debt by liquidating its receivables and inventory. Long-term debt, by contrast, should be repaid from operating cash flow in excess of financing costs and funds needed to maintain capital assets.

Cash-Flow Statement Format. Because most firms prepare financial statements on an accrual rather than cash basis, revenues and expenses are recognized when earned or incurred rather than when a cash payment is made. Thus, reported NI may differ substantially from operational cash flow. Consider the income statement and balance sheet for Prism Industries in Exhibits 14.1 and 14.2. These data are used to generate the statement of changes reconciled to cash for Prism presented in Exhibit 14.4. This format combines a traditional income statement and changes in balance sheet figures to produce a cash-based income statement. It emphasizes CFO, not reported NI.

The following items are included in each of the four sections of a cash-flow statement:

- *Operations Section*—income statement items and the change in current assets and current liabilities (except bank debt)
- *Investments Section*—the change in all long-term assets
- *Financing Section*—payments for debt and dividends, the change in all long-term liabilities, the change in short-term bank debt, and any new stock issues
- *Cash Section*—the change in cash and marketable securities

With a statement of changes reconciled to cash (cash-based income statement), a source of funds is any transaction that increases cash (or cash-equivalent) assets. A use of funds is any transaction that decreases cash assets. As noted below, sources of funds include any decrease in a noncash asset, increase in liability, any noncash expense, or any revenue item. Selling receivables or issuing new debt subsequently represents sources of cash. Uses of funds include any increase in a noncash asset, decrease in a liability, and any cash expense item. Thus, the purchase of a building or principal payment on debt is a use of cash.

Sources of funds must equal uses of funds. Equivalently, the balance sheet identity requires that the sum of the changes in each asset must equal the sum of the changes in each liability and the change in net worth (stockholders' equity). Let:

$\mathbf{A}_i$ = the dollar value of the i^{th} type of asset (A)
$\mathbf{L}_j$ = the dollar value of the j^{th} type of liability (L)
$\mathbf{NW}$ = the dollar value of net worth

There are n different assets and m different liabilities. Then:

$$\sum_{i=1}^{n} \Delta A_i = \sum_{j=1}^{m} \Delta L_j + \Delta NW \qquad \textbf{(14.1)}$$

We know that ΔNW equals minus cash dividends paid (DIV) plus the change in common and preferred stock (stock) outstanding plus the change in paid-in surplus (surplus). Thus, if we designate the first asset as cash, A_1, and solve for the change in cash, Equation 14.1 can be written as:

$$\Delta A_1 = \Delta \text{cash} = \sum_{j=1}^{m} \Delta L_j - \sum_{i=2}^{n} \Delta A_i + \Delta \text{stock} + \Delta \text{surplus} + NI - DIV \qquad \textbf{(14.2)}$$

CFO is derived using Equation 14.2 and the components of NI from the income statement. Each source of cash has a positive sign, and each use of cash has a negative

CONTEMPORARY ISSUES

Revenue Creation at Enron: A Lesson in Creative Accounting

How did Enron double reported sales in 2000 just prior to declaration of bankruptcy on December 2, 2001? Enron exploited open-ended accounting rules that allowed for the reporting of revenue from the sale of energy derivative contracts at their gross or notional value rather than net value as most firms report. Enron was able to show high sales growth, but relatively small profits, by buying and selling the same energy multiple times. Each time an energy contract was sold, Enron would book the trade at its full gross or notional value, rather than the net profit expected from the trade. The Financial Accounting Standards Board (FASB) did not have clear rules on how energy commodity contracts should be accounted for. Effectively, the FASB allowed each company to determine how it would account for the deals. Enron typically elected to take the largest revenue numbers. Hence, rather than booking only a "small" profit from brokering the supply of gas and electricity to large companies, Enron would book the full notional value of the derivative contracts. (See Chapter 9 for a discussion of futures and forward contracts and the concept of notional value.) Enron would then move its debt into partnerships it created. It would list these as off-balance sheet transactions even though Enron controlled these partnerships and used the structure to bolster its reported data.

How did Enron report profits that may have never materialized? Enron would book profits in the current fiscal year based on projected cost savings it *predicted* it would earn on long-term contracts. These contracts were for operating and managing physical plants for clients. Effectively, Enron was booking income *immediately* on long-term energy and service contracts with clients that could take years to complete and generate earnings, if ever realized. In addition, Enron used many "creative" tax-avoidance strategies. Many of the cost savings associated with these long-term contracts were based on estimates that were either unrealistic or, at a minimum, difficult to confirm due to the long-term estimates of energy costs embedded in the contracts. Projections of cost savings were typically based on long-term forecasted values of future energy prices, construction costs, and the client's future energy use.

Because Enron was a "market maker" in many of the energy markets, it could effectively manipulate the "market" price on long-term energy contracts. Using accounting rules that allowed for the use of mark-to-market accounting to report profits for commodity contracts such as natural gas and electricity, Enron was able to book millions of dollars of profits that were forecast over 10 years, in the current accounting period. In fact, Enron employees indicated that it was not unusual to underestimate commodity prices in the later years of a long-term contract to improve reported profits, because the markets were so thin that no one could estimate the "market" price with much certainty. Hence, Enron was able to book huge profits, not based on historical costs of energy or actual cash earnings, but rather on Enron's predicted estimates of the "market" value of these commodities and services and the cost savings Enron predicted it could generate for clients over many years!

The importance of CFO relative to NI is key. From 1997 to 1999, Enron's CFO declined independent of reported earnings. Mulford and Comiskey (2002) point out that a decline in a company's core business occurs when a company's reported earnings are not associated with similar changes in cash flow.[12] Enron is a lesson in how a company's "reported" earnings can be overstated. Clearly, cash flow from operations is critical to fully understanding a company's core business.

sign. The statement of changes format simply rearranges the elements of Equation 14.2 in terms of a cash-based income statement. Because (NI) equals revenues minus expenses and taxes, substituting into Equation 14.2 yields:

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[12] See Charles W. Mulford and Eugene E. Comiskey (2002).

$$\Delta A_1 = \Delta\text{cash} = \sum_{j=1}^{m} \Delta L_j - \sum_{i=2}^{n} \Delta A_i + \Delta\text{stock} + \Delta\text{surplus} + \text{Revenues} - \text{Expenses} - \text{Taxes} - \text{DIV} \tag{14.3}$$

As the signs before each element indicate, any increase in a liability or decrease in a noncash asset is a source of cash. A decrease in a liability or increase in a noncash asset is a use of cash.

Issues of stock or positive additions to surplus represent a source of cash. Finally, revenues are a source of cash, while cash expenses, taxes paid, and cash dividends are a use of cash. These general relationships are summarized below:

Sources of Cash	Uses of Cash
Increase in any liability	Decrease in any liability
Decrease in any noncash asset	Increase in any noncash asset
New issue of stock	Repayments/buy back stock
Additions to surplus	Deductions from surplus
Revenues	Cash expenses
	Taxes
	Cash dividends

Cash-Flow Analysis for Prism Industries

The cash-flow statement for Prism Industries is presented in Exhibit 14.4 and uses the income statement and balance sheet data from Exhibits 14.1 and 14.2. The focal point is the firm's CFO. The far right column identifies the type of cash-flow impact in terms of Equation 14.3 for each entry. The top part of the statement shows why reported NI for Prism differs from cash flow from operations.

Cash Flow from Operations. When evaluating the cash-flow statement, the analyst usually focuses on the difference in cash flow from operations (CFO) and traditional cash flow (TCF). **Traditional cash flow** is NI plus depreciation and amortization. The typical working capital loan is actually financing the difference in CFO and TCF. Observe, if the change in all current assets and current liabilities were zero, then CFO and TCF would be equal. Hence, it is the change in items, such as accounts receivable, inventory, and accounts payable, for example, that directly address the source and use of cash to support working capital.

For 2014, CFO was \$125,000, while TCF was \$106,000 (\$55,000 + \$51,000). CFO actually exceeded TCF by \$19,000. So, overall, the change in current assets and liabilities actually provided financing. Starting at the top of the statement, the first item listed is net sales. Prism collected less in credit sales than it billed its customers, because outstanding accounts receivable increased from 2013 to 2014. Thus, net sales (and the resulting CFO) are offset by the \$26,000 use of cash to support the increase in receivables. Hence, actual cash receipts were less than net sales. Had accounts receivables declined, actual cash receipts from sales would have exceeded the reported sales figure. The use of cash to support the growth in accounts receivable is a function of two primary factors. First, increases in sales will lead to an equal percentage growth in accounts receivable, all else being equal. Second, a more lenient credit policy (increase in days receivables) will lead to an increase in accounts receivable, all else being equal. Days accounts receivable outstanding increased only slightly from 2013 to 2014 for Prism, so the use of cash in accounts receivable was primarily to support sales growth, not a significantly more lax credit policy.

The next series of figures address the difference between actual cash purchases and reported COGS. Actual cash purchases differ for two basic accounting reasons. First, COGS does not represent actual purchases of inventory during the year. Reported COGS only represents the COGS during the period, not the actual purchases of inventory the company made.

If the company's inventory increased (decreased) during the year, purchases of goods would exceed (be less than) the cost of the goods sold during the year. Second, some purchases are financed by increases in accounts payable (trade credit) while others are paid for in cash. From accounting, we know that:

$$\text{Purchases} = \text{COGS} + \Delta\text{inventory} \qquad \textbf{(14.4)}$$

For Prism, purchases equaled $2,369,000 in 2014 as indicated by the following calculation and the application of Equation 14.4.

Production Budget Summary for 2014 (Thousands of Dollars)	
Beginning inventory	$306
+ Purchases	$2,369
= Goods available for sale	$2,675
− Cost of goods sold	$2,380
= Ending inventory	$295
or Purchases = 2,380 + (295 − 306) =	2,369

Prism started 2014 with $306,000 in inventory. During 2014 the firm purchased $2,369,000 from suppliers such that after COGS was subtracted, it held $295,000 in inventory at the end of the year. The statement of changes adds the change in inventory to the COGS to get total purchases. The $11,000 reduction in inventory was a source of cash. Similar to accounts receivable, inventory growth is a function of sales growth as well as inventory turnover.[13] Faster inventory turnover, however, is associated with a slower growth in inventory. If inventory decreases, as it does for Prism, actual cash purchases are less than COGS, and vice versa. Even though sales increased, Prism's inventory turnover was faster in 2014 (8.07 times) as compared with 2013 (6.70 times). This faster inventory turnover was a source of cash.

The cash-flow statement then subtracts the change in outstanding accounts payable from total purchases to get actual cash purchases. For Prism, the $7,000 increase in payables was a source of cash and indicates that a portion of purchases was financed by additional trade credit provided by suppliers. Prism's cash purchases thus equaled $2,362,000 (purchases less change in accounts payable = $2,369,000 − $7,000). In general, net cash purchases equals the COGS adjusted for inventory accumulation not financed by additional trade credit:

$$\text{Cash purchases} = -(\text{COGS} + \Delta\text{inventory} - \Delta\text{accounts payable}) \qquad \textbf{(14.5)}$$

COGS is reported on the income statement, while cash purchases represents the actual amount of cash used to purchase goods for resale. Using the relationship

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[13] Technically speaking, the change in inventory is a function of the growth in COGS and inventory turnover. If COGS is a stable function of sales, then the change in inventory is a function of sales growth and inventory turnover.

EXHIBIT 14.4 **Statement of Changes Reconciled to Cash for Prism Industries, 2014**

CASH-BASED INCOME STATEMENT	2014 $1,000	Cash-Flow Impact	
Net sales	2,800	Source	Revenue
Change in accounts receivable	(26)	Use	Asset increase
Cash receipts from sales	2,774		
Cost of goods sold	(2,380)	Use	Expense
Change in inventory	11	Source	Asset decrease
Change in accounts payable	7	Source	Liability increase
Cash purchases	(2,362)		
Cash margin	412		
Total operating expenses	(301)	Use	Expense
Depreciation & amortization	51	Source	Noncash expense
Change in prepaid expenses	4	Source	Asset decrease
Change in accruals	17	Source	Liability increase
Cash operating expenses	(229)		
Cash operating profit	183		
All other expenses & income (net)	(1)	Use	Expense
Cash before interest & taxes	182		
Interest expense	(34)	Use	Expense
Income taxes reported	(29)	Use	Expense
Change in income tax payable	6	Source	Liability increase
Change in other current assets & liabilities	0		
Cash flow from operations (CFO)	**125**		
Capital exp. & leasehold improvements	(76)	Use	Asset increase
Change in long-term investments	(9)	Use	Asset increase
Change in other noncurrent assets	0		
Cash used for investments	*(85)*		
Payment for last period's CMLTD	(35)	Use	Payment for financing
Dividends paid (DIV)	(20)	Use	Payment for financing
Payments for financing	*(55)*		
Cash before external financing	**(15)**		
Change in short-term bank debt	20	Source	Liability increase
Change in LT debt + EOP CMLTD	0		
Change in stock & surplus	0		
Change in other noncurrent liabilities	0		
External financing	**20**		
Change in cash & marketable securities	**5**		

Note: Figures are in thousands of dollars.

shown in Equation 14.5 and reviewing Exhibit 14.4, we know that four factors directly affect cash purchases: sales growth, gross margin, inventory policy, and trade credit policy. Holding other factors constant, we know that COGS will increase proportionately to sales. Hence, cash purchases will increase proportionately to sales. Hence, the faster inventory turnover and the longer days accounts payable were both sources of cash.

Because the statement format presented mimics an income statement, the next step is to subtract cash operating expenses. Reported operating expenses typically overstate actual cash expenses by the amount of noncash charges, including depreciation and amortization. The format subtracts total operating expenses, which includes all noncash charges, then adds back noncash charges to yield a net figure for cash expenses. In this example, depreciation expense ($51,000) is the only noncash expense such that total operating expense equals $301,000 before the adjustment.[14]

Prism's prepaid expenses fell in 2014, as it paid more in expenses than that reported on the income statement. The increase in accrued expenses was a source of cash and indicates that Prism paid $17,000 less in cash than costs incurred. Combining the changes in prepaid and accrued expenses with total operating expenses adjusted for noncash charges produces cash operating profit. The resulting figure is then adjusted by income on marketable securities and long-term investments and other noninterest expense and income that arise from normal business activity.

Finally, actual interest expense and an estimate of income taxes paid are subtracted to obtain cash flow from operations. The data indicate that income taxes reported on the income statement exceeded actual taxes paid. This typically occurs because firms take greater deductions for tax purposes than they report in published statements. Tax payments are effectively deferred, and the net tax expense is $23,000 ($29,000 − $6,000), or $6,000 less than that reported.

The resulting net figure, cash flow from operations, indicates whether Prism was able to service its debt and is useful in forecasting whether the firm can assume additional debt. As suggested in the Contemporary Issues box, “The Many Faces of Cash Flow,” cash flow from operations is one of many cash-flow measures. As a rule, any transaction representing a normal business activity should be recognized prior to calculating cash flow from operations.

The items listed in Exhibit 14.4 do not represent all items that potentially appear in a balance sheet or income statement, as financial statements contain different line items for different firms. When constructing a cash-based income statement, it is important to recognize that every income statement and balance sheet account or item must appear somewhere.[15] The key criterion is that the items representing the cash-flow impact of normal operating activities are listed above the “cash flow from operations” line, while extraordinary items should be listed after “cash flow from operations.” Thus, if other income arises from a one-time sale of real estate, it should appear below “cash flow from operations.”

At a minimum, cash flow from operations must be sufficient to cover cash dividends and mandatory principal payments. These required principal payments for the upcoming year are indicated by current maturities of long-term debt (CMLTD). Thus, when looking back on historical performance for a period, cash flow from operations should cover current maturities of long-term debt outstanding at the beginning of the period. For

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[14] The analysis should be careful to use depreciation expense from the income statement ($51,000) and not the change in accumulated depreciation from the balance sheet ($45,000), which can be different. For more details, see the following section, “Cash from Investing Activities.”

[15] Exceptions to this would be NI from the income statement and retained earnings from the balance sheet, as these items are already included.

CONTEMPORARY ISSUES

The Many Faces of Cash Flow

What is cash flow? The classic definition is NI plus depreciation, amortization, and deferred taxes. According to a statement of changes reconciled to cash, cash flow from operations approximately equals classic cash flow adjusted for changes in working capital. In practice, the meaning of cash flow varies according to which analyst reviews the data.

Several commonly accepted definitions of cash flow are listed below, along with the associated value, using the data for Wade's Office Furniture in 2013 (in thousands of dollars):

1. Traditional cash flow = Net income + (depreciation + amortization) = $339 + $73 = $412
2. [No.1] + Δdeferred tax liability) + / − one time expenditures : $412 + $0 + $0 = $412
3. [No.2] − Δaccounts receivable − Δinventory − Δprepaid expenses + Δaccounts payable + Δaccruals : $412 − $497 − $559 − ($35) + $374 + $90 = ($145)
4. [No.1] − all capital expenditures: $412 − $157 = $255
5. [No.3] − all capital expenditures: ($145) − $157 = $302
6. Pretax income + (depreciation + amortization) − maintenance capital expenditures: $527 + $73 − $70 = $530
7. EBITDA(earnings before interest, taxes, depreciation and amortization) = Pretax income + interest + depreciation + amortization : $527 + $157 + $73 = $757

Maintenance capital expenditures equal that portion of capital outlays required to maintain production operations at the current level (*assumed* equal to $70 for Wade's). Definitions numbered 4–6 are often referred to as **free cash flow**. Wade's cash flow from operations is calculated before subtracting capital expenditures but after the change in most current assets and liabilities--and thus at ($128) is much less than values obtained for cash flow according to definitions 1, 2, 4, 6, and 7.

Which is the best measure? Like most data analysis, there is no obvious answer. Definitions 1, 2, 6, and 7 take a long-run view of cash flow at the firm and are more appropriate for valuation. They do not, however, consider the level of net capital expenditures required to maintain and grow the company. Definitions 4, 5, and 6 consider the impact of required capital expenditures to maintain the company's productive assets. Definitions 3 and 5 provide the best estimates of how much new debt a firm can support with existing cash flow. However, firms can generally manipulate both income statement and balance sheet data and thus bias cash-flow estimates. The statement of changes format incorporates all income statement and balance sheet data. When viewed comprehensively, an analyst can examine transactions relationships across the entire portfolio. Cash flow from operations is the appropriate estimate but must be compared with dividends, mandatory principal payments, and capital expenditures to determine debt service capabilities.

Prism, $35,000 (listed in Exhibit 14.2) is the balance sheet value for CMLTD at year-end 2013. Other cash flows are unpredictable and cannot be relied on. In the case of Prism, cash flow from operations of $125,000 in 2014 exceeded cash dividends paid and the principal payment on long-term debt by $70,000 ($125,000 − $20,000 − $35,000). The excess cash flow, along with an increase in short-term debt, essentially was used to purchase new capital assets ($76,000) and increase long-term investments ($9,000).

Cash from Investing Activities. There are many cash expenditures not directly reflected in financial statements. In particular, capital expenditures and long-term investments require cash but are not reflected on the income statement. If cash flow from operations is insufficient to cover capital expenditures and new long-term investments, additional financing will be required. Because capital expenditures are not listed on the income statement or the balance sheet, they must be estimated. One measure of capital expenditures is simply the change in gross fixed assets. This is appropriate, however, only when a firm has not sold any fixed assets during the period. If the firm sells an asset, accounting procedures will reduce accumulated depreciation by the amount of accumulated depreciation attributable to the asset sold. In these cases, the change in accumulated depreciation will be less than depreciation expense from the income statement. Note that depreciation expense ($51,000) reported in Prism's income statement for 2014 differs from the change in accumulated depreciation reported on the balance sheet ($45,000). This typically occurs when a firm sells assets that have been at least partially depreciated. Specifically:

$$\Delta\text{Net fixed assets} = \Delta\text{Gross fixed assets} - \Delta\text{accumulated depreciation} \tag{14.6}$$

and

$$\Delta\text{Net fixed assets} = \text{Capital expenditures} - \text{depreciation} \tag{14.7}$$

hence,

$$\text{Capital expenditures} = \Delta\text{Net fixed assets} + \text{depreciation} \tag{14.8}$$

According to Equation 14.8, the change in gross fixed assets will underestimate actual capital expenditures. Hence, the amount of capital expenditures in 2014 was $76,000 ($485,000 − $460,000 + $51,000).

In addition to the $76,000 in capital expenditures, Prism had another $9,000 in new long-term investments that represented a cash outflow. Total cash used for investments was $85,000. Subtracting this from cash flow from operations produced a positive $40,000 in cash before principal debt and dividend payments.

Cash from Financing Activities. The bottom of the cash-based income statement of Exhibit 14.4 indicates the firm's payments for financing and how a firm obtains financing from external sources. Although cash-flow statements group payments for financing below the investment section, this is somewhat misleading. Payments for financing generally take precedence over capital expenditures and increases in long-term investments. After subtracting the required principal payment on long-term debt (last period's current maturity of long-term debt) and cash dividends, Prism's cash shortage is $15,000 before external financing. Note that cash flow from operations ($125,000) was sufficient to make the required debt and dividend payments ($35,000 + $20,000) but was insufficient to *also* cover the capital expenditures ($76,000).

Prism's cash shortfall must be financed by external sources or by reducing cash balances. Although Prism's balance sheet indicates there is enough cash to cover this shortfall, cash is required in the operations of the business. A firm cannot bring cash levels to zero, as some *minimum* amount of cash is necessary to make change in the cash registers, and to pay bills and employee salaries. Typical external sources of financing include new issues of long-term debt, common stock, or preferred stock; increases in notes payable to banks or other short-term liabilities; or issues of other hybrid instruments. In this example, Prism actually increased its notes payable to the bank by $20,000 (which represented a cash inflow), accounting for all its external financing.

Change in Cash. The last element of the cash-based income statement is the change in cash and marketable securities, or the left-hand side item (Δcash) in Equation 14.3. This equals cash flow from operations adjusted for *discretionary expenditures*, cash used for investments, payments for financing, and external financing. For Prism Industries, cash flow from operations less total discretionary expenditures produced a $15,000 deficiency. The $20,000 in external financing generated a $5,000 net cash inflow for the year.

The cash-based income statement *balances* by reconciliation to the change in cash, because this $5,000 inflow equals the change in cash and marketable securities calculated from the 2014 and 2013 balance sheet figures ($90,000 − $85,000). Because the cash-based income statement is a sources and uses summary that is reconciled to cash and marketable securities, an analyst can verify the aggregate calculations by comparing the bottom line change in cash and marketable securities obtained from the statement with the simple change in the balance sheet figures. If the two figures are not equal, at least one of the components of the statement is incorrect.

Interpreting Cash Flow from Operations. While short-term debt is typically rolled over, cash flow from operations might ultimately be needed to cover these maturing obligations as well as certain cash expenditures. In 2014, Prism's cash flow from operations of $125,000 was just sufficient to pay $20,000 in cash dividends, $35,000 in maturing principal on long-term debt, and the entire $70,000 in notes payable outstanding at the end of the year. Thus, Prism was in excellent operating condition and could have supported new borrowing, ceteris paribus.

This analysis suggests that two additional ratios may be useful for evaluating a firm's cash-flow condition and whether it has the ability to service additional debt:

1. Cash flow from operations (CFO) divided by the sum of dividends paid (DIV) and last period's current maturities of long-term debt (CMLTD):

$$\text{CFO}_t/(\text{DIV}_t + \text{CMLTD}_t - 1) \text{ and}$$

2. Cash flow from operations divided by the same two terms plus short-term debt outstanding at the beginning of the year.

$$\text{CFO}_t/(\text{DIV}_t + \text{CMLTD}_{t-1} + \text{S.T. Debt}_t)$$

where subscripts t and $t - 1$ refer to values for the period being examined (2014 for Prism) and the preceding period (2013 for Prism), respectively. The denominator in the first ratio represents mandatory principal payments owed on outstanding long-term debt plus discretionary cash dividends. The second ratio adds outstanding principal on other short-term debt. If these ratios exceed 1, as is the case with Prism at 2.27× and 1.00×, respectively, the firm's operational cash flows can pay off existing debt and support new borrowing. If these numbers are less than 1 or negative, the firm's operational cash flows are not sufficient to repay the required principal payments or the balance of short-term notes.

$$\text{CFO}_t/(\text{DIV}_t + \text{CMLTD}_t - 1) = \mathbf{2.27}\times = \$125{,}000/(\$20{,}000 + \$35{,}000)$$

$$\text{CFO}_t/(\text{DIV}_t + \text{CMLTD}_{t-1} + \text{S.T. Debt}_t) = \mathbf{1.00}\times = \$125{,}000/(\$20{,}000 + \$35{,}000 + \$70{,}000)$$

Some analysts construct a third ratio that adds maintenance capital expenditures to the denominator. Maintenance capital expenditures are generally viewed as the amount of outlays necessary to replace the firm's depreciating capital assets. As such, it is investigated internally.

Financial Projections

The three-stage process described previously enables a credit analyst to evaluate the historical performance of a potential borrower. The final step in evaluating a loan request, generating pro forma statements, addresses the basic issues introduced at the beginning of the chapter. Projections of the borrower's financial condition reveal what the loan proceeds are needed for, how much financing is required, how much cash flow can be generated from operations to service new debt, and when, if at all, a loan can be repaid. In order to understand the range of potential outcomes, an analyst should make forecasts that incorporate different assumptions about sales, inventory turnover, the level of interest rates, and the growth in operating expenses.

Consider the prospective use of loan proceeds. Firms with a legitimate need for working capital financing would demonstrate a decline in cash flow from operations caused by some combination of increased receivables and inventory or decreased accounts payable and accruals. Seasonal needs should appear from interim (within year) financial statements. Firms with positive and stable cash flow from operations do not generally need working capital financing but do have the capacity to service new debt. Specific cash outflows associated with term loans are easily identified in the bottom part of the statement of changes as "discretionary expenditures increase" or "external financing declines." The amount of financing required and the source and timing of repayment can be similarly determined with financial projections. In essence, each element of the cash-flow statement is projected over the future.

Pro Forma Assumptions. Projecting financial statements typically begins with sales projections. The key driver is sales growth, which determines how fast sales will increase or decrease in the future. Next period's sales $(\mathrm{t}+1)$ is estimated as:

$$\mathrm{Sales}_{\mathrm{t}+1} = \mathrm{Sales}_{\mathrm{t}} \times (1 + g_{sales})$$

The required input, or parameter, needed to project sales is the growth rate in sales (g_{sales}) and is listed in ***bold italic.*** Estimates are commonly obtained by evaluating the average growth expected in the industry, what is going on with respect to the company's market share, and even the company's own profit plan and capital budget. Sales growth, along with all other change-related parameters, should be based on the analyst's best estimate of what the company will actually do. Often, an inexperienced analyst views his or her job as projecting the financials such that the company will qualify (or not qualify) for a loan. However, the true purpose of pro forma analysis is to provide an objective method of *examining* potential positive or negative events that might affect a company's ability to repay the loan.

COGS is critically related to sales and the expected markup on goods sold. COGS is usually estimated as:

$$\mathrm{COGS}_{\mathrm{t}+1} = \mathrm{Sales}_{\mathrm{t}+1} \times \boldsymbol{\mathit{COGS\ \%\ of\ sales}}$$

The pro forma parameter, ***COGS as a percentage of sales***, is estimated by past data, industry averages, expected future competitive strengths and weaknesses, and the analyst's best estimates of what COGS will be in the future.

Other operating expenses are projected by using either a growth rate assumption or a percentage-of-sales assumption. Selling expenses, for example, are usually considered variable costs and would most likely be estimated as a percentage of sales. General and administrative expenses could be estimated by either a growth rate assumption or as a percentage of sales.

Many balance sheet items are also associated with sales or obtained directly from external sources such as capital budgets. For example, current assets frequently equal a relatively constant percentage of sales or exhibit a stable turnover rate. Accounts receivable are a function of sales growth and the firm's credit policy, while inventory is linked to COGS, a predictable fraction of sales. Projecting accounts receivable thus requires forecasts of sales growth and the pro forma parameter ***days accounts receivable outstanding***:

$$\text{Accounts receivable}_{t+1} = \textbf{\textit{Days A/R outstanding}} \times \text{average daily sales}_{t+1}$$

Inventory is projected similarly using the parameter inventory turnover:

$$\text{Inventory}_{t+1} = \text{COGS}_{t+1}/\textbf{\textit{inventory turnover}}$$

The analyst can determine the approximate turnover rates from historical data or comparable firm standards. Purchases and trade credit financing are tied to inventory growth. Accounts payable, therefore, will also vary with sales forecasts:

$$\begin{aligned}\text{Accounts payable}_{t+1} &= \textbf{\textit{Days AP outstanding}} \times \text{average daily purchases}_{t+1}\\ &= \textbf{\textit{Days AP outstanding}} \times [(\text{COGS}_{t+1} + \Delta\text{inventory}_{t+1})/365]\end{aligned}$$

Contractual principal payments on debt are known, and planned fixed asset purchases can be obtained from the capital budget. Other accounting principles apply as well. For example, accumulated depreciation is simply last period's accumulated depreciation plus the current period's depreciation expense net of accumulated depreciation on assets sold or retired during the period. Retained earnings on the balance sheet increase each year by the difference between NI and dividends paid. The section titled "Credit Analysis Application: Wade's Office Furniture," applies these relationships in more detail to Wade's Office Furniture.

One obvious exception to the sales link is interest expense, which is based on the amount of debt a borrower has or is expected to have outstanding and the underlying interest rates. Forecasts must incorporate expectations regarding outstanding debt and loan balances and projected interest rates. This can be cumbersome as many loans carry floating rates, and the projections must include an interest rate forecast as well. Based on this model, NI will vary directly with sales in a stable environment.

Projecting Notes Payable to Banks. During the pro forma process, assets, liabilities, and equity are forecast separately. Rarely will the balance sheet "balance" in the initial round of pro forma forecasts. To reconcile this, there must be a balancing item, which is often called a "plug" figure. When projected assets exceed projected liabilities plus equity, additional debt is required. When projected assets are less than projected liabilities plus equity, no new debt is required, and existing debt could be reduced or excess funds invested in marketable securities (also a "plug" figure). Typically, any new debt, calculated in this manner, is considered to be a firm's line of credit or short-term debt requirement. The difference in the projected asset base and total funding without new debt, therefore, indicates how much additional credit is required, the firm's line of credit (LOC), at each future interval. This is an iterative procedure as new debt, in turn, increases projected interest expense and lowers NI. Lower NI means lower retained earnings, hence greater levels of debt.

Working capital financing projections should be made using peak and trough estimates of current asset needs over the next year. This enables an analyst to determine *maximum* and *minimum* borrowing requirements when there are seasonal patterns in the borrower's business that should be reflected in balance sheet or income statement items. For term loans, projections should be made over several years or as long as the debt will remain outstanding. The projected loan need must approach zero within a reasonable time period, or the firm will have to restructure its existing financing and operations to service new debt. The effective maturity of a loan is revealed in the pro forma data as the period when the additional debt requirement, or "plug" figure, approaches zero. This estimate will vary with the assumptions that generate the pro forma estimates.

Sensitivity Analysis. Pro forma analysis is a form of sensitivity analysis. The analyst formulates a set of assumptions that establishes the relationships between different income statement and balance sheet items. At a minimum, three alternative scenarios or sets of assumptions should be considered:

- A *best case scenario* in which optimistic improvements in planned performance and the economy are realized
- A *worst case scenario* that represents the environment with the greatest potential negative impact on sales, earnings, and the balance sheet
- A *most likely scenario* representing the most reasonable sequence of economic events and performance trends

The three alternative forecasts of loan needs and cash flow establish a range of likely results, which indicates the riskiness of the credit. The analysts can use these alternative scenarios to determine if the loan will be paid back in a reasonable time under less-than-favorable conditions.

Rating Category	Rating Scale	Collateral Support	Descriptive Indicators of Loan Quality
Highest Quality	1	Gov't. securities; cash	Highest-quality borrowers. Five years of historic cash-flow data. Strong balance sheet and liquidity.
	2	Agency and high-quality municipal securities; insured CDs	Highest quality; differs from class 1 only by degree of financial strength.
	3	Uninsured CDs; high-quality stocks and bonds	Highest quality; cash-flow average is slightly below classes 1 and 2.
Acceptable Quality	4	Gov't. guaranteed loans; may be unsecured	High degree of liquidity; assets readily convertible to cash; unused credit facilities. Strong equity capital and management.
	5	Secured by trading assets (A/R & Inv.) and/or real estate	Adequate liquidity; adequate equity capital with comfortable cash-flow coverage; proactive management; cyclical industry with smaller margins.
	6	Heavily dependent on collateral and/or guarantees	Partially strained liquidity; limited equity so that leverage exceeds industry norms; limited management strength; business is cyclically vulnerable.
Poor Quality	7	Inadequate collateral	Strained liquidity, inadequate capital, and weak management. Adverse trends in industry and borrower financials.
	8	Inadequate collateral	Same as class 7, except financials are weaker.
	9	Inadequate collateral	Totally inadequate profile; well-defined weaknesses.

Risk-Classification Scheme

Most banks use a risk-classification scheme as part of the analysis process for commercial loans. After evaluating the borrower's risk profile along all dimensions, a loan is placed in a rating category ranked according to the degree of risk. Such a system, used for credit granting and pricing decisions, is presented in the table above.

The actual risk rating assigned by lenders will reflect an evaluation of the borrower's historical performance (along the lines of the analysis introduced earlier) and a critique of the borrower's pro forma operating profile. The evaluation will look at key trends in historical performance and the current profit and risk profile relative to industry norms. Pro forma analysis will determine the adequacy of the firm's cash flow from operations coverage of debt service requirements if the firm requests a term loan, or the adequacy of cash flow from liquidating trading assets and collateral if the firm requests a working capital loan. Banks do not generally make new loans to firms rated seven through nine because they are high risk, but borrowers may be downgraded to these lower ratings if their condition deteriorates.

Credit Analysis Application: Wade's Office Furniture

The following analysis presents a systematic application of the credit evaluation procedure just described. It emphasizes using the procedure to evaluate a term loan request that requires forecasts of cash flow from operations. It focuses on how to interpret data and make a loan decision rather than on how the model works. The analysis addresses each of the four key issues. The nonquantitative aspects of the evaluation are generally ignored.

On March 1, 2014, Marcus Wade, president and majority owner of Wade's Office Furniture, met with you and requested an increase in the company's credit line from $900,000 to $1.2 million and a term loan of $400,000 for the purchase of new equipment. Wade's Office Furniture is a small manufacturer of metal office furniture. It has been in business for more than 25 years and has been a good customer of the bank for the last 10 years. Mr. Wade was very positive about the firm's present condition, having just reported a 52 percent increase in sales for 2013 after two consecutive years of slow growth. He attributed this recent success to a new product line and marketing program and claimed it would continue—evidenced by backlogged orders totaling $250,000. In support of his request, he provided you with three years of historical income statement and balance sheet data for 2011–2013, as well as two years of pro forma data (2014–2015), which appear in Exhibits 14.5 and 14.6.[16] Wade projected sales to increase another 50 percent in 2014 and felt that this would quickly reduce the outstanding note payable to the bank and help repay the term loan.

Common Size and Financial Ratios Analysis: Wade's Office Furniture

The analysis begins with an evaluation of common size ratios from the income statement and balance sheet data (Exhibits 14.5 and 14.6). Comparable peer group figures for 2013, from the *Annual Statement Studies* by The Risk Management Association (formerly Robert Morris Associates) (RMA) are listed in the column labeled "RMA." These data are collected over several months, as listed, and are generally published sometime after March of each year. A review of the income statement in Exhibit 14.5 reveals three important factors. First, sales increased almost 52 percent, an impressive number for a "low-growth" industry like office furniture. Second, and equally as impressive, was that this growth was obtained with a COGS that was a substantially lower percentage of sales

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[16] Actually, the pro forma data provided in Exhibits 14.5 and 14.6 are assumed not to have been provided by Wade's, but rather by the credit analysts. These data will be discussed below.

EXHIBIT 14.5 Comparative Income Statement for Wade's Office Furniture, 2011–2015

Wade's Office Furniture	HISTORICAL			HISTORICAL			HISTORICAL		RMA
Unaudited: SIC #2522	**2011**	**% of**		**2012**	**% of**		**2013**	**% of**	**6/30/13 –**
INCOME STATEMENT	**$1,000**	**Total**	**% Cha**	**$1,000**	**Total**	**% Cha**	**$1,000**	**Total**	**3/31/14**
Net sales	**7,571**	**100.00**	**8.10**	**8,184**	**100.00**	**51.90**	**12,430**	**100.00**	**100.00%**
Cost of goods sold	5,089	67.20	6.60	5,424	66.30	52.20	8,255	66.40	67.30%
Gross profit	2,482	32.80	11.20	2,760	33.70	51.30	4,175	33.60	32.70%
Selling expenses	906	12.00	13.20	1,026	12.50	58.70	1,628	13.10	
General & administrative expenses	1,019	13.50	18.80	1,211	14.80	39.50	1,689	13.60	
Depreciation & amortization	70	0.90	1.40	71	0.90	2.80	73	0.60	
Other operating expenses	0	0.00	0.00	0	0.00	0.00	0	0.00	
Total operating expenses	1,995	26.40	15.70	2,308	28.20	46.90	3,390	27.30	25.70%
Operating profit	487	*6.40*	−7.20	452	*5.50*	73.70	785	*6.30*	7.00%
Interest on marketable securities	0	0.00	0.00	0	0.00	0.00	0	0.00	
Income on long-term investments	0	0.00	0.00	0	0.00	0.00	0	0.00	
Interest expense—bank notes	141	1.90	−15.60	119	1.50	31.90	157	1.30	
Interest expense—term notes + LTD	0	0.00	0.00	0	0.00	0.00	0	0.00	
All other expenses	63	0.80	36.50	86	1.10	17.40	101	0.80	
All other income	0	0.00	0.00	0	0.00	0.00	0	0.00	
Total All Other Income (Expenses)	−204	−2.70	0.50	−205	−2.50	25.90	−258	−2.10	
Profit before taxes	283	*3.70*	−12.70	247	*3.00*	113.40	527	*4.20*	6.20%
Income taxes	100	1.30	−5.00	95	1.20	97.90	188	1.50	
Extraordinary & other income (exp.)	0	0.00	0.00	0	0.00	0.00	0	0.00	
Net income	**183**	**2.40**	**−16.90**	**152**	**1.90**	**123.00**	**339**	**2.70**	
Dividends	0	0.00	0.00	0	0.00	0.00	0	0.00	
Retained earnings	183	2.40	−16.90	152	1.90	123.00	339	2.70	

EXHIBIT 14.5 (continued)

Wade's Office Furniture		**PRO FORMA**			**PRO FORMA**	
Unaudited: SIC #2522		**2014**	**% of**		**2015**	**% of**
INCOME STATEMENT	**% Cha**	**$1,000**	**Total**	**% Cha**	**$1,000**	**Total**
Net sales	**20.00**	**14,916**	**100.00**	**20.00**	**17,899**	**100.00**
Cost of goods sold	22.90	10,143	68.00	20.00	12,171	68.00
Gross profit	14.30	4,773	32.00	20.00	5,728	32.00
Selling expenses	19.10	1,939	13.00	20.00	2,327	13.00
General & administrative expenses	7.70	1,820	12.20	20.00	2,184	12.20
Depreciation & amortization	50.70	110	0.70	0.00	110	0.60
Other operating expenses	0.00	0	0.00	0.00	0	0.00
Total operating expenses	14.10	3,869	25.90	19.40	4,621	25.80
Operating profit	15.20	904	*6.10*	22.40	1,107	*6.20*
Interest on marketable securities	0.00	0	0.00	0.00	0	0.00
Income on long-term investments	0.00	0	0.00	0.00	0	0.00
Interest expense—bank notes	−35.60	101	0.70	−48.50	52	0.30
Interest expense—term notes + LTD	#N/A	85	0.60	−16.50	71	0.40
All other expenses	8.90	110	0.70	22.70	135	0.80
All other income	0.00	0	0.00	0.00	0	0.00
Total All Other Income (Expenses)	14.80	−296	−2.00	−12.80	−258	−1.40
Profit before taxes	15.40	608	*4.10*	39.60	849	*4.70*
Income taxes	16.50	219	1.50	39.60	306	1.70
Extraordinary & other income (exp.)	0.00	0	0.00	0.00	0	0.00
Net income	**14.80**	**389**	**2.60**	**39.60**	**543**	**3.00**
Dividends	0.00	0	0.00	0.00	0	0.00
Retained earnings	14.80	389	2.60	39.60	543	3.00

compared with the industry average, reflecting either lower cost of goods or higher markups on finished products. Third, Wade's operating expenses far exceeded the industry norm. This may reflect a large salary for Marcus Wade in that the firm pays no dividends, and the company provides his only source of income. The net effect is that the firm earns proportionately less before taxes than comparable firms, 4.2 percent versus 6.2 percent for peers.

The balance sheet data in Exhibit 14.6 indicate that Wade's accounts receivable and inventory substantially exceeded the industry norms in 2013 and increased each year from 2011 to 2013. Net fixed assets, on the other hand, were well below industry standards in each year. After further exploration, you discover that Wade's leases a much larger portion of its fixed assets than the industry norm. One weakness of common size ratios is that they may be distorted by any one account that takes an extreme value. The fact that Wade's leases a disproportionately large amount of equipment necessarily increases the relative proportion of current assets. For this reason, the analyst must carefully compare the implications of common size ratios and other financial ratios before drawing conclusions. Finally, in terms of financing, Wade's reliance on accounts payable and short-term bank loans was almost twice the industry norm; Wade's relied less on

EXHIBIT 14.6 **Comparative Balance Sheet for Wade's Office Furniture, 2011–2015**

	HISTORICAL			HISTORICAL			HISTORICAL		RMA
Unaudited: SIC #2522 **BALANCE SHEET**	**2011 $1,000**	**% of Total**	**% Cha**	**2012 $1,000**	**% of Total**	**% Cha**	**2013 $1,000**	**% of Total**	**6/30/13 – 3/31/14**
Assets									
Cash	141	4.3	−5.7	133	3.9	−45.9	72	1.6	5.5%
Marketable securities	0	0.0	0.0	0	0.0	0.0	0	0.0	
Accounts receivable	1,254	38.4	11.6	1,399	40.8	35.5	1,896	42.3	28.8%
Inventory	1,160	35.6	3.9	1,205	35.2	46.4	1,764	39.4	29.7%
Prepaid expenses	47	1.4	6.4	50	1.5	−70.0	15	0.3	
Current assets	**2,602**	**79.7**	**7.1**	**2,787**	**81.4**	**34.4**	**3,747**	**83.6**	**66.4%**
Gross fixed assets	629	19.3	7.2	674	19.7	17.4	791	17.7	
Leasehold improvements	198	6.1	2.0	202	5.9	17.8	238	5.3	
Less accumulated dep.	206	6.3	34.5	277	8.1	24.9	346	7.7	
Net fixed assets	**621**	**19.0**	**−3.5**	**599**	**17.5**	**14.0**	**683**	**15.2**	**28.2%**
Intangible assets	40	1.2	−2.5	39	1.1	28.2	50	1.1	0.4%
Other noncurrent assets	0	0.0	0.0	0	0.0	0.0	0	0.0	5.0%
Total Assets	**3,263**	**100.0**	**5.0**	**3,425**	**100.0**	**30.8**	**4,480**	**100.0**	**100.0%**
Liabilities & Equity									
Notes payable—bank	643	19.7	−9.5	582	17.0	53.3	892	19.9	6.0%
Accounts payable	836	25.6	8.6	908	26.5	41.2	1,282	28.6	14.0%
Accrued expenses	205	6.3	25.9	258	7.5	34.9	348	7.8	
Income tax payable	41	1.3	51.2	62	1.8	27.4	79	1.8	1.7%
Current maturity—term notes	0	0.0	0.0	0	0.0	0.0	0	0.0	
Current maturity—LTD	75	2.3	0.0	75	2.2	0.0	75	1.7	3.6%
Other current liabilities	0	0.0	0.0	0	0.0	0.0	0	0.0	11.8%
Current liabilities	**1,800**	**55.2**	**4.7**	**1,885**	**55.0**	**42.0**	**2,676**	**59.7**	**37.1%**
Term notes	0	0.0	0.0	0	0.0	0.0	0	0.0	
Long-term debt (LTD)	450	13.8	−16.7	375	10.9	−20.0	300	6.7	20.1%
Other noncurrent liabilities	0	0.0	0.0	0	0.0	0.0	0	0.0	0.9%
Total liabilities	**2,250**	**69.0**	**0.4**	**2,260**	**66.0**	**31.7**	**2,976**	**66.4**	**58.1%**
Common stock—par	600	18.4	0.0	600	17.5	0.0	600	13.4	
Paid-in surplus	100	3.1	0.0	100	2.9	0.0	100	2.2	
Retained earnings	313	9.6	48.6	465	13.6	72.9	804	17.9	
Stockholders' equity	**1,013**	**31.0**	**15.0**	**1,165**	**34.0**	**29.1**	**1,504**	**33.6**	**41.9%**
Total Liabilities & Equity	**3,263**	**100.0**	**5.0**	**3,425**	**100.0**	**30.8**	**4,480**	**100.0**	**100.0%**

EXHIBIT 14.6 (continued)

Wade's Office Furniture	PRO FORMA			PRO FORMA		
Unaudited: SIC #2522		2014	% of		2015	% of
BALANCE SHEET	% Cha	$1,000	Total	% Cha	$1,000	Total
Assets						
Cash	66.7	120	2.3	0.0	120	2.1
Marketable securities	0.0	0	0.0	0.0	0	0.0
Accounts receivable	7.8	2,043	38.7	10.4	2,256	39.6
Inventory	17.3	2,070	39.2	15.3	2,387	41.9
Prepaid expenses	33.3	20	0.4	25.0	25	0.4
Current assets	**13.5**	**4,253**	**80.6**	**12.6**	**4,787**	**84.0**
Gross fixed assets	50.6	1,191	22.6	0.0	1,191	20.9
Leasehold improvements	0.0	238	4.5	0.0	238	4.2
Less accumulated dep.	31.8	456	8.6	24.1	566	9.9
Net fixed assets	**42.5**	**973**	**18.4**	**−11.3**	**863**	**15.1**
Intangible assets	0.0	50	0.9	0.0	50	0.9
Other noncurrent assets	0.0	0	0.0	0.0	0	0.0
Total Assets	**17.8**	**5,276**	**100.0**	**8.0**	**5,700**	**100.0**
Liabilities & Equity						
Notes payable—bank	−21.8	697	13.2	−48.5	359	6.3
Accounts payable	18.3	1,517	28.8	19.5	1,813	31.8
Accrued expenses	5.7	368	7.0	5.4	388	6.8
Income tax payable	27.4	101	1.9	27.4	128	2.3
Current maturity—term notes	#N/A	50	0.9	0.0	50	0.9
Current maturity—LTD	0.0	75	1.4	0.0	75	1.3
Other current liabilities	0.0	0	0.0	0.0	0	0.0
Current liabilities	**4.9**	**2,808**	**53.2**	**0.2**	**2,814**	**49.4**
Term notes	#N/A	350	6.6	−14.3	300	5.3
Long-term debt (LTD)	−25.0	225	4.3	−33.3	150	2.6
Other noncurrent liabilities	0.0	0	0.0	0.0	0	0.0
Total liabilities	**13.7**	**3,383**	**64.1**	**−3.5**	**3,264**	**57.3**
Common stock—par	0.0	600	11.4	0.0	600	10.5
Paid-in surplus	0.0	100	1.9	0.0	100	1.8
Retained earnings	48.4	1,193	22.6	45.5	1,737	30.5
Stockholders' equity	**25.9**	**1,893**	**35.9**	**28.7**	**2,437**	**42.7**
Total Liabilities & Equity	**17.8**	**5,276**	**100.0**	**8.0**	**5,700**	**100.0**

long-term debt than did comparable firms. The firm's net-worth-to-asset ratio was 8 percent less than the industry norm in 2013, which indicates that Wade's has financed much of its growth using debt.

Wade's balance sheet is typical of a small company exhibiting short-term rapid sales growth. Most of the growth in sales, which has led to a large increase in accounts receivable and inventory, was financed by a short-term line of credit. Cash has fallen to a *minimum* level, and Wade's is likely pushing the upper limit of its short-term line of credit. A cash shortage may be one of the reasons Wade's is making the loan request.

Financial ratios for Wade's are presented in Exhibit 14.7. Current and quick ratios are low but have been fairly stable over the preceding three years. Days accounts receivable is about 11 days longer than the industry norm, and inventory turns over only 4.7 times a year compared with the industry norm of 5.6 times. The low current and quick ratios tend to indicate a lower value of current assets, but the common size and ratio analysis indicates that the level of accounts receivable and inventory is above peers. Remember that the common size ratios are somewhat distorted (too high for current assets) relative to peers due to the high amount of leased fixed assets.

Examination of days accounts payable further explains the conflicting information. Days accounts payable is much higher at 53 days outstanding as compared with the industry norm of only 32 days. This indicates that, relative to purchases, accounts payable exceeded that of peers. Thus, the denominator of the current and quick ratios (current liabilities) reduces the current and quick ratios rather than the numerator (current assets). High accounts payable suggest that Wade's is riding its creditors for long periods and may be at risk of being put on a "cash basis" by the creditors.

The set of leverage ratios in Exhibit 14.7 confirms the common size analysis in that minimal net worth supports the firm's operations. Debt exceeds tangible net worth by almost 100 percent in each year, well above the RMA average. Both the times interest earned and fixed charge coverage are low compared with competitors, indicating greater interest expense and lease payments on equipment relative to earnings.

The profitability ratios presented in Exhibit 14.7 indicate that Wade's profits before taxes exceeded the standard relative to net worth but fell below the standard relative to total assets. This again evidences the firm's relatively high degree of financial leverage. Reported profits did increase substantially in 2013, due in large part to the dramatic increase in net sales. Wade's lower profits before taxes to total assets (pretax ROA), however, was due to the higher operating expenses relative to the industry norm: 27.3 percent for Wade's versus 25.7 percent for the industry. Lower profits were obtained even though Wade's COGS was lower than that of peers at 66.4 percent of total sales (versus the peer average of 67.3 percent). Still, Wade's reported an ROE of 22.54 percent in 2013, which was a substantial improvement over prior years.

In summary, Wade's invested more in receivables and inventory and less in fixed assets than did comparable firms. It likewise relies proportionately more on trade credit and short-term bank loans and less on long-term debt for financing. Its net worth is also substantially lower. These ratios are important because they suggest areas in which additional information must be obtained. Here the focus should be on Wade's current and fixed assets. Possible explanations are that the firm's terms of credit sales are too lenient or that the firm has poor collection policies. Some of the receivables might be uncollectible because they are outdated. Thus, a receivables aging schedule seems necessary. Similarly, Wade's may hold obsolete inventory or simply acquire it too far in advance of sales. With respect to earnings, profitability has been relatively low, adversely affecting the equity base. On the positive side, however, sales growth and markup on sales are excellent. If the receivables and inventory are of good quality, Wade's exhibits excellent potential. It is important, however, for the banker to obtain a receivables aging schedule and personally audit the composition and quality of inventory.

EXHIBIT 14.7 Financial Ratio Analysis for Wade's Office Furniture, 2011–2015

Wade's Office Furniture	**HISTORICAL**		**HISTORICAL**		**HISTORICAL**		**RMA**	
Unaudited: SIC #2522	**2011**		**2012**		**2013**		**6/30/13–**	
FINANCIAL RATIOS	**$1,000**		**$1,000**		**$1,000**		**3/31/14**	
Liquidity Ratios								
Current ratio	1.45		1.48		1.40		1.70	
Quick ratio	0.78		0.81		0.74		0.90	
	Days	***Times***	***Days***	***Times***	***Days***	***Times***	***Days***	***Times***
Days cash	6.80	53.70×	5.93	61.53×	2.11	172.64×		
Days accounts receivable	60.46	6.04×	62.39	5.85×	55.67	6.56×	45.0	8.1×
Days inventory	83.20	4.39×	81.09	4.50×	78.00	4.68×	65.0	5.6×
Cash-to-cash asset cycle	150.45		149.41		135.79			
Days AP outstanding	48.83	7.47×	60.60	6.02×	53.09	6.88×	32.0	11.3×
Memo: COGS/accts payable		6.09×		5.97×		6.44×		11.3×
Days cash-to-cash cycle	101.62	3.59×	88.81	4.11×	82.70	4.41×		
Est. W.C. financing needs	$1,417		$1,320		$1,870			
Leverage Ratios	***Percent***	***Times***	***Percent***	***Times***	***Percent***	***Times***	***Percent***	***Times***
Debt to tangible net worth		2.31×		2.01×		2.05×		1.7×
Times interest earned		3.01×		3.08×		4.36×		5.3×
Fixed charge coverage		1.96×		1.79×		2.09×		2.8×
Net fixed assets to tangible net worth	63.82%		53.20%		46.97%		50.0%	
Dividend payout	0.00%		0.00%		0.00%			
Profitability Ratios	***Percent***	***Times***	***Percent***	***Times***	***Percent***	***Times***	***Percent***	***Times***
Return on net worth (ROE)	18.07%		13.05%		22.54%			
Profit before taxes to net worth	29.09%		21.94%		36.24%		27.7%	
Return on assets (ROA)	5.61%		4.44%		7.57%			
Profit before taxes to total assets	8.67%		7.21%		11.76%		12.1%	
Equity multiplier (= TA/TE)		3.22×		2.94×		2.98×		2.4×
Income								
Tot. asset turnover (net sales/TA)		2.32×		2.39×		2.77×		2.1×
All other income/total assets	0.00%		0.00%		0.00%			
Expenses								
Net profit margin (NI/net sales)	2.42%		1.86%		2.73%			
COGS/net sales	67.22%		66.28%		66.41%		67.3%	
Operating expenses/net sales	26.35%		28.20%		27.27%		25.7%	
Income taxes to earnings before taxes	35.34%		38.46%		35.67%			
Sales/net fixed assets		12.19×		13.66×		18.20×		
Cash-Flow Ratios		***Times***		***Times***		***Times***		
CFO/(DIV + last CMLTD)		#N/A		2.35×		1.71×		
CFO/(DIV + last CMLTD + bank notes)		#N/A		0.27×		0.13×		
CFO/(DIV + last CMLTD & CMTN + bank notes)		#N/A		0.27×		0.13×		

EXHIBIT 14.7 (continued)

Wade's Office Furniture	**PRO FORMA**		**PRO FORMA**	
Unaudited: SIC #2522	**2014**		**2015**	
FINANCIAL RATIOS	**$1,000**		**$1,000**	
Liquidity Ratios				
Current ratio	1.51		1.70	
Quick ratio	0.77		0.84	
	Days	***Times***	***Days***	***Times***
Days cash	2.94	124.30×	2.45	149.16×
Days accounts receivable	50.00	7.30×	46.00	7.93×
Days inventory	74.49	4.90×	71.57	5.10×
Cash-to-cash asset cycle	127.43		120.02	
Days AP outstanding	53.00	6.89×	53.00	6.89×
Memo: COGS/accts payable		6.69×		6.71×
Days cash-to-cash cycle	74.43	4.90×	67.02	5.45×
Est. W.C. financing needs	$2,068		$2,235	
Leverage Ratios	***Percent***	***Times***	***Percent***	***Times***
Debt to tangible net worth		1.84×		1.37×
Times interest earned		4.27×		7.90×
Fixed charge coverage		2.19×		2.89×
Net fixed assets to tangible net worth	52.79%		36.16%	
Dividend payout	0.00%		0.00%	
Profitability Ratios	***Percent***	***Times***	***Percent***	***Times***
Return on net worth (ROE)	20.56%		22.30%	
Profit before taxes to net worth	33.00%		35.58%	
Return on assets (ROA)	7.38%		9.53%	
Profit before taxes to total assets	11.53%		14.90%	
Equity multiplier (leverage = TA/TE)		2.79×		2.34×
Income				
Tot. asset turnover (net sales/TA)		2.83×		3.14×
All other income/total assets	0.00%		0.00%	
Expenses				
Net profit margin (NI/net sales)	2.61%		3.04%	
COGS/net sales	68.00%		68.00%	
Operating expenses/net sales	25.94%		25.81%	
Income taxes to earnings before taxes	36.00%		36.00%	
Sales/net fixed assets		15.33×		20.74×
Cash-Flow Ratios		***Times***		***Times***
CFO/(DIV + last CMLTD)		4.24×		6.17×
CFO/(DIV + last CMLTD + bank notes)		0.41×		1.07×
CFO/(DIV + last CMLTD & CMTN + bank notes)		0.39×		0.96×

The data suggest two specific risks. First, if suppliers refuse to grant Wade's the same volume of trade credit in the future, the firm will need additional bank loans to support operations. In particular, accounts payable provided $1,282,000 in financing for 2013. If suppliers were to put the company on a cash basis (cash on delivery), Wade's would have to pay off this $1,282,000 and come up with additional funds to buy its inventory. If the firm is having a problem with its suppliers, Marcus Wade would probably return to the bank for additional financing! Second, the firm's low net worth and high debt provide limited support for the planned growth (Wade estimates another 50 percent for 2014) and exposes the firm to declining profits if interest rates increase. Wade's profitability has not been high enough to continue to support a 50 percent per year growth in sales using only debt. The firm must either slow its growth, or additional equity will be required. On the positive side, however, Wade's could slow the growth in sales by restricting credit sales, reducing inventory, or even increasing price. All of these would improve Wade's cash position.

Cash-Based Income Statement: Wade's Office Furniture

Exhibit 14.8 presents a cash-based income statement for Wade's and documents changes in CFO. Consider the first two columns of historical data. In 2012 CFO equaled $176,000, which was $47,000 less than traditional cash flow (net income + depreciation and amortization = $152,000 + $71,000). CFO fell to −$128,000 in 2013, however, even though sales increased by over $4 million, and net income NI increased by 123 percent to almost $340,000. Traditional cash flow, however, was much higher at $412,000 ($339,000 + $73,000). A close examination of the statement reveals that the decline in CFO for 2013 was caused primarily by a combined increase in receivables and inventory of almost $1.1 million ($497,000 + $559,000). The $374,000 increase in accounts payable, while substantial, left $682,000 in new trading assets (change in accounts receivable plus the change in inventory less the change in accounts payable) to be financed either externally or out of cash flow. The cash margin did increase by $851,000, but cash operating expenses increased by over $1 million, leading to a decline in cash operating profit. Increases in noninterest and interest expense and income taxes paid then produced the negative CFO. The additional $310,000 in notes payable to the bank financed a portion of this cash deficiency. Payments for maturing principal on term debt and $157,000 in capital expenditures added to the cash deficiency as well. The residual financing came from reduced cash holdings.

Consider the following implications. Wade's collected less on credit sales than it billed its customers in 2012 and 2013 as shown by an increase in accounts receivable outstanding from 2011 to 2013. Thus, net sales were offset by the $497,000 increase in receivables to obtain actual cash receipts. Had receivables declined, actual cash receipts from sales would have exceeded the reported sales figure. Sales increased by almost 52 percent from 2012 to 2013, while accounts receivable increased by only 35.5 percent. The liquidity and activity ratios in Exhibit 14.7 indicate that Wade's credit policy tightened from 2012 to 2013, as days accounts receivable fell by almost seven days from 62.39 to 55.67. If Wade's credit policy had not improved over this period, CFO would have been approximately $229,000 lower.[17] The improvement in collection of receivables is a positive sign for Wade's and has reduced the amount of financing Wade's otherwise would have needed at the end of 2013.

Wade's profitability (gross margin) improved in 2012 but deteriorated in 2013—indicating CFO would be higher relative to NI in 2012, but that the lower gross margin in 2013 was a use of cash. Wade's inventory turnover improved in 2012 (4.50×) and 2013 (4.68×). The improved inventory turnover means that inventory growth was less than the growth in sales. The company's more efficient utilization of inventory means

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[17] Using the longer 2012 days accounts receivables (assuming credit policy had not changed) would have meant that accounts receivable would be $229,000 higher in 2013 at $2,125,000 [($12,430,000/365) × 62.39]. Therefore, the change in accounts receivable would have been $726,000 ($2,125,000–1,399,000) if credit policy had not tightened.

EXHIBIT 14.8 Statement of Changes Reconciled to Cash for Wade's Office Furniture, 2012–2015

Wade's Office Furniture	**HISTORICAL**		**PRO FORMA**	
Unaudited:, SIC #2522	**2012**	**2013**	**2014**	**2015**
CASH-BASED INCOME STATEMENT	**\$1,000**	**\$1,000**	**\$1,000**	**\$1,000**
Net sales	8,184	12,430	14,916	17,899
Change in accounts receivable	(145)	(497)	(147)	(213)
Cash receipts from sales	8,039	11,933	14,769	17,687
Cost of goods sold	(5,424)	(8,255)	(10,143)	(12,171)
Change in inventory	(45)	(559)	(306)	(317)
Change in accounts payable	72	374	235	296
Cash purchases	(5,397)	(8,440)	(10,214)	(12,192)
Cash margin	2,642	3,493	4,555	5,495
Total operating expenses	(2,308)	(3,390)	(3,869)	(4,621)
Depreciation and amortization	71	73	110	110
Change in prepaid expenses	(3)	35	(5)	(5)
Change in accruals	53	90	20	20
Change in other current assets and liabilities	0	0	0	0
Cash operating expenses	(2,187)	(3,192)	(3,744)	(4,496)
Cash operating profit	455	301	811	999
Interest on marketable securities	0	0	0	0
Income on long-term investments	0	0	0	0
All other expenses and income (net)	(86)	(101)	(110)	(135)
Cash before interest and taxes	369	200	701	864
Interest expense—bank notes	(119)	(157)	(101)	(52)
Interest expense—term notes + LTD	0	0	(85)	(71)
Income taxes reported	(95)	(188)	(219)	(306)
Change in income tax payable	21	17	22	28
Change in deferred income taxes	0	0	0	0
Cash flow from operations (CFO)	***176***	***(128)***	***318***	***463***

EXHIBIT 14.8 (continued)

Wade's Office Furniture **Unaudited:, SIC #2522**	**HISTORICAL**		**PRO FORMA**	
CASH-BASED INCOME STATEMENT	**2012** **$1,000**	**2013** **$1,000**	**2014** **$1,000**	**2015** **$1,000**
Capital exp. and leasehold improvements	(49)	(157)	(400)	0
Change in long-term investments	0	0	0	0
Change in intangible assets	1	(11)	0	0
Change in other noncurrent assets	0	0	0	0
Cash used for investments	***(48)***	***(168)***	***(400)***	***0***
Payment for last period's CM term note	0	0	0	(50)
Payment for last period's CMLTD	(75)	(75)	(75)	(75)
Dividends paid (DIV)	0	0	0	0
Payments for financing	***(75)***	***(75)***	***(75)***	***(125)***
Cash before external financing	53	(371)	(157)	338
Change in short-term bank debt	(61)	310	(195)	(338)
Change in term notes and EOP CM term notes	0	0	400	0
Change in LT debt + EOP CMLTD	0	0	0	0
Change in stock and surplus	0	0	0	0
Change in preferred stock	0	0	0	0
Change in Treasury and other equities	0	0	0	0
Change in other noncurrent liabilities	0	0	0	0
External financing	**(61)**	**310**	**205**	**(338)**
Extraordinary exp. and change in acct. principal	0	0	0	0
Current period accounting adjustment	0	0	0	0
Change in cash and marketable securities	***(8)***	***(61)***	***48***	***0***

Note: Figures are in thousands of dollars.
LTD, CM, and EOP refer to long-term debt, current maturity, and end-of-period, respectively.

that Wade's used proportionately less cash to finance sales growth than it would have used if inventory turnover had not improved, again positive news. The fact that accounts payable increased in 2013 means cash additional cash was supplied by Wade's trade credit, but the fact that days accounts payable outstanding decreased over the period meant that less cash was provided by trade credit financing than would have been if days payable outstanding remained at its 2012 level.

On the positive side, Wade's accounts receivable and inventory growth, although substantial, was less than the growth in sales. Wade's cash needs to finance the increase in working capital was not a result of a more lax credit or inventory policy, but instead was primarily driven by sales growth. If these credit sales and inventory are of high quality, this will provide cash flow in the future as Wade's collects on credit sales. Wade's also reduced its days accounts payable outstanding in 2013, thus improving its position with suppliers.

In summary, Wade's CFO in 2012 of $176,000 exceeded capital expenditures ($49,000) and the principal payment on long-term debt ($75,000) by $52,000. This excess cash flow, along with $8,000 in cash, was essentially used to pay $61,000 on the amount of short-term debt owed. In 2013, however, CFO was negative (−$128,000) and hence insufficient to cover current principal payments on long-term debt ($75,000) and capital expenditures ($157,000). Cash flow before external financing was also negative (−$371,000) in 2013. Wade's borrowed an additional $310,000 in short-term debt and used $61,000 in cash to fund this deficit.

Wade's generated good profits, but these profits did not materialize as cash profits. Why? In essence, the increase in receivables and inventory exceeded the increase in accounts payable. While Wade's provided $73,000 from noncash expenditures (depreciation) and $142,000 from a reduction in prepaid expenses, showed an increase in accrued expenses, and reduced income tax payables, this was less than the amount needed to finance current operations. Wade's profit of $339,000 provided all but $128,000 of this deficiency. Thus, most of the $310,000 in additional financing was used to finance the increase in net working capital needs.

The ratios at the bottom of Exhibit 14.7 demonstrate that Wade's generated enough cash from operations to pay off current maturities of long-term debt in 2012 but fell far short in 2013. The negative CFO in 2013 indicates that the firm should not take on additional debt unless it can successfully restructure its operating policies.

Pro Forma Analysis: Wade's Office Furniture

Negative cash flow does not necessarily eliminate the possibility that the bank may want to make a loan. Under proper operating policies, Wade's may be able to expand and pay off new debt on a timely basis. Recall that Wade's negative cash flow was driven primarily by the 52 percent growth in sales. If sales growth slows, Wade's use of cash for accounts receivable and inventory will fall dramatically—most likely producing positive CFO. Exhibits 14.9 and 14.10 outline a set of financial projections that describes *a most*

EXHIBIT 14.9 **Financial Projections: Assumptions for Most Likely Circumstances at Wade's Office Furniture, 2014–2015**

1. Sales increase by 20 percent annually. All sales are credit sales. Wade's forecasts a 50 percent rise.
2. Cost of goods sold equals 68 percent of sales.
3. Selling expenses average 13 percent of sales, general and administrative expenses average 12.2 percent of sales, and depreciation equals $110,000 annually.
4. Noninterest expense equals $110,000 in 2014 and $135,000 in 2015.
5. Interest expense equals 14.5 percent of outstanding bank and term debt and 9 percent of other long-term debt.
6. Income taxes equal 36 percent of earnings before taxes; income tax payable increases annually by the rate of change in 2013.
7. Receivables collection improves so that days receivables outstanding equals 50 in 2014 and 46 in 2015.
8. Inventory turnover increases to 4.9 times in 2014 and 5.1 times in 2015.
9. Days accounts payable outstanding remains constant at 53.
10. Prepaid expenses and accruals increase by $5,000 and $20,000 annually in 2014 and 2015, respectively.
11. No dividends are paid.
12. $400,000 is loaned to purchase new equipment, with the principal repaid over eight years in equal annual installments. The first payment is due March 1, 2014.
13. Reported depreciation on the new equipment equals $40,000 a year for 10 years. Depreciation on old assets will be $70,000 per year.
14. The minimum cash required is $120,000.
15. Other assets remain constant at $50,000.

EXHIBIT 14.10 Pro Forma Model Used to Project Wade's Financial Statements

Pro forma values on the income statement are calculated as follows:

$$\begin{aligned}
\text{Sales}_{2014} &= \text{Sales}_{2013} \times (\boldsymbol{\mathit{1}} + \boldsymbol{\mathit{g_{sales}}}) = \$12{,}430 \times (1 + \boldsymbol{\mathit{0.20}}) = \$14{,}916 \\
\text{COGS}_{2014} &= \text{Sales}_{2014} \times \textbf{\textit{COGS \% of sales}} \\
&= \$14{,}916 \times \boldsymbol{\mathit{0.68}} = \$10{,}143 \\
\text{Selling exp}_{2014} &= \text{Sales}_{2014} \times (\textbf{\textit{selling exp. \% of sales}}) \\
&= \$14{,}916 \times \boldsymbol{\mathit{0.13}} = \$1{,}939 \\
\text{GA exp}_{2014} &= \text{Sales}_{2014} \times \textbf{\textit{GA exp. \% of sales}} \\
&= \$14{,}916 \times \boldsymbol{\mathit{0.122}} = \$1{,}820 \\
\text{Interest exp}_{2014} &= (\text{Bank debt}_{2014} \times \textbf{\textit{rate on bank debt and term debt}}) \\
&\quad + (\text{L.T. debt}_{2014} \times \textbf{\textit{rate on L.T. debt}}) \\
&= [\$697 + \$50 + \$350] \times \boldsymbol{\mathit{0.145}} + [(\$75 + \$225) \times \boldsymbol{\mathit{0.09}}] = \$186
\end{aligned}$$

Pro forma values on the balance sheet are calculated as follows:

$$\begin{aligned}
\text{Accounts rec}_{2014} &= \textbf{\textit{Days A/R outstanding}} \times \text{average daily sales}_{2014} \\
&= \boldsymbol{\mathit{50}} \times (\$14{,}916/365) = \$2{,}043 \\
\text{Inventory}_{2014} &= \text{COGS}_{2014}/\textbf{\textit{inventory turnover}} \\
&= \$10{,}143/\boldsymbol{\mathit{4.9}} = \$2{,}070 \\
\text{Gross fixed}_{2014} &\ \text{Gross fixed}_{2013} + \textbf{\textit{capital expenditures}} \\
&= \$791 + \boldsymbol{\mathit{\$400}} = \$1{,}191 \\
\text{Accumulated dep}_{2014} &= \text{Accumulated depreciation}_{2013} + \text{depreciation expense}_{2014} \\
&= \$346 + \$110 = \$456 \\
\text{Notes payable}_{2014} &= \textbf{\textit{``Plug figure''}} = \text{Assets}_{2014} - (\text{liabilities}_{2014} + \text{net worth}_{2014}) \\
\text{Accounts pay}_{2014} &= \textbf{\textit{Days AP outstanding}} \times \text{average daily purchases}_{2014} \\
&= \textbf{\textit{Days AP outstanding}} \times [(\text{COGS}_{2014} + \Delta\text{inventory}_{2014})/365] \\
&= 53 \times \left[\left(\$10{,}143 + (\$2{,}070 - \$1{,}764)\right)/365\right] = \$1{,}517 \\
\text{LTD}_{2014} &= \text{LTD}_{2013} - \textbf{\textit{CMLTD}} + \textbf{\textit{new issues of LTD}} \\
&= \$300 - \boldsymbol{\mathit{\$75}} + \boldsymbol{\mathit{\$0}} = \$225 \\
\text{Term notes}_{2014} &= \text{Term notes}_{2013} - \textbf{\textit{CM term notes}} + \textbf{\textit{new issues of term notes}} \\
&= \boldsymbol{\mathit{\$0}} - \boldsymbol{\mathit{\$50}} + \boldsymbol{\mathit{\$400}} = \$350 \\
\text{Retained earn}_{2014} &= \text{Retained earnings}_{2013} + (\text{net income}_{2014} - \textbf{\textit{dividends}}) \\
&= \$804 + (\$339 - \boldsymbol{\mathit{\$0}}) = \$1{,}193
\end{aligned}$$

Note: Figures are in thousands of dollars. Values in ***bold italic*** are parameters that the analyst must provide.

likely set of circumstances regarding the economic environment and revisions in Wade's operating policies. In this case, the loan should be repaid.

Each of these pro forma assumptions (parameters) reflects a conservative but realistic estimate of future performance moving Wade's operating ratios closer to industry norms or reflecting economic realities. In making the loan decision, the bank will lend money only if Wade's understands it must restrict its growth in current assets by tightening credit policies and slowing inventory growth. The loan officer cannot, however, require Wade's to restrict sales in any formal document, or the bank may be held responsible if the company does not perform well. Rather, the officer must be convinced, based on discussions with Marcus Wade and an assessment of his character, that Wade agrees that this plan is in the best interest of the company. This is just one of the many aspects of the more qualitative issues that must be addressed to finalize a loan decision. Restrictions on credit sales are assumed to lower sales below Marcus Wade's forecast of 50 percent for 2014 and decrease the effective markup over COGS. In addition to restrictions on credit sales, economic principals would lead the loan officer closer to a single-digit growth-in-sales assumption of an office furniture company unless the company's marketing plan was truly one that could improve market share. The office furniture business is not a "high-growth" industry, but Wade's has demonstrated strong growth in sales. Therefore, it would be realistic to assume, on the basis of Wade's new product lines and aggressive marketing, that the business could grow faster than the rest of the economy. Nevertheless, 15 percent to 20 percent would seem more reasonable than Wade's estimate of 50 percent.

It is assumed, based on discussion with Wade, that both receivables and inventory turnover will improve and move closer to the industry norm by 2015. Net profit will increase proportionately because of decreases in expenses, as Wade's salary is assumed unchanged, and nonoperating expenses decline proportionately.

Income statement and balance sheet projections for 2014 and 2015 appear in Exhibits 14.5 and 14.6, respectively. These projections are based on the explicit assumptions made in Exhibits 14.9 and 14.10. The resulting projected cash-based income statement is presented in Exhibit 14.8. If projected CFO is realized, it will total $318,000 in 2014 and $463,000 in 2015, considerably more than current maturities of long-term debt. CFO increases with sales, because new trading assets presumably are financed almost entirely by additional trade credit. Thus, the cash margin increases more than cash operating expense, interest expense, and taxes paid. The bank's short-term loan exposure will decrease in 2014 and 2015 to $697,000 and $359,000, respectively. Of course, the total bank loan outstanding will equal almost $1.1 million at the end of 2014 and $709,000 at the end of 2015. This amount is substantially less than the requested $1.6 million. Hence, the answer to the first question— "How much does Wade need to borrow?"— is approximately $1.1 million in 2014 (notes payable–bank plus current maturities of long-term debt and the outstanding amount of long-term debt) and $709,000 in 2015.

In this scenario, the answer to the second question—"What were the loan proceeds used for?"— is to finance the new equipment and Wade's continued need for working capital financing. The projected decrease in notes payable, however, represents a reduction in working capital financing needed, not an increase as Wade had requested. Effectively, the bank has restructured Wade's debt to include more term debt and less of the short-term line of credit. In addition, the lower sales growth means that working capital needs do not grow as rapidly as they did in 2013, and profits from Wade's operations are sufficient to cover the increase in working capital. In 2014, CFO of $318,000 is forecast to exceed principal and interest payments by $243,000.[18] Because capital expenditures of $400,000 were financed with a term loan of an equal amount, this leaves a cash-flow surplus, after payment on long-term debt, that was used to pay down the short-term bank debt ($195,000) and increase cash by $48,000. This analysis indicates that that the remaining notes payable–bank were actually from prior-year needs when Wade's financed a permanent growth in working capital with a line of credit rather than a term note. The excess cash flow is forecast to reach $338,000 in 2015. Estimates for both pro forma periods reveal that Wade's has the ability to take on additional debt.

The previous discussion indicates that the bank may be financing long-term needs, including permanent increases in working capital from the prior year's 50 percent growth in sales, with short-term debt. The bank could consider "restructuring" the debt by using a larger term loan, effectively reducing the amount of the line of credit (short-term bank debt). This structure would allow Wade to "clean up" the line of credit once a year. **Clean up the line of credit** means to bring the outstanding loan balance to zero at least once during the year. In order to determine Wade's true short-term needs on his line of credit, the analysis

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[18] This surplus is calculated as $318,000 − $75,000 because it is assumed that the $400,000 term loan financed the $400,000 capital expenditures.

should look at monthly or quarterly financials and estimate the company's maximum and minimum working capital needs. See Chapter 13 for more details. Alternatively, the bank could shorten the maturity of the term loan and increase the annual principal payment.

The third question— "What is the primary source of repayment and when will the loan be repaid?"—can be answered as follows. At the end of 2015, Wade's is producing roughly $338,000 in excess cash flow from its operations after principal payments on debt. Clearly, cash flow from Wade's ongoing operations is the primary source of funds to repay the outstanding loans. If this cash flow continues, Wade's could repay its remaining bank debt of $709,000 ($359,000 + $50,000 + $300,000) in just over two additional years (by 2017). The projections simply provide an estimate of total loan needs with the composition determined through negotiations.

Evaluation of Collateral: Wade's Office Furniture

In all likelihood, the bank would secure both the short-term and term loans with all available collateral, including receivables, inventory, and new equipment. The bank must subsequently determine the quality of Wade's trading assets. Again, a receivables aging schedule and an inventory evaluation are required.[19]

Exhibit 14.11 represents a summary of Wade's **borrowing base**. The borrowing base is an estimate of the available collateral on a company's current assets. Accounts receivable are purged of accounts 60 days or more past due, and credit is given for 70 percent of the remaining accounts. The percentage of credit given will vary by bank policy as well as the analyst's estimate of the general quality of the accounts. Inventory value is reduced by the amount of accounts payables because trade creditors will generally have a superior claim to the bank's. In this example, inventory is credited at 50 percent of its value. Again, the credit rate will vary by bank policy and quality of inventory. Total debt not secured by real estate is then removed to determine the company's excess (deficit) of

EXHIBIT 14.11 Borrowing Base Certificate for Wade's Office Furniture, 2013–2015

Wade's Office Furniture	2013	2014	2015
Borrowing Base	**$1,000**	**$1,000**	**$1,000**
Accounts receivable	$1,896.00	$2,043.29	$2,255.79
Less: accounts over 60 days	$(192.00)	$(230.40)	$(276.48)
Subtotal	$1,704.00	$1,812.89	$1,979.31
Total eligible @ 70%	$1,192.80	$1,269.02	$1,385.52
Inventory	$1,764.00	$2,069.98	$2,386.56
Less: accounts payable	$(1,282.00)	$(1,517.23)	$(1,813.33)
Subtotal	$482.00	$552.74	$573.23
Total eligible @ 50%	$241.00	$276.37	$286.61
Total debt (less LTD secured by real estate)	$(892.00)	$(697.12)	$(359.09)
Excess (deficit)	$541.80	$848.27	$1,313.04

Note: Figures are in thousands of dollars. The $192,000 presented for accounts over 60 days in 2013 is an estimate. It is assumed that accounts over 60 days will increase proportionately to sales.

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[19] An aging schedule is a listing of accounts receivable grouped according to the month in which the invoice is either dated or payable. A comparison of aging schedules indicates whether the volume of past due accounts is rising or falling and whether the general quality of receivables is deteriorating.

collateral available. As revealed in Exhibit 14.11, Wade's has sufficient collateral to support the current loan in 2013 by an excess of $542,000. Coverage improves in the *pro forma* period as the debt is paid off.

Sensitivity Analysis

The financial forecasts previously presented represent only one possible outcome. In all likelihood, Wade's performance in 2014 and 2015 will differ materially from that described above. A lender should always perform sensitivity analysis by adjusting assumptions regarding key factors, such as sales growth and receivables collection, and recalculating the projected financial statements. This generates a range of projected outcomes for the loan magnitude and repayment schedule.

Most importantly, the lender should consider critical assumptions identified during the historical analysis, such as days accounts payable in the Wade's case. Although not presented here, if Wade did have to pay down his trade credit, such that his days accounts payable went to 48 and 45 days in 2014 and 2015, the notes payable–bank would increase to $855,000 and $677,000 in 2014 and 2015, respectively. Although this would increase the amount of debt and length of time it would take to repay the loan, Wade's produces sufficient cash flow to repay the loan in a reasonable period of time. At the end of 2015, Wade's is producing about $338,000 in excess CFO after principal payments on debt, hence the outstanding debt at the end of 2015 ($677,000 + $350,000) could be paid off by 2018, only one year longer than under the most likely case. If Wade's accounts receivable collection remained stable at its 2013 pace, its projected short-term loan requirement would exceed $950,000 in 2014 and $900,000 in 2015. Again, further projections indicate that it would take until 2019 to repay the loan.

The bank ultimately assigns probabilities (at least implicitly) to each potential outcome to arrive at an expected result. A worst case scenario is extremely useful because it identifies all contingencies that a lender should consider when examining downside risk. It should be clear that pro forma projections are not *the* answer to the loan question, but rather an objective method the lender can use to determine the likelihood of repayment under various situations.

Note that when forecasting a firm's financial condition, a lender does not know what interest rates will prevail. Most commercial loans will be priced on a floating-rate basis such that the rate a borrower pays will vary with changes in some base rate. Thus, the actual interest due will typically not be known before a loan is approved. To address this, a bank should include, as part of the sensitivity analysis, a "rate shock" comparison of forecasts of CFO before interest with expected principal and interest payments plus cash dividends. CFO before interest equals CFO prior to any adjustment for interest expense on any new debt. Expected interest payments will then vary under scenarios of rising, falling, and constant interest rates. A bank can thus assess the extent to which rising interest rates may create problems for the borrower.

Managing Risk with Loan Sales and Credit Derivatives

Many financial institutions have changed their business models, switching from the model of earning a spread on the difference between loan yields and funding costs to the originate-to-distribute (OTD) model. Under the OTD model, firms make loans and thereby collect fees, then either sell parts of the loan through participations or package the loans into pools and sell them in the marketplace. Larger institutions also form loan syndicates in which one firm serves as a principal in negotiating terms with a borrower who has significant credit needs, but then engages other firms to take part of the credit and thus share the risk. Financial institutions can either sell the entire loan or sell only the cash stream from the loan to a third party without contractual recourse, guarantee, insurance, or other credit enhancements. They earn income from either or both activities, selling the loans at a premium or servicing the loans after the sale.

By pooling similar loans, institutions can diversify away some of the risk and raise the price of the loan, effectively reducing the yield the investor receives. Financial institutions can also serve as an intermediary in collecting payments from borrowers and distributing these payments to the investors. Investors benefit when an institution services the loan because they do not have to employ staff to collect payments or administrate the loans.

Institutions use loan participations and loan sales primarily to diversify their loan portfolios either by industry or by geographic area. For example, a small community bank in a rural community might have a moderate demand for agricultural loans but could better diversify its portfolio by buying a loan participation in a commercial business from another bank. The primary risk underlying participations is that the participating bank might not have the same underwriting expertise in assessing default risk and/or liquidity risk inherent in the loans sold. The **lead bank** is the institution that actually underwrites the original loan and sells the participation. The risk that loans were not carefully underwritten by investors was a contributing cause to the subprime financial crisis of 2007–2008 when investors purchased pools of securitized mortgage loans on the basis of the ratings given the pools by rating agencies. Many rating agencies awarded AAA ratings to some of the high-risk pools of debt. When the borrowers did not make the required payments, the value of these pools dropped dramatically. It is critical that participating investors do their own due diligence and carefully evaluate the quality of the loan or pool of loans they participate in or purchase.

There are other incentives for financial institutions to sell or buy participations or sell loans outright. By selling loans or participations, the originating institution can reduce its capital needs, as these loans are no longer on the books. Loan sales also provide additional sources of liquidity. Loan sales and participations provide investors the opportunity to share in the originating institution's potential information advantage as well as the originating institution's lower transactions costs. Cost efficiencies are possible on both sides. A bank that sells loan participations may realize cost efficiencies from the increased volume of loans made. Loan buyers may realize some cost efficiencies through the reduction in administrative staff needed to execute the loan contract and administer the payments and collateral.

In addition to general credit risks, there are also several inherent risks in loan participations or loan sales. When the demand for certain types of loans is high, as it was recently for mortgage participations and securitizations, there is an inherent potential conflict between the originating institution and the investor. The loan originator might see the up-front fees and premium to the loan value as an excellent source of revenue that might not be as attractive if these loans were subsequently held in portfolio. Generally, higher-risk loans come with higher yields and fees, and these are booked immediately. If, however, the loans are not carefully underwritten, losses accumulate later when the borrower is unable to pay. If the originating institution has sold the loans without recourse or guarantee, it is less concerned about the long-term performance of the loan. An investor, on the other hand, might see the yield as an attractive alternative to other lower-yielding investment choices. If the investor relies on others to evaluate the quality of the loan (because the investor either doesn't have the expertise or doesn't trust rating agencies), the investor might see losses that exceed those expected. One method of solving this problem is through the use of credit enhancements. Credit enhancements may take the form of establishing a reserve pool for losses, acquiring guarantees, or using credit default swaps. Credit enhancements are discussed in a later section.

Underwriting Loan Sales, Participations, and Syndications

The two separate parties—the lead lending institution, or syndicate, and the participating investor—are required to underwrite the loans as if they were making the loans themselves and placing them on their own books. When underwriting loans, investors should carefully evaluate the loans they are purchasing as well as the originating institution's objective in selling the loan. Using the tools and techniques presented in this chapter, participating institutions can evaluate loans in a pool. To evaluate the originating institution, investors should follow the model presented in Chapter 3, paying particular attention to credit and liquidity risk. If the originating institution is successful in controlling risk and generating returns on its own portfolio, the investor knows it has the expertise and ability to underwrite quality loans. This, of course, does not guarantee that the loans they have participated in are of high quality! Over time, institutions build reputations that are widely known among competing institutions.

Shared National Credits

A Shared National Credit (SNC) is a loan or loan commitment in excess of $20 million by three or more unaffiliated financial institutions with a formal lending agreement. Regulatory agencies created the SNC program in 1977 to monitor and review the risk structure of large syndicated loans. SNCs are loan participations used by the largest regulated financial institutions and consist of the very largest credits. Regulators monitor SNCs for concentration risk in sectors of the economy as well as the concentration of the shared credits at a few institutions. The **concentration risk** is a direct result of a lack of diversification and dramatically affects a large portion of the bank's portfolio if economic factors negatively affect the geographic or industry concentration. A financial institution with these types of concentrations could be subject to risks that the rest of the banking industry is not subject to in its operations. Enron was one example—several large institutions had over $350 million in guaranteed loan commitments to Enron prior to its failure. Enron was able to draw upon this line of credit, even after it was widely known that the firm was in serious trouble. Just prior to the financial crisis, AGI had concentrated exposures to mortgage backed securities and credit default swaps. Losses to financial institutions that had made loans or loan commitments to AIG were mitigated, however, when the Treasury provided $182 billion in capital.

Credit Enhancements

Through the use of credit insurance, structured investment vehicles, or other credit derivatives, credit enhancements can take many forms—for example, as collateral requirements, recourse agreements, and formal guarantees. Key terms of these enhancements potentially include the following:

- Excess cash flow—many securitized assets are placed in pools in which the required payments to investors are less than the contractual payments of borrowers. Thus, even if some borrowers do not make the required payments, there is sufficient cash flow to continue to pay investors.
- Reserve accounts—the originating institution creates a trust for losses up to an amount allocated for a reserve which is used to make up any deficits in payments by borrowers.
- Collateralization—one or more parties pledge collateral against the loan.
- Loan guarantees—one or more parties pledge personal or business assets or are contractually bound to meet the obligations of the borrower if that party defaults.

- Credit insurance—any party can purchase credit insurance, provided either privately or by a governmental unit, for loans that provide payments for losses stemming from default.
- Credit derivatives—credit derivatives are instruments or contracts that derive their value from the underlying credit risk of a loan or bond. While there are many types of credit derivatives, the growth in the credit default swap (CDS) market has been especially large; participants' cash-flow obligations have had an enormous impact.

Credit Default Swaps

The CDS market has experienced rapid growth in the past several years. CDS contracts are relatively unregulated derivative instruments based on the underlying payments and values of fixed-income securities (typically corporate bonds and securitized asset pools). These contracts are privately negotiated instruments between a buyer and a seller. Prior to the financial crisis of 2008 and the Dodd–Frank Act, CDSs were traded in over-the-counter markets. The Dodd–Frank Act requires, with a few exceptions, that CDS contracts trade on an exchange.

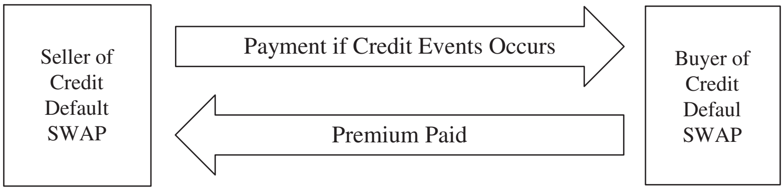
The buyer of a CDS pays a premium, which represents the risk of default on the underlying security, and thus the CDS is similar to an insurance contract. The premium often consists of two parts: an up-front fee as well as periodic payments. The seller of the CDS receives the payments and assumes the risk of default. Up-front fees are usually required for high-risk bonds and reached 60 to 80 percent of the value of some underlying assets during the credit crisis of 2007–2009.

The seller of the CDS plays a role similar to that of an insurance company. Sellers generally do not own the debt and provide longer-term protection. If an adverse event occurs, such as a default of the underlying instrument, the seller pays the buyer the change in value of the underlying asset. When the value of a CDS changes, one of the parties to the contract may have to post additional collateral. Such collateral calls potentially impose significant liquidity needs. Exhibit 14.12 shows the flow of payments and risk transfer for plain credit default swap.

Although the buyer often owns the underlying debt and uses the CDS as a hedge, one of the causes of the financial crisis of 2008 was that some investment companies were paid to create pools of assets that they then sold for a profit only to buy a CDS in the event the pools default. Since they created the pools, some wondered if they packaged the worst loans only to be paid twice—once when they sold the pools and again from the CDS when the pools defaulted!

There are several credit events that potentially trigger a payment from the seller of a CDS to the buyer. Because credit default swaps are negotiated contracts, these trigger events can vary from contract to contract. There are five generally accepted credit events:[20]

EXHIBIT 14.12 Credit Default Swap


Seller of Credit Default SWAP
Payment if Credit Events Occurs
Premium Paid
Buyer of Credit Defaul SWAP

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[20] See PIMCO, "Bond Basics: What Are Credit Defaults Swaps and How Do They Work?" June 2006, http://japan.pimco.com/EN/Education/Pages/CreditDefaultSwaps.aspx.

1. Failure to pay principal and interest payments in a timely manner
2. Restructuring of the debt in such a way that the lender (investor in the debt) is negatively affected
3. Bankruptcy or insolvency in which the debt is not paid
4. Acceleration of the principal and interest payments prior to the scheduled date(s)
5. Repudiation or moratorium in which the debt issuer rejects or refuses to pay the debt

The credit crisis of 2008 caused many sellers of credit default swaps to make large and unexpected payments for default. Sellers also were forced to post additional collateral when the swap values moved against them. Generally, CDS contracts require sellers to make payments in the event the company defaults or files bankruptcy.

Summary

Credit analysis is the evaluation of risk associated with a borrower's willingness and ability to repay debts. Before analyzing financial data, the analyst should assess the borrower's character and the quality of management. The subsequent financial analysis consists of spreading the financial statements, which involves analyzing common size income statement and balance sheet data and calculating liquidity, activity, leverage, and profit ratios; determining CFO using historical data; and then reviewing pro forma income statement, balance sheet, and cash-flow data. The entire procedure provides a framework for determining how large a loan is needed, what the proceeds will finance, how and when the loan should be repaid, and what collateral is available. This information and answers to specific questions about the firm's production process, supply relationships, and related concerns generally enable the lending officer to determine whether the credit request falls within acceptable risk limits.

One important facet of the analysis is evaluating cash flow. Principal and interest payments on debt plus dividends and a portion of other discretionary expenditures should be paid out of CFO. Term loans should generally not be approved unless the analysis indicates that projected cash flow will be sufficient to cover debt service requirements. Term loan analysis requires pro forma analysis. A statement of changes reconciled to cash generates cash-flow estimates by constructing a cash-based income statement. The ratio of CFO to dividends and principal payments on loans reveals whether the firm's underlying operating position is healthy.

The final section of the chapter address loan sales, participations, syndications, and credit default swaps. The growth in these types of transactions has been exceptional in the past decade. The large increase in the principally unregulated CDS market was a significant contributor to the credit crisis of 2008.

Questions

1. Rank the importance of the five basic credit issues described in the text.
2. Explain why collateral alone does not justify extending credit. Cite examples, using real estate or agricultural products as collateral.
3. Which of the following loan requests by an off-campus pizza parlor would be unacceptable, and why?
    a. To buy cheese for inventory
    b. To buy a pizza heating oven

   c. To buy a car for the owner
   d. To repay the original long-term mortgage used to buy the pizza ovens
   e. To pay employees due to a temporary cash-flow problem
   f. To buy stock in the company that supplies cheese to the parlor

4. Of the five key questions mentioned at the beginning of the chapter, only the last four were discussed in detail. The first question—"What is the character of the borrower and quality of information provided?"—can be the most important. Explain why this is the first question the lender should ask.
5. Explain how the following situations can shed light on the question, "What is the character of the borrower and quality of information provided?"
   a. Significant number of Better Business Bureau complaints.
   b. The business is a family business and several members of the family work for the business.
   c. The use of significant off-balance sheet entities and intercompany partnerships.
   d. A million dollars of new stock issued to the principals of the company.
   e. Little experience of management with the current business.
6. Standard ratio analysis distinguishes between four categories of ratios. Describe how ratios in each category indicate strength or weakness in the underlying firm's performance.
7. Generally, a high current ratio is an indicator of good liquidity. Under what circumstances or conditions could a high current ratio be an indicator of problems with the company's current assets?
8. Explain how it is possible for a firm to report rising NI each year yet continue to need more working capital financing from a bank.
9. Indicate whether each of the following is a source of cash, use of cash, or has no cash impact.
   a. Firm issues new long-term debt.
   b. Firm prepays operating costs.
   c. Because the firm buys another firm, it amortizes goodwill.
   d. Firm sells outdated computer equipment.
   e. Firm pays a stock dividend.
   f. Firm sells its product on credit.
   g. Firm buys a new fleet of trucks.
10. Suppose that you generate a cash-based income statement and determine that CFO equals 75 percent of cash dividends paid and payments on current maturities of long-term debt. What is the significance of this in terms of the firm's cash-flow position?
11. Should a firm's CFO generally exceed capital expenditures?
12. Explain the importance of identifying the "primary" source of repayment. Clearly, the primary source of repayment is always "cash." The analysis question is really one of identifying the source of the cash used to repay the loan. Explain the advantages and disadvantages of the following sources of cash as the primary source of repayment on a loan:

Selling an asset
Generating more sales
Issuing stock (equity)
Increasing a liability
Decreasing expenses
Reducing cash dividends

Under what circumstances would you be comfortable with the mentioned sources being the "primary" source of repayment?

13. Use the following data to calculate the requested ratios:

Assets		Liabilities and Equity		Income Statement	
Cash	80	Accounts payable	400	Net sales	9,125
Accounts receivable	700	Accrued expenses	80	COGS	6,100
Inventory*	500	Notes payable—bank	450	Operating expenses	2,550
Current assets	1,280	CM LTD	50	Interest expense	101
Fixed assets	1,220	Current liabilities	980	Other income	2
		LTD	550	Other expenses	48
Total assets	2,500	Equity	970	Taxes	112
		Total liabilities and equity	2,500	Net income	216

*Prior-period inventory was 170.

a. Current ratio
b. Days accounts receivable
c. Inventory turnover
d. Days accounts payable outstanding
e. Debt to equity
f. Times interest earned
g. ROE
h. Total asset turnover (asset utilization)

14. Suppose that you have generated the estimates listed below from a pro forma analysis for a manufacturing company that had requested a three-year term loan. The loan is a $1.5 million term loan with equal annual principal payments. Principal and interest are payable at the end of each year with interest calculated against outstanding principal at a rate of prime plus 2 percent.

	Year 1	Year 2	Year 3
Capital expenditures	$250,000	$125,000	$75,000
Cash dividends	$140,000	$140,000	$140,000
Cash flow from operations before interest expense	$750,000	$780,000	$800,000

a. The prime rate averages 8 percent each year. Will the firm's CFO before interest be sufficient to meet debt service requirements and other mandatory expenditures?

b. If prime averages 8 percent, 9 percent, and 10 percent over the three years, respectively, will cash flow be sufficient?

15. Using the example in the text, develop a list of questions that a loan officer should ask Marcus Wade to gain a better understanding of the risks involved in lending to Wade's Office Furniture.
16. Discuss why loan originators might consider selling a loan. Why might an institution consider buying a loan participation? Why do large institutions participate in loan syndications? What are the advantages and disadvantages of serving as the lead bank?

Problems

I. **Southwest Trading Company, Taos, New Mexico.** Summer is approaching, and Steven and Sue Mahan have finally decided that their idea of a successful Southwestern furniture, art, and jewelry trading company has come of age. They know that summer is a popular tourist time in New Mexico and could be the best time to start this new business. The Mahans have had a long-time interest in Southwestern art and furniture. Steven graduated from college with an economics degree about 15 years ago and received his MBA in finance a few years later. He has been working in Dallas, Texas, as the controller of a major wholesale distributor company for many years. His wife, Sue, who will be a full partner in the business, spent the first 10 years of her career in retail sales. Over the last several years, she has assumed more administrative duties for the group she works with.

Steven and Sue know they bring the expertise and skill to run a successful business, but to ensure success they have been researching the market for over five years. They also know that they must be very careful and thoroughly research the business and industry they are pursuing. They have traveled extensively to New Mexico and have spent a good deal of time getting to know the local artists (primarily ski bums). They have found that there is a great demand for Southwestern furniture in Texas and elsewhere in the Southwest, and prices are high. Through their contacts with the local craftspeople, they have found that many of them would like a reliable source for displaying and selling their goods. They have been able to make tentative arrangements with a large and dependable group to supply the furniture and art pieces they will need to run the business.

The Mahans have decided to open a shop called Southwest Trading Company in Taos, New Mexico, and act as both a retailer and a supplier to furniture and art outlets in Texas. Steven's extensive contacts with businesses in Dallas and Houston have given him the orders needed to make the business a success as soon as they begin shipping the goods. Sue has already begun marketing the Southwest Trading Company's products. Southwest Trading Company's arrangements with the local craftspeople will allow very aggressive pricing of the goods to retail establishments in Texas. This aggressive pricing has been well received, and tentative orders are already in place.

Steven has found an ideal location in Taos that is currently available. The owner is asking $275,000 for the space, but Southwest Trading has a contract, contingent on financing, for $250,000. Steven and Sue have gotten bids on remodeling and should be able to renovate the space for about $45,000. Although they will purchase the building, the land is leased on a transferable lease with 65 years remaining. The Mahan's have decided to invest $235,000, which represents most of their savings, into the venture. Sue's sister is also interested in the possibilities that the company exhibits and is lending Southwest Trading $90,000. Repayment on the note to Sue's sister is not expected to begin for five years. They have estimated that they will need $130,000 in inventory to start the business, and they will buy the inventory in cash to build goodwill with the local craftspeople. They also estimate that they will need $20,000 in cash to conduct day-to-day operations and bill payment.

Wanting to use a local bank, Steven has approached Cary Farmer, the senior loan officer at Santa Fe National Bank in Santa Fe, New Mexico, for financing. Steven's background in finance has allowed him to put together the following assumptions for their preliminary business plan. Steven believes that all renovations to the building and inventory can be in place by the end of June 2014.

1. Sales are expected to be a bit lower the first year (July through December, 2014), because only six months will be included in the first fiscal year. Sales are expected to grow significantly in the first full year, 2015, with growth leveling off in the third and fourth years. Sales are expected to be $275,000, $675,000, $800,000, and $900,000 in 2014, 2015, 2016, and 2017, respectively. Sales are expected to level off after 2017.
2. Based on tentative agreements and orders, it is expected that COGS will average about 63 percent of sales.
3. General and administrative expenses are expected to be $70,000 for the six months of operations in 2014, increase to $100,000 in 2015, and level off at $120,000 from 2016 forward. The land lease expenses and interest expenses are included in operating expenses.
4. Selling expenses are expected to be about 12 percent of sales and Sue is expecting to undertake extensive marketing and promotion efforts throughout Texas after the business is opened. It is expected that these additional promotional expenses will be about $30,000 in 2014 only.
5. The company will use 10-year straight-line depreciation of the building and improvements.
6. Southwest's effective tax rate is expected to be 34 percent.
7. Because they expect a good deal of sales to be paid by credit card and to ship goods to customers in Texas on credit, they expect to carry about 48 days of accounts receivable. They also expect that, because of the type of business they are entering, they will turn their inventory over about three times a year.
8. On the basis of the negotiations they have had with their craftspeople, suppliers, and other wholesale distributors, they estimate that they can count on about 28 days of accounts payable to help finance the business.

In preparing to go to the bank for the necessary loan, the Mahans want to prepare projected financial statements showing that Southwest Trading Company can make a profit and pay back the loan. They also want to know more precisely how much they will need to borrow from the bank to open the doors for business. The Mahans plan to prepare five years of balance sheet, income statement, and cash budget data for the bank. They must also develop an opening balance sheet as of the day they plan to open the doors, June 30, 2014. These pro forma financial statements will aid them, and the bank officer, in answering many questions, including the following:

1. How much financing will be needed to open the doors of the business in July 2014?
2. Five years of pro forma balance sheet and income statement data must be prepared to determine if additional financing is needed, and if so, how much. Ste-

ven's finance background tells him that the estimated financing needed each year will be an accounting plug figure to ensure that the balance sheet balances. If projected assets exceed liabilities and equity, the difference will be the bank's borrowing needs. If liabilities and equity exceed projected asset purchases, these funds will be used to pay off debt or increase cash or marketable securities.

3. Because this is a start-up business, it is even more important to identify what the loan proceeds will be used for, what the primary source of repayment is, and when the total loan proceeds will be repaid. Using the pro forma projections, the primary source of repayment and when the loan will be repaid can be determined.
4. A cash budget or cash-based income statement needs to be prepared because Steven knows the only thing that matters to the bank is cash.
5. Finally, Steven needs to prepare a collateral schedule. He knows that the banker does not want the collateral but will need all he can get if the business is not as successful as expected.
6. Prepare a list of questions to which you would need the answers. Be sure to explain the specifics of the questions as they relate to this case.
   a. What types of loan covenants would you require?
   b. Identify the bank's largest risks in making this loan.
   c. How would you structure the loan to protect the bank?
   d. What is your recommendation concerning the loan request?

   Conduct the analysis suggested by the above questions. What is your recommendation concerning the loan request?

II. **Performance of Chem-Co Coatings.** Table 1 presents income statement and balance sheet data for Chem-Co Coatings, a producer of fertilizers used in agriculture, that recently bought a small manufacturing firm outside the United States. During 2013 the firm instituted a national marketing campaign to inform agricultural businesses and individual farmers of Chem-Co's new products. Chief executive officer Wynona Presley was pleased with sales in 2013, noting the 30 percent increase over 2012 sales. However, with the economic recession and decline in U.S. and foreign agriculture and commodity prices, Presley is anticipating a sharp pull-back in business

1. Using the data in Table 1, generate a cash-based income statement for Chem-Co for 2013.
2. Calculate days accounts receivable, inventory turnover, and days accounts payable for 2012 and 2013 and determine whether the use (source) of cash in working capital was a result of sales growth, credit policy, inventory policy, or trade credit policy. Did these turnover ratios improve or deteriorate? What was the resulting impact on cash flow?
3. Interpret the figures by evaluating the firm's CFO and key financial ratios.
4. Identify potential problems that the firm faces.

TABLE 1 **Balance Sheet and Income Statement Data for Chem-Co (Millions of Dollars)**

Balance Sheet	2012	2013	Income Statement	2014
Assets				
Cash and marketable securities	$30	$6	Net sales	$861
Accounts receivable	102	215	Cost of goods sold	680
Merchandise inventory	65	104	Gross margin	181
Prepaid expenses	8	5	Selling expenses	64
Gross fixed assets	120	149	General and administrative expenses	60
Less accumulated depreciation	40	57	Depreciation	26
Net fixed assets	80	92	Operating profit	31
Intangible assets	4	3	Interest income	6
Total assets	$289	$425	Interest expense	18
Liabilities and Net Worth				
Notes payable—bank	$106	$223	Profit before taxes	19
Current maturities of long-term debt	9	11	Income taxes	5
Accounts payable	33	50	Net profit	14
Accruals	2	9		
Federal income tax payable	3	4		
Long-term mortgage	16	15		
Long-term debt	43	32		
Total liabilities	$212	$344		
Common stock	40	40		
Retained earnings	37	41		
Total net worth[a]	77	81		
Total liabilities and equity	$289	$425		

[a] Net worth reconciliation

Beginning net worth	77
= + Net profit	14
Dividends paid (cash)	10
Ending net worth	81

Note: Inventory was $45 million in 2011.

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APPENDIX Calculation of Financial Ratios

Liquidity Ratios

- Current ratio = Current assets/current liabilities
- Quick ratio $= \dfrac{\text{Cash} + \text{accounts receivable}}{\text{Current liabilities}}$
- Accounts receivable aging schedule: a comparison of the dollar amount and percentage of total receivables outstanding across the number of days they have been outstanding (less than 30, 31–60, etc.)

Activity Ratios

- Days cash = Cash/average daily sales
- Days inventory on hand = Inventory/average daily COGS
- Inventory turnover = 365/days inventory = COGS/inventory
- Accounts receivable collection period (Days AR) = Accounts receivable/average daily sales
- Accounts receivable turnover = 365/days AR = Sales/accounts receivable
- Days cash-to-cash asset cycle = Days cash + days AR + days inventory on hand
- Days accounts payable outstanding

  = Accounts payable/average daily purchases
  = Accounts payable/[(COGS + Δinventory)/365]

- Sales to net fixed assets = Sales/net fixed assets

Leverage Ratios

- Debt to tangible net worth = Total liabilities/tangible net worth
- Times interest earned = EBIT/interest expense
- EBIT = Earnings before taxes + interest expense
- Fixed charge coverage = (EBIT + lease payments)/(interest expense + lease payments)
- Net fixed assets to tangible net worth = Net fixed assets/tangible net worth
- Dividend payout = Cash dividends paid/net profit

Profitability Ratios

- Return on equity (ROE) = Net income/total equity
- Return on average net worth = Net income/tangible net worth
- Profit before taxes to net worth = Profit before taxes/tangible net worth = Pretax ROE
- Return on assets (ROA) = Net income/total assets

- Profit before taxes to total assets = Profit before taxes/total assets = Pretax ROA
- Asset utilization = Asset turnover = Sales/total assets
- Profit margin (PM) = Net income/sales
- Sales growth = Change in sales/last period's sales
- Income taxes to profit before taxes = Reported income tax/profit before taxes

Note: Tangible net worth = Total equity–intangible assets.

Appendix I References

Annual Statement Studies, RMA, published annually (www.rmahq.org). Provides common size income statement and balance sheet data as well as ratio data by four-digit SIC code. Data for all companies are provided for the last five years, and current peer group data are provided by size using total assets and total sales. Median and upper and lower quartiles for each ratio are also provided.

Industry Norms and Key Business Ratios, Dun & Bradstreet, published annually (www.dnb.com). Common size income statement and balance sheet data as well as industry ratios using four-digit SIC code. Common size data are presented using total assets or total sales and the median value must be used to calculate the percentage of total values. Data are presented for the current year only but median and upper and lower quartiles are provided for each ratio.

Industry Surveys, Standard & Poors Corporation, published annually (http://www.standardandpoors.com/products-services/industry_surveys/en/us).

Almanac of Business and Industrial Ratios, Leo Troy, annual.

Edgar Database of Corporate Information, Securities and Exchange Commission, available online at www.sec.gov. Features a large and searchable database of corporate filings including 10Ks and 10Qs.

APPENDIX II

Background Information for Financial Analysis

A quantitative analysis of financial data serves as the basis for most credit decisions. Its effectiveness depends largely on the quality of the data. Before proceeding with the ratio and cash-flow evaluation, an analyst should examine the nature of available information and its completeness. This appendix summarizes background information regarding financial analysis.

Financial Statements

Accountants prepare formal financial statements with an eye toward generally accepted accounting principles (GAAP). The intent of GAAP is to establish a set of policies and procedures that require the consistent, systematic presentation of accounting information. Even with GAAP, however, two problems frequently arise. First, many financial statements are prepared by individuals who are not familiar with GAAP, let alone fundamental accounting identities, such as assets equal liabilities plus net worth. Thus asset classifications and expenses claimed in many reports vary from allowable provisions. Second, even GAAP allow different procedures for presenting information. For example, if a company sells a product under an installment contract, it can book sales when the order is signed or when delivery is actually made. Similarly, a company has a choice in how it accounts for inventory. Last-in–first-out systems have far different reporting and cash-flow impacts than first-in–first-out systems.

The implication is that an analyst must examine the nature of financial data before spreading statements. Following are some recommended guidelines:

- Determine who prepared the statements.
- Determine if the statements are audited.
- If audited, assess what type of opinion was issued and the nature of any qualification or disclaimer. In general, an unqualified opinion means that the auditor determined that the reported statements conformed with GAAP. A qualified opinion means that either some item in the report does not conform with GAAP or selected figures cannot be determined with a reasonable degree of certainty. The second case occurs, for example, when the value of inventory cannot be adequately determined. Adverse opinion means that the financial statements are not presented in accordance with GAAP, and a disclaimer appears when the auditor expresses no opinion.
- Determine areas where a firm has used its discretion to select a particular accounting policy within GAAP that might significantly affect reported figures. This requires the careful examination of notes to financial statements. Discretionary policies frequently arise in the areas of revenue recognition; income tax reconciliation; inventory valuation; accounts receivable classification; depreciation of plant and equipment; goodwill; consolidation of entities; and pension, profit sharing, and stock option plans.
- Determine all outstanding commitments and contingent claims.
- Identify any unusual balance sheet entries or transactions.

APPENDIX III

Cash-Flow Statement Section Investment	Column Number	Cash-Based Income Statement	Factors Determining the Difference between the Income Statement and Cash-Based Income Statement	Income Statement Equivalent
Operations	**(1)**	+ Sales		Sales
	(2)	− ΔAccounts receivable	Sales growth Credit policy	
	(3) = (1) + (2)	= Cash sales		
	(4)	− COGS	Sales growth Gross margin	COGS
	(5)	− ΔInventory	Inventory turnover	
	(6)	+ ΔAccounts payable	Trade credit policy	
	(7) = (4) + (5) + (6)	= Cash purchases		
	(8) = (3) + (7)	= Cash gross margin	All factors listed above	Gross margin
	(9)	− Operating expenses		Operating expenses
	(10)	+ Depreciation	Accounting methods	
	(11)	− ΔPrepaid expenses	Operating expense payment policies	
	(12)	+ ΔAccrued expenses	payment policies	
	(13) = sum(9 to 12)	= Cash operating expenses		
	(14)	+ Other income		Other income
	(15)	− Other expenses		Other expenses
	(16)	− Interest expense		Interest expenses
	(17)	− ΔOther current assets	Changes in other current assets and liabilities	
	(18)	+ ΔOther current liabilities		
	(19) = (13) + sum(14 to18)	= Cash profit before taxes	Factors listed above	Profit before taxes
	(20)	− Income taxes reported	Accounting methods Tax laws	Income taxes
	(21)	+ ΔIncome taxes payable		
	(22)	+ ΔDeferred income taxes		
	(23) = (20) + (21) + (22)	= Cash taxes paid		
	(24) = **(19)** + **(23)**	= **Cashflow from operations**	**All factors listed above**	**Net income**

Cash-Flow Statement Section Investment	Column Number	Cash-Based Income Statement	Factors Determining the Difference between the Income Statement and Cash-Based Income Statement	Income Statement Equivalent
Investment	**(25)**	− Capital expenditures = −(ΔNet fixed assets+ Depreciation expense)	Actual capital expenditures	Not included
	(26)	− ΔLong − term investments	Additions to long-term investments	
	(27)	− ΔAll other noncurrent assets	Changes in all other long-term assets	
	(28) = (25) + (26) + (27)	= Cash used for investments		
Financing	**(29)**	− Payment for last period's CMLTD	Loan principal repayment schedule	Not included
	(30)	−Dividends paid (DIV)	Dividend policy	Dividends
	(31) = (29) + (30)	= Payments for financing		
	(32)	+ ΔShort-term bank debt	Level of short-term bank debt and working capital needs	Not included
	(33)	+ ΔLT debt + EOP CMLTD	Long-term debt, capital expenditures, and capital structure decisions	Not included
	(34)	+ ΔCommon and preferred stock		Not included
	(35)	+ ΔOther equities and noncurrent liabilities		Not included
	(36) = sum(32 to 36)	= External financing		
Cash	**(37)** = (24) + (28) + (31) + (36)	= Δ(Cash and marketable securities)	All factors listed above	Not included

EOP = end of period, CMLTD = current maturity of long-term debt.

15

Evaluating Consumer Loans

Think about the convenience provided by credit and debit cards. Consumers can use either type of card to buy sandwiches at McDonalds, pay taxes, use the subway, and make purchases at vending machines. Not surprisingly, card transactions have sharply reduced individuals' use of cash. A recent survey showed that only 27 percent of point of sale transactions were made with cash, and merely 7 percent involved a paper check. Over 66 percent of point of sale transactions were made with plastic (29 percent with credit cards and 31 percent with debit cards).[1]

Today, however, mobile banking and mobile payments are re-writing the payment system landscape. A 2012 Federal Reserve survey found that nearly 21 percent of mobile phone users used mobile banking. Mobile payments are more likely to be used by the younger population, with the 18–29 age group accounting for 36 percent of mobile payment users. A survey by the firm Deloitte in late 2013 found that, for the first time, online shopping overtook the more traditional brick and mortar. The survey found that 47 percent of retail buyers indicated that the Internet would be their preferred shopping method, while only 37 percent still preferred the more traditional retail stores.[2]

Over the years, banks have aggressively pursued consumers, partly because of the loyalty that individuals show to their primary financial institution, especially the ones providing transactions services. Bank's often talk about "sticky products" such as checking and savings accounts, which are products not likely to leave once they are opened. Studies show that most customers won't end their relationship unless they move out of the bank's trade area, the bank changes names, and/or service deteriorates sharply. Banks can readily cross-sell services, debit cards, credit cards, consumer loans, and so on to grow noninterest income. Importantly, most individuals are not as price sensitive as business customers. Hence, banks can earn risk-adjusted profits above that generated in other lines of business or from other types of customers.

This chapter examines consumer lending activities at banks. It looks at the characteristics and profitability of different types of consumer loans and introduces general evaluation techniques to assess credit risk. In doing so, it demonstrates why consumer credit relationships are attractive to banks.

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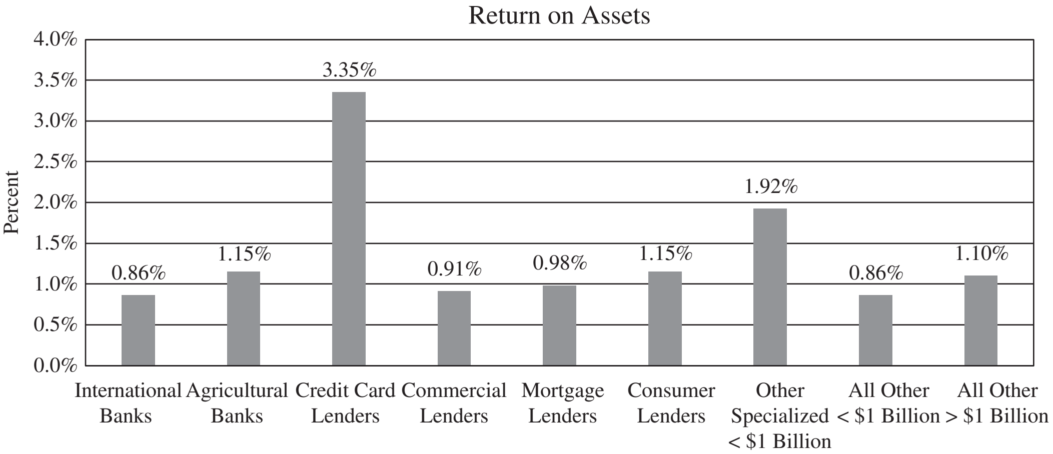
[1] New, Catherine, "Cash Dying As Credit Card Payments Predicted To Grow In Volume: Report," *The Huffington Post*, June 7, 2012, http://www.huffingtonpost.com/2012/06/07/credit-card-payments-growth_n_1575417.html.

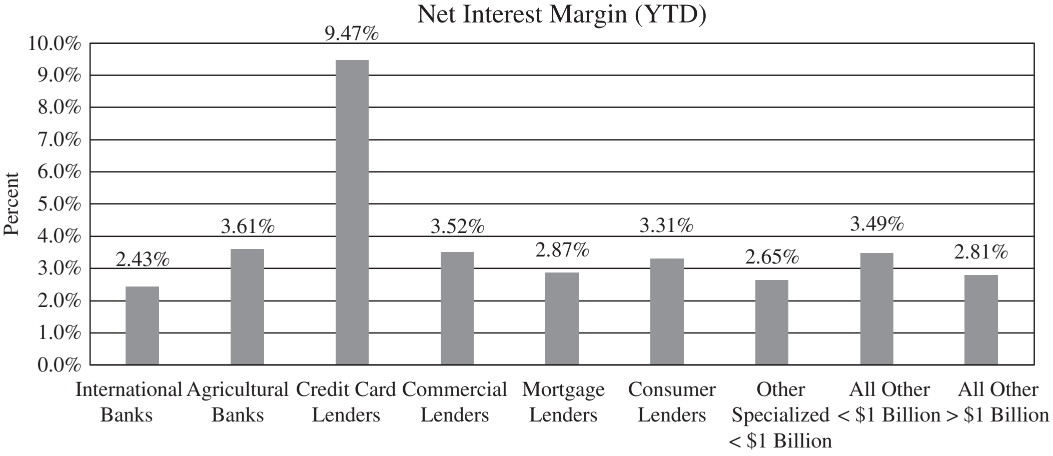
[2] See Holliday, Katie, "New Top Choice for Shoppers: Online Overtakes Brick-and-Mortar," cnbc.com, November 18, 2013, http://www.cnbc.com/id/101205503.

For many years, banks viewed consumer loans with skepticism. Commercial loans were available in large volume, net yields were high, and the loans were highly visible investments. Consumer loans, by contrast, involved small dollar amounts and a large staff to handle accounts, and there was less prestige associated with lending to individuals. This perception changed with the decline in profitability of commercial loans. In recent years, competition among lenders has lowered spreads on commercial loans to where potential profits are small relative to credit risk. Most states no longer have effective usury ceilings on consumer loans so that lenders have increased interest rates, and risk-adjusted returns have exceeded those on commercial loans. Even with high relative default rates, portfolios of consumer loans currently produce greater percentage profits than commercial loans.

Consider the summary profitability data provided in Exhibit 15.1 for FDIC-insured banks categorized by asset concentration. Banks labeled "credit card lenders" and "consumer lenders" have the heaviest concentration of loans in credit cards and other consumer loans, respectively. Note that in 2013 (and in prior periods), these two groups of banks generated some of the highest returns on assets (ROAs) compared with all other banks. In fact, the ROAs of credit card banks at 3.35 percent exceeded the ROAs

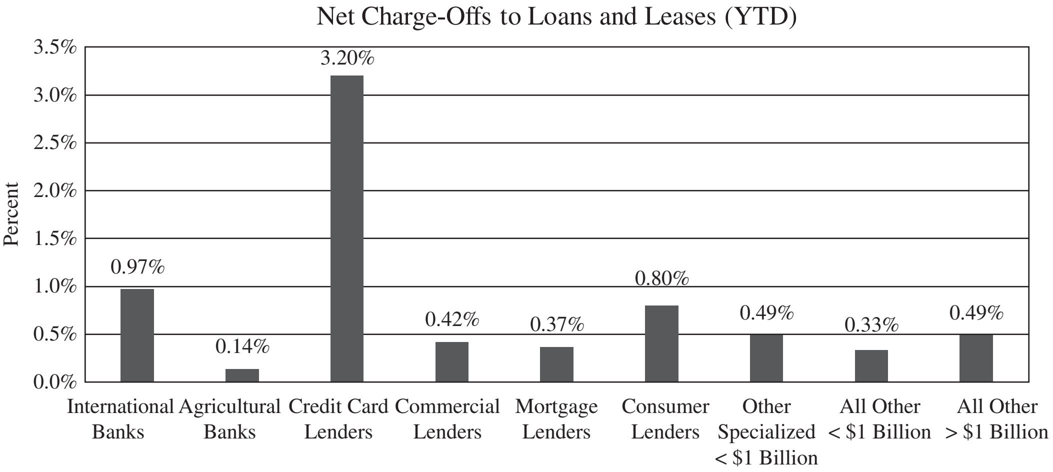
EXHIBIT 15.1 **Profitability Measures for FDIC-Insured Banks by Asset Concentration: December 2013**





Source: FDIC Quarterly Banking Profile. http://www2.fdic.gov/qbp/index.asp.

EXHIBIT 15.2 **Net Charge-Offs for FDIC-Insured Banks by Asset Concentration: December 2013**



Source: FDIC Quarterly Banking Profile. http://www2.fdic.gov/qbp/index.asp.

of all other banks by about 150 to 250 basis points. These high ROAs were realized even after recording the highest net charge-off rates. Exhibit 15.2 demonstrates that credit card lenders charged off an average of 3.2 percent of loans, whereas consumer lenders charged off 0.8 percent of loans, much more than depository institutions in other categories with the exception of international banks.

Today, many banks target individuals as the primary source of growth in attracting new business. This reflects the attraction of consumer deposits, as well as consumer loans. Interest rate deregulation forced banks to pay market rates on virtually all their liabilities. Corporate cash managers, who are especially price sensitive, routinely move their balances in search of higher yields. Individuals' balances are much more stable, largely because they are federally insured up to $250,000 per account. Although individuals are price sensitive, a bank can generally retain deposits by varying rates offered on different maturity time deposits to meet the customer's needs. Consumers also hold substantial demand deposits and NOW accounts that are relatively inexpensive to the bank and normally are not held to meet compensating balance requirements. A consumer who maintains a deposit relationship and borrows from the same institution is typically quite loyal.

From a lender's perspective, the analysis of consumer loans differs from that of commercial loans. First, the quality of financial data is lower. Personal financial statements are typically unaudited, so it is easy for borrowers to hide other loans. It is similarly easy to inflate asset values. Second, the primary source of repayment is current income, primarily from wages, salaries, dividends, and interest. This may be highly volatile, depending on the nature of the individual's work experience and history. The net effect is that character is more difficult to assess but is extremely important.

Types of Consumer Loans

When evaluating the measurable aspects of consumer loan requests, an analyst addresses the same issues discussed with regard to commercial loans: the character of the borrower, the use of loan proceeds, the amount needed, and the primary and secondary sources of repayment. However, consumer loans differ so much in design that no comprehensive analytical format applies to all loans. With credit cards, for example, a bank does not know what the loan proceeds will be used for or how much the customer will borrow at any point in time. By contrast, a boat loan with fixed installment payments has a maximum borrowing amount and regular repayment schedule. Credit analysis thus differs across loan types. Many banks mass market their credit cards knowing that losses will increase but hoping to price this risk accordingly and to attract enough affluent customers to offset charge-offs. There is no formal analysis of individual borrower characteristics unless the lender uses a **credit scoring model**. A credit scoring model is a quantitative model whereby a loan officer grades a loan request using a statistically sound model that assigns points to selected characteristics of a prospective borrower. By contrast, lenders treat installment loans made directly in negotiation with the borrower much like commercial loans. Each facet of the credit request, such as estimating discretionary income (cash flow) relative to debt service requirements, is evaluated similarly to commercial loans.

Consumer loans can be classified into one of three types: installment loans, credit cards or revolving credit lines, and noninstallment loans. Each type requires a different approach for credit analysis and provides different answers to the fundamental credit issues.

Installment Loans

Installment loans require the periodic payment of principal and interest. In most cases, a customer borrows to purchase durable goods or cover extraordinary expenses and agrees to repay the loan in monthly installments.[3] Examining Exhibit 15.3, we can see that mortgage loans are by far the largest consumer installment loan category. Auto loans have historically been the second largest category of installment loans, but recently have been overtaken by student loans. Most nonmortgage installment loans have much smaller average original principals. On the other hand, it is not unusual to see loans for purposes such as aircraft purchases, boat purchases, and personal investments that exceed $500,000, depending on the use of the proceeds. The typical maturity ranges from two to six years. Except for revolving credit, most consumer loans are secured.

Installment loans may be either direct or indirect loans. A **direct loan** is negotiated between the bank and the ultimate user of the funds. An individual who borrows from a bank to finance an automobile must formally request credit and provide supporting personal financial information. The loan officer analyzes the information and approves or rejects the request. An **indirect loan** is funded by a bank through a separate retailer that sells merchandise to a customer. The retailer, such as an automobile dealer, takes the credit application, negotiates terms with the individual, and presents the agreement to the bank. If the bank approves the loan, it buys the loan from the retailer under prearranged terms. Automobile loans exceed any other type of installment loans at banks, followed by revolving credit and mobile home loans. Approximately 60 percent of automobile loans are indirect loans purchased from dealers. The figure for indirect mobile home loans is considerably higher.

Revenues and Costs from Installment Credit. Installment loans can be extremely profitable. Generally, the average size of a loan is small, historically averaging around $6,000 to $7,000. It costs from $100 to $250 to originate each installment loan, with electronic loan costs the lowest for larger banks. Origination costs include salaries, occupancy, computer, and marketing expenses associated with soliciting, approving, and processing

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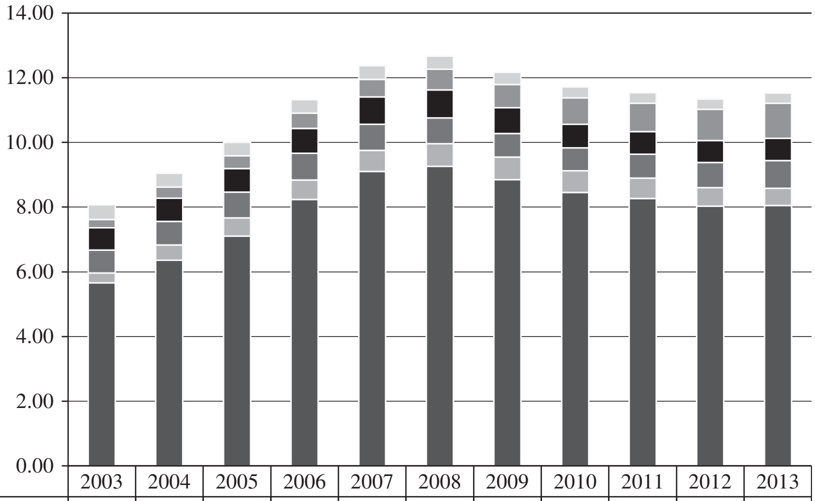
[3] Credit card loans and overdraft lines are formally installment loans because they require periodic monthly payments. They are discussed separately because their other features differ widely from other installment loans.

EXHIBIT 15.3 **Total Consumer Debt Balance and Its Composition: 2002–2013 ($ trillions)**



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
■ Other	0.45	0.42	0.42	0.41	0.42	0.41	0.38	0.34	0.33	0.32	0.32
■ Student Loan	0.25	0.35	0.39	0.48	0.55	0.64	0.72	0.81	0.87	0.97	1.08
■ Credit Card	0.70	0.72	0.74	0.77	0.84	0.87	0.80	0.73	0.70	0.68	0.68
■ Auto Loan	0.70	0.73	0.79	0.82	0.82	0.79	0.72	0.71	0.73	0.78	0.86
■ HE Revolving	0.30	0.47	0.57	0.60	0.65	0.71	0.71	0.67	0.63	0.56	0.53
■ Mortgage	5.66	6.36	7.10	8.23	9.10	9.26	8.84	8.45	8.27	8.03	8.05

Source: FRBNY Consumer Credit Panel, http://www.newyorkfed.org/microeconomics/data.html.

loan applications. There are also costs associated with collecting payments and charging off loans. Generally, installment loans have yielded net spreads in excess of 5 percent, where the net spread equals loan income minus loan acquisition costs, collection costs, and net charge-offs.

Credit Cards and Other Revolving Credit. Credit cards and overlines or overdrafts tied to checking accounts are the two most popular forms of revolving credit agreements. A study conducted by Woolsey and Schulz suggested that about 92 percent of households had credit cards, and the average number of cards held per household was 13.[4] The typical consumer had access to $19,000 in credit, but more than one-half of consumers used less than 30 percent of the available credit. The study showed that one in six cardholders paid the minimum amount due each month, while 15 percent had outstanding balances in excess of $15,000. When a consumer pays only a fraction of her monthly bill, she incurs finance charges on the remainder. Credit lines against demand deposit accounts at banks are less common but function identically to credit cards. Customers can write checks in excess of actual balances held but must pay interest on the overdraft, usually against lump sums at $50 or $100 increments.

Banks offer a variety of credit cards. Although some banks issue cards with their own logo and support the cards by their own marketing effort, most operate as franchises of MasterCard or Visa. To become part of either group's system, a bank must pay a one-time membership fee plus an annual charge determined by the number of its customers

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[4] See Woolsey and Schulz (2009).

actively using the cards. MasterCard and Visa, in turn, handle the national marketing effort. All cards prominently display the MasterCard and Visa logos with the issuing bank's name. Recently, both MasterCard and Visa have allowed banks to increase the size of the bank's name and reduce the size of the logo to emphasize which bank actually issues the card. The primary advantage of membership is that an individual bank's card is accepted nationally and internationally at most retail stores without each bank negotiating a separate agreement with every retailer. While U.S. banks have pushed consumers to use debit cards, they have not been aggressive in developing alternatives like the smart card, which is currently dominated by foreign competitors.

Debit Cards, Smart Cards, and Prepaid Cards. Financial institutions throughout the world are investing in technologies that promote debit cards, smart cards, and prepaid cards. Debit cards are widely available and have recently become the most commonly used method of in-store payment in the United States. According to a study conducted by Javelin Strategy & Research, by 2017, only 23 percent of point of sale purchases will be made with cash, while 66 percent will be made with plastic—31 percent with debit cards and 29 percent with credit cards.[5] When an individual uses a **debit card**, his or her balance at a bank is immediately debited; that is, funds are immediately transferred from the card user's account to the account of the retailer. The obvious disadvantage to a consumer is the loss of float. Some retailers also charge fees when a customer uses a debit card. Banks prefer that customers use debit cards instead of checks, because debit cards have lower processing costs than do checks and automated teller machine (ATM) transactions. As discussed in the Contemporary Issues box, "Prepaid Debit Cards for Social Security," Social Security recipients can now receive their monthly payments via prepaid debit cards.

CONTEMPORARY ISSUES

Prepaid Debit Cards for Social Security

Almost 4 million Americans who receive social security do not have a bank account. Historically, the federal government sent every recipient a paper check, which could be lost, stolen, or delayed. Upon receipt, an individual would still have to cash the check—a transaction for which many check cashing services charge $35–$50.

In 2008 the U.S. Treasury, in conjunction with Comerica Bank, offered recipients the option to get their benefit payments via prepaid debit cards. Social Security recipients would thereby have access to cash immediately upon receipt of the card. With the prepaid card, there are no sign-up fees or overdraft fees. Users have to pay ATM fees if they withdraw cash too frequently. If the card is lost or stolen, the cardholder will lose only $50 as long as he or she contacts Comerica within two days; otherwise, the cardholder may lose up to $500. The service clearly reduces the hassle and cost of using checks.

Source: Emily Brandon, "Social Security Debit Cards: 7 Things You Need to Know," *U.S. News & World Report*, June 11, 2008.

A **smart card** is like an enhanced debit or credit card; it contains a computer memory chip that stores and manipulates information. Such a chip can store more than 500 times the data of a magnetic-stripe credit or debit card. When inserted in a terminal, the

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[5] See New, Catherine, "Cash Dying As Credit Card Payments Predicted To Grow In Volume: Report," *The Huffington Post*, June 7, 2012, http://www.huffingtonpost.com/2012/06/07/credit-card-payments-growth_n_1575417.html.

cardholder can pay for goods and services, dial the telephone, make airline arrangements, and authorize currency exchanges. Because it is programmable, users can store information regarding their complete financial history and recall this information when effecting transactions. These electronic checkbooks can effectively handle virtually all of consumers' purchasing needs. Although smart cards are very popular in Europe and Japan, they have only modestly penetrated the U.S. market, which accounts for just 2 percent of worldwide usage. This largely reflects the U.S. consumer's satisfaction with existing technology and banks' unwillingness to invest in the computer terminals necessary for processing smart card transactions.

Prepaid cards are a hybrid of the debit card: customers prepay for services to be rendered and receive a card against which purchases are charged. The subway system in Washington, D.C., for example, lets customers prepay for access cards, then use the cards to pay for subway rides. Many universities and businesses, in turn, let students and employees prepay for books and meals, then charge their purchases against the card. The primary advantage to the bank is that processing costs are low, and there is little risk of loss. In fact, many lenders gain because users lose prepaid cards.

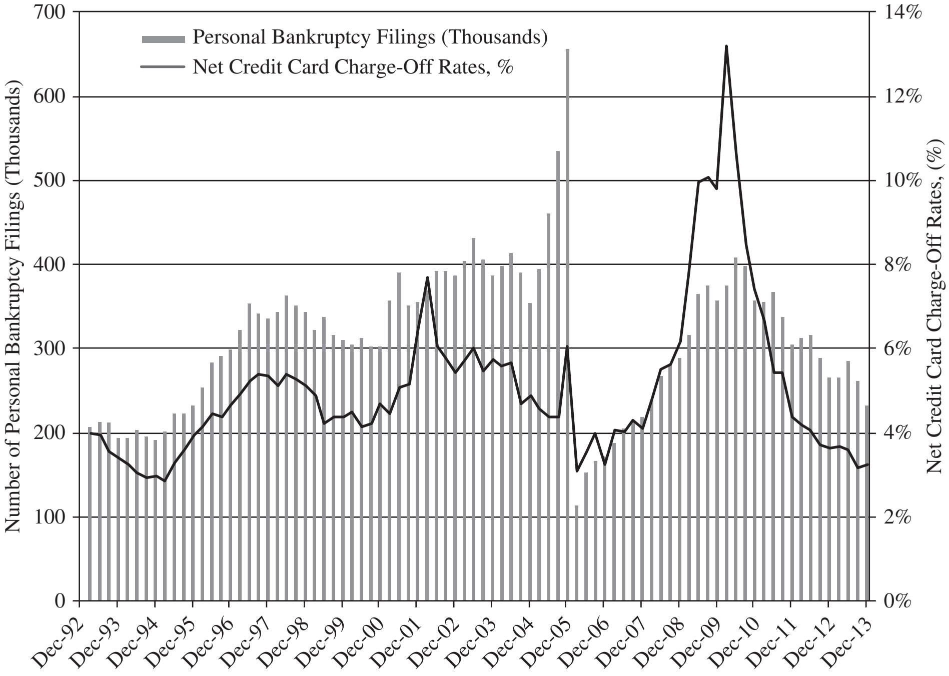
Credit cards are attractive because they typically provide higher risk-adjusted returns to the issuing financial institution than other types of loans. Card issuers earn income from three sources: charging cardholders fees, charging interest on outstanding loan balances, and discounting the charges that merchants accept on purchases. CreditCards.com reports that 28 out of 108 credit cards surveyed charge an annual fee at a median cost of $50. Annual fees on cards that charged fees ranged from $18 to $500 per year. On the low end was Wells Fargo Secured Card at $18, and on the high end was the Citi Chairman American Express card at $500. CreditCards.com also reported annual interest rates charged averaged around 15.06 percent, and the discount to merchants ranged from 2 to 5 percent. Even though other interest rates may fall, credit card rates are notoriously sticky. Thus, the spread between the rate charged and a bank's cost of funds widens with declining rates. This has generated criticism that banks use credit cards to gouge customers. In fact, banks have begun to lower loan rates and annual fees, such that many customers can avoid fees entirely and pay interest at rates equal to or slightly above the Wall Street prime rate. Still, in order to generate more revenue, card issuers have been raising late-payment fees to more than $30 per month when they do not receive the monthly payment by the due date.

Credit card lending involves issuing plastic cards to qualifying customers. The cards have preauthorized credit limits that restrict the maximum amount of debt outstanding at any time. An individual can use the card to purchase goods and services from any merchant that accepts the card. Thus, the individual determines the timing and amount of actual borrowing. Many cards can be used in electronic banking devices, such as ATMs, and to make deposits or withdrawals from existing transactions accounts at a bank.

Many issuers view credit cards as a vehicle for generating a nationwide customer base. These issuers offer extraordinary incentives to induce consumers to accept cards in the hope that they can cross-sell mortgages, insurance products, and eventually securities. Some banks also use the card relationship to solicit money market deposits or small CDs. Credit cards are profitable because many customers are price insensitive. Most banks charge annual user fees, and credit card interest rates are among the highest rates quoted. Still, many borrowers look primarily at the minimum monthly payment required rather than the quoted interest rate. People simply like the convenience of buying goods whenever they wish, and many believe that the periodic interest is too small to give up the spending convenience.

One negative aspect of credit card lending is that losses are among the highest of all loan types. Fraud is prevalent, and many individuals eventually default on their debts because their incomes do not cover their spending habits. The data in Exhibit 15.4

EXHIBIT 15.4 Credit Card Loss Rates and Personal Bankruptcy Filings, 1993–2013



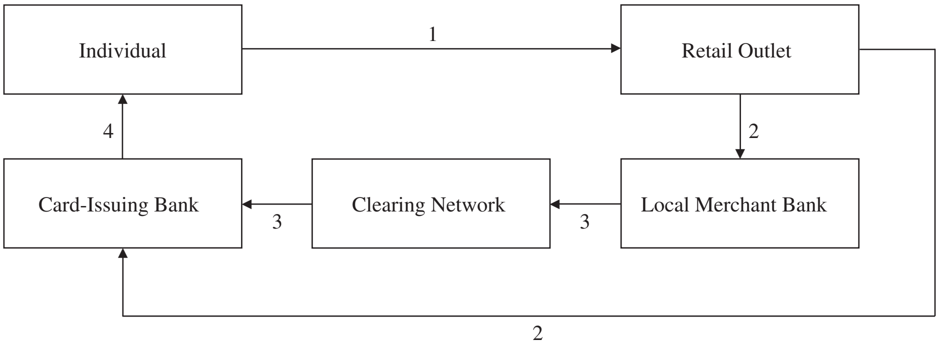
Source: FDIC Quarterly Banking Profile. http://www2.fdic.gov/qbp/index.asp.

document recent trends in credit card charge-off rates that banks keep on their books, as well as trends in the number of personal bankruptcy filings. Note the increase in both charge-offs and the number of personal bankruptcies during the recessions of 1990–1991 and 2000–2001. Note also that the sharp increase in both measures after 1994 occurred during a strong period of growth in the U.S. economy, when loan quality improved and more people were working and personal incomes rising. Many analysts believe that individuals' access to credit card debt is too easy and that, culturally, there is no longer a great stigma associated with filing for bankruptcy. For many, credit cards represent a low-cost way to start over. The dramatic increase in bankruptcy filings in 2005 occurred because Congress approved more stringent bankruptcy laws and individuals rushed to file under the older, more generous, rules. During the housing crisis of 2006–2008, bankruptcy filings and credit card charge-offs once again rose.

Interestingly, the charge-off data are even worse when loss rates on securitized credit card loans are recognized. The charge-off rate for securitized credit cards, according to Moody's, is around 1.5 percent higher. Also, the data are potentially misleading, because there are no industry standards regarding when to recognize a loss. Legally, lenders can wait up to 209 days after an account is bankrupt to charge it off. Some lenders charge off bankrupt accounts immediately, while others wait the maximum 209 days.

Credit Card Systems and Profitability. The returns to credit card lending depend on the specific roles that a bank plays. According to Federal Reserve classifications, a bank is called a card bank if it administers its own credit card plan or serves as the primary regional agent of a major credit card operation, such as Visa or MasterCard. By contrast, a noncard bank operates under the auspices of a regional card bank and does not issue its own card. Noncard banks do not generate significant revenues from credit cards.

EXHIBIT 15.5 **Credit Card Transaction Process**



Steps	Fees
1. Individual credit card purchase	1. None
2. Retail store deposits credit card receipt or submits electronically.	2. Merchant bank "discounts" the receipt by 2–4 percent, crediting the retail store 96–98 percent of the sale.
3. Local merchant bank sends transaction to the credit card clearing system which route to the individual card holder	3. The bank who issued the card charges the merchant bank 1–2 percent of the amount of the transaction.
4. The bank who issued the card send a detailed statement to the individual card holder.	4. The bank who issued the card charges the individual card holder an annual fee and interest if applicable.

Source: Michael Weinstein, "Credit Card Business Mushrooms at Large Banks," *American Banker*, August 14, 1986.

The types of revenues available are described in Exhibit 15.5, which summarizes the clearing process for a credit card transaction. Once a customer uses a card, the retail outlet submits the sales receipt to its local merchant bank for credit. A retailer may physically deposit the slip or electronically transfer the information via a card-reading terminal at the time of sale. The merchant bank discounts the sales receipt by 2 to 5 percent as its fee. Thus, a retailer will receive only $97 credit for each $100 sales receipt if the discount is 3 percent. If a merchant bank did not issue the card, it sends the receipt to the card-issuing bank through a clearing network, paying an interchange fee. The card-issuing bank then bills the customer for the purchase. Most card revenues come from issuing the card that a customer uses. The bank earns interest at rates ranging from 2.9 to 28 percent and normally charges each individual an annual fee for use of the card. As mentioned earlier, interest rates are sticky. When money market rates decline and lower a bank's cost of funds, the net return on credit card loans increases because credit card rates do not fall coincidentally. Interest income and annual fees constitute approximately 80 percent of credit card revenues. The remaining 20 percent are merchant discounts.

Overdraft Protection and Open Credit Lines. Revolving credit also takes the form of overdraft protection against checking accounts. A bank authorizes qualifying individuals to write checks in excess of actual balances held in a checking account up to a prespecified limit. The customer must pay interest on the loan from the date of the draft's receipt and can repay the loan either by making direct deposits or periodic payments. One relatively recent innovation is to offer open credit lines to affluent individuals whether or not they have an existing account relationship. These loans are the functional equivalent of loan commitments to commercial customers. In most instances, the bank provides customers with special checks that activate a loan when the checks are presented for payment. The maximum credit available typically exceeds that for overdraft lines, and the interest rate floats with the bank's base rate.

Mortgage Loans. A mortgage is a legal document through which a borrower gives a lender a lien on real property as collateral against a debt. If the borrower defaults, the lender can exercise the lien and claim the property. Generally, a borrower has the right of redemption, whereby foreclosure is prevented if the debt is repaid within a reasonable time after default.

Banks can make conventional mortgages or mortgages insured by the Federal Housing Authority or Veterans Administration. These last two carry long maturities and require small down payments by borrowers. They are costly in terms of officer time, because management must complete considerable paperwork before the loans are officially approved. Mortgages generally pay principle and interest monthly for maturities ranging from 10, 15, or 30 years.

There are many different types of mortgage loans, including fixed rate, variable rate, and even a **reverse mortgage** or a home equity conversion mortgage. A reverse mortgage is a loan that allows the borrower to convert the equity in their home to cash payments without selling their home. Most often, these are monthly payments, which increase the principle loan balance each time a cash payment is taken. A very similar loan would be a home equity loan (discussed below), in which the borrower takes a lump sum loan against the equity in their home. A reverse mortgage can be a reasonable option for an older couple wanting to use the equity in their home to supplement their retirement savings. However, careful planning must be employed to avoid debt that cannot be repaid.

The credit analysis of single-family residential mortgages resembles that of any consumer loan. Most mortgages are amortized with monthly payments, including both principal and interest. Because of the long maturity, mortgage lenders look carefully at the borrower's cash flow, character, and willingness to repay. The evaluation concentrates on three significant features of the loan: the appraised property value, the borrower's down payment, and the borrower's cash flow relative to required interest and principal payments. Mortgage lenders assume less credit risk when the down payment is high and debt service payments are small relative to the buyer's income.

Although the financial crisis of 2008 focused a bright light on housing and mortgage markets, mortgages are generally the lowest-risk consumer loans and have very low default rates. The introduction of subprime loans prior to the financial crisis as well as a significant relaxation in credit standards and documentation meant that many of these poorly underwritten loans did go bad. The majority of homeowners, however, owe much less than their property is worth and pay their mortgage loans on time consistently.

The Wall Street Reform and Consumer Protection Act of 2010 (Dodd–Frank Act) changed real estate lending, especially mortgage lending, rather dramatically. The Act effectively required the implementation of a qualified mortgage. Effective January 2014, the Consumer Financial Protection Bureau requires mortgage lenders to assess a borrower's "Ability-to-Repay" the mortgage. The rule is designed to ensure lenders offer mortgages that consumers can actually afford to repay. A **qualified mortgage** is a mortgage that charges less than 3 percent in fees; contains no risky features, such as negative amortization; provides for a maximum loan term of 30 years; and meets one of three criteria established by the Consumer Financial Protection Bureau:

1. A loan that reflects a debt-to-income ratio of 43% or less
2. Any loan that is eligible for purchase, guarantee, or insurance by a GSE, FHA, VA, or USDA regardless of the debt-to-income ratio
3. A mortgage loan made by a smaller financial institution that is held on the books of that financial institution, as long as the lender has verified the borrower's debt-to-income ratio

Although these rules are designed to protect consumers, the negative side effect is that it is much more difficult to obtain a mortgage for those with less than perfect credit. Many experts are concerned that these rules will negatively impact the housing market and those with fewer financial resources.

Home Equity Loans and Credit Cards. Home equity loans grew from virtually nothing in the mid-1980s to more than $600 billion by the end of in 2009, before declining after the financial crisis to $475 billion at the end of 2013. Much of the growth was spurred by the Tax Reform Act of 1986, which limited deductions for consumer loan interest paid by individuals unless the loan was real estate related. Home equity loans meet the tax deductibility requirements (with some limits) because they are secured by equity in an individual's home. The bulk of these loans are structured as open credit lines where a consumer can borrow up to 80 percent of the market value of the property less the principal outstanding on the first mortgage. Individuals borrow simply by writing checks or using a credit card, pay interest only on the amount borrowed, pay 1 to 2 percent of the outstanding principal each month, and can repay the remaining principal at their discretion. In most cases, the loans carry adjustable rates tied to the bank's base rate. Because consumers can take out only one such loan, the lender that initiates the credit relationship has locked in a long-term customer.

These credit arrangements combine the risks of a second mortgage with the temptation of a credit card, a potentially dangerous combination. Home equity loans place a second lien on a borrower's home. If the individual defaults, the creditor can foreclose so that the borrower loses his or her home. Still, ready access to the financing through credit cards encourages consumers to spend and potentially take on too much debt. During the slow growth period following September 11, 2001, many individuals used home equity loan funding to maintain lifestyles in the hope of better future prospects down the road. Federal Reserve studies have generally shown that consumers borrow primarily to improve their existing home, consolidate debts, or finance a child's college education. In either case, the typical home equity loan represents a large initial borrowing that is paid down over several years. With the decline in real estate values after the financial crisis in 2008, the number and amount of home equity loans fell dramatically.

In order to attract customers, many banks price these loans at prime or just 1 to 2 percent over prime, which is well below other consumer loan rates. Some require only interest payments during the first few years. Low rates have been justified by historically low losses and good collateral, which is a home. Of course, delinquency rates increase during economic downturns when real estate values often decline. In addition, there is always the risk that customers will borrow the maximum, especially under credit card arrangements, for short-run lifestyle expenses. If they take on too much debt and interest rates increase or housing values decline, many borrowers may default, and lenders will see losses increase. The decline in housing values in 2007–2008 created an environment where many borrowers found that they had negative equity in their homes (i.e., the mortgage balance outstanding exceeded the appraised value of the home), which led to rising mortgage defaults and foreclosures. In response, many banks either eliminated outstanding home equity lines of credit (HELOC) agreements or reduced the amount of credit available to individual customers. Because housing values in some areas of the country fell much more than in other areas, the more dramatic actions occurred where home prices had historically risen the most.

Noninstallment Loans

A limited number of consumer loans require a single principal and interest payment. Typically, the individual's borrowing needs are temporary. Credit is extended in anticipation of repayment from a well-defined future cash inflow. Bridge loans are representative of single-payment consumer loans. Bridge loans often arise when an individual borrows funds for the down payment on a new house. The loan is repaid when the borrower sells an existing home, hence the term "bridge." The quality of the loan depends on the certainty of the timing and amount of the anticipated net cash inflow from the sale.

Subprime Loans

Many lenders long ago reached the conclusion that they could earn high risk-adjusted returns by lending to riskier borrowers. Large bank holding companies, such as Washington Mutual (since merged with JPMorgan Chase) and Countrywide Financial (since merged with Bank of America), and firms such as GE Capital, aggressively pursued high-risk borrowers for whom they could charge higher fees and rates. They also bought consumer finance subsidiaries that make loans to individuals that a bank would not traditionally make and keep on-balance sheet. Of course, subprime lenders charge higher rates and have more restrictive covenants.

During the early 2000s, one of the hottest growth areas was subprime mortgage loans. These higher-risk loans were labeled "B," "C," and "D" credits, and were also popular in auto and home equity lending. These loans carry the same risk as those originated through consumer finance companies. Although no precise definitions exist, "B," "C," and "D" credits exhibit increasingly greater risk and must be priced consistently higher than prime-grade loans. Paul Finfer of Franklin Acceptance Corporation, a subprime auto lender, provided the following definitions:[6]

B: Typically scores 600+ under the Fair Isaac credit scoring system (FICO); has some 90-day past dues but is now current. When extended credit, delinquencies are 2–5 percent, repossessions are 2.5–6 percent, and losses are 1.5–3 percent.

C: Typically scores between 500 and 600 under the Fair Isaac system and has had write-offs and judgments. The borrower has made subsequent payments of some or all of the loans. When extended credit, delinquencies are 5–10 percent, repos are 5–20 percent, and losses are 3–10 percent.

D: Typically scores between 440 and 500 under the Fair Isaac system; has charge-offs and judgments that have not been repaid, and has not made payments on these loans. When extended credit, delinquencies are 10–20 percent, repos are 16–40 percent, and losses are 10–20 percent.

What Happens When Housing Prices Fall?

Subprime loans can be attractive when housing values are rising. Even those individuals who are overextended and cannot make their monthly principal and interest payments in full, can often sell the home or refinance and withdraw equity to pay the debts if the price increases are sufficiently high. Of course, the opposite occurs when housing prices fall. Data

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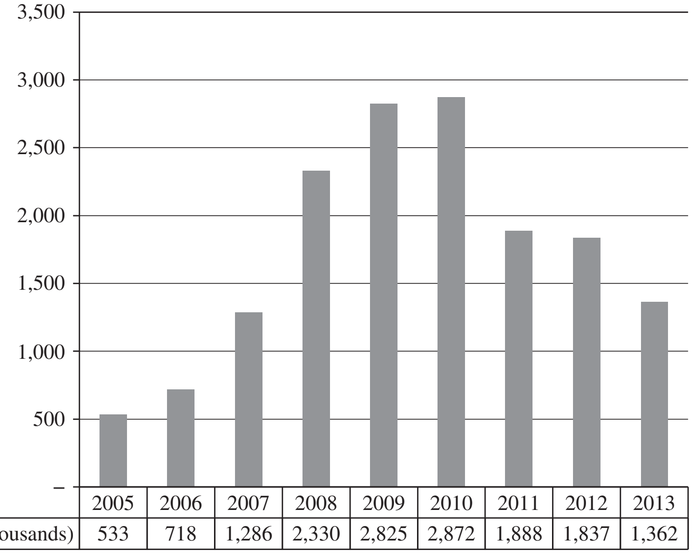
[6] Definitions appear in Steve Cocheo (1996).

EXHIBIT 15.6 **U.S. Properties with Foreclosures Filings (Thousands)**



	2005	2006	2007	2008	2009	2010	2011	2012	2013
Foreclosures Filings (thousands)	533	718	1,286	2,330	2,825	2,872	1,888	1,837	1,362

Source: 1.4 Million U.S. Properties with Foreclosure Filings in 2013 Down 26 Percent to Lowest Annual Total Since 2007, http://www.realtytrac.com/Content/foreclosure-market-report/2013-year-end-us-foreclosure-report-7963.

from Corelogic Home Price Index, from the pre-2007 recession peak to the post-recession trough shows the average decline in the home price index ranged across states from well below 15 percent in Texas, Oklahoma, Arkansas, Louisiana, Mississippi, Tennessee, Kentucky, North Caroline, Nebraska, South and North Dakota, as well as a few other states, to well over 40 percent in Nevada, California, Arizona, Idaho, Florida, and Michigan. Generally, the largest declines occurred in states where housing speculation was the greatest in preceding years.

During 2008–2010, banks were forced to charge off historically high amounts of mortgage loans as delinquencies and foreclosures skyrocketed. In fact, many investors that owned mortgage-backed securities had to write down the values of their holdings as real estate related assets generally fell in value. Exhibit 15.6 shows the increase in foreclosure filings from 2008–2010. During that period, many borrowers had negative equity in their homes to such an extent that there arose a booming business in helping individuals "walk away" from their homes. In essence, borrowers simply handed keys back to the lenders in lieu of making mortgage payments. Foreclosure filings improved from 2011 through 2013 but remain well above pre-financial crisis levels.

Consumer Credit Regulations

The federal government has approved a wide range of regulations to protect individuals when obtaining credit. Most of the regulations address discrimination, billing practices, customer liability, and the proper disclosure of finance charges and reasons for denying credit. The need for such regulation arose from abuses of the credit system. At one time, many lenders refused to extend credit to women who did not have a personal credit record because loans were credited to a husband. Loans were sometimes denied because of the borrower's race or age. Lenders would refuse to extend credit in deteriorating neighborhoods and made it difficult for borrowers to determine the effective cost of credit. This section discusses several important regulations that addressed these abuses.

Equal Credit Opportunity

Ideally, credit will be available to any borrower who satisfies acceptable risk criteria. To ensure this, Congress passed the Equal Credit Opportunity Act (ECOA), which makes it illegal for lenders to discriminate against potential borrowers because of race, religion, sex, marital status, age, or national origin. The Federal Reserve's Regulation B specifies conditions that must be met in structuring credit applications and establishing creditworthiness. In doing so, it focuses on three different aspects of credit transactions. First, it indicates what information a creditor may not request. Implicitly, this information is not relevant to the credit evaluation and would, if available, be used primarily to discriminate. Second, it specifies how certain information can be used in credit scoring systems. Credit scoring models are discussed later in the chapter. Finally, it provides for proper credit reporting. For example, lenders must include spouses in the credit records whenever a spouse is jointly liable for any debts. Lenders must also notify applicants of adverse action on a loan within 30 days of the request. The following list identifies specific items that are prohibited or required.

Prohibited Information Requests

1. Lenders may not request information about the applicant's marital status unless credit is being requested jointly, the spouse's assets will be used to repay the loan, or the applicant lives in a community property state.[7] This popularized the term *cohabitant* on many application forms.
2. Lenders may not request information about whether alimony, child support, and public assistance payments are included in an applicant's reported income. Applicants can voluntarily provide this information if they believe it will improve perceived creditworthiness.
3. Lenders may not request information about a woman's childbearing capability and plans, or birth control practices.
4. Lenders may not request information about whether an applicant has a telephone.

Credit Scoring Systems

1. Credit scoring systems are acceptable if they do not require prohibited information and are statistically justified. The statistical soundness should be systematically reviewed and updated.
2. Credit scoring systems can use information about age, sex, and marital status as long as these factors contribute positively to the applicant's creditworthiness.

Credit Reporting

1. Lenders must report credit extended jointly to married couples in both spouses' names. This enables both individuals to build a credit history.
2. Whenever lenders reject a loan, they must notify applicants of the credit denial within 30 days and indicate why the request was turned down. An applicant may request written notification, and the lender must comply.

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[7] In community property states, couples own assets jointly. Assets listed on an application are often only partly owned by a married applicant, which would restrict a lender's access to collateral.

In practice, the ECOA includes many complex provisions that are difficult to comprehend. To make compliance easier, the Federal Reserve provides model loan application forms that conform to Regulation B.

Truth in Lending

The intent underlying truth in lending legislation is for lenders to disclose consumer loan finance charges and interest rates in a standardized format. This enables borrowers to compare credit terms and the cost of credit between loans and between lenders. Truth in lending regulations apply to all loans up to $25,000 extended to individuals, where the borrower's primary residence does not serve as collateral.[8]

Legislation arose because lenders quoted interest rates in many different ways and often included supplemental charges in a loan that substantially increased the actual cost. Consumers could not easily determine how much they were paying and what the effective interest rate was on a loan. This confused borrowers and potentially led to inferior credit decisions.

Historically, consumer loan rates were quoted as add-on rates, discount rates, or simple interest rates. Add-on rates are applied against the entire principal of installment loans. The gross interest is added to the principal with the total divided by the number of periodic payments to determine the size of each payment. For example, suppose that a customer borrows $3,000 for one year at a 12 percent add-on rate, with the loan to be repaid in 12 equal monthly installments. Total interest equals $360, the monthly payment equals $280, and the effective annual interest cost is approximately 21.5 percent. Exhibit 15.7 presents these calculations and similar ones for discount rate and simple interest examples.

With the discount rate method, the quoted rate is applied against the sum of principal and interest, yet the borrower gets to use only the principal, as interest is immediately deducted from the total loan. Exhibit 15.7 considers a one-year loan with a single $3,000 payment at maturity. The borrower receives only $2,640, or the total loan minus 12 percent discount rate interest. The effective annual percentage rate (APR), equals 13.64 percent. The bottom part of Exhibit 15.7 demonstrates simple interest calculations. Simple interest is interest paid on only the principal sum. A $3,000 loan at 12 percent simple interest per year produces $360 in interest, or a 12 percent effective rate. At the bottom of the exhibit, the quoted rate is adjusted to its monthly equivalent, which is applied against the unpaid principal balance on a loan. A $3,000 loan, repaid in 12 monthly installments at 1 percent monthly simple interest, produces interest under $200. The monthly interest rate equals 1 percent of the outstanding principal balance at each interval. Depending on how it is quoted, a 12 percent rate exhibits a noticeably different effective rate, ranging from 12 percent to 21.55 percent in the examples.

Truth in lending legislation requires that lenders disclose to potential borrowers both the total finance charge and an APR. The total finance charge equals the dollar amount of interest costs plus all supplemental charges that are imposed as part of a loan, including loan origination fees, service charges, and insurance premiums if the lender demands the customer take out a policy as part of the agreement. The APR equals the total finance charge computed against the loan balance as a simple annual interest rate equivalent.

The regulations also stipulate that advertisements must include all relevant terms of a loan if any single payment or pricing feature is mentioned. These terms include the

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[8] The Truth in Lending Act, passed in 1968, is implemented through the Federal Reserve's Regulation Z. Originally, it applied to agricultural loans as well as personal credit. In 1980, Congress exempted agriculture from the reporting requirements.

EXHIBIT 15.7 Comparison of Interest Rate Quotes

Add-On Rate

$3,000 loan for one year, 12% add-on rate, repaid in 12 equal monthly installments

Interest charge: $360

$$\text{Monthly payment} = \frac{[0.12(\$3{,}000) + \$3{,}000]}{12} = \frac{\$3{,}360}{12} = \$280$$

$$\text{Effective interest rate (i):} \quad = \sum_{t=1}^{12} \frac{\$280}{(1+i)^t} = \$3{,}000$$

$$i = 1.796\%$$

$$\text{Annual percentage rate (APR)} = 21.55\%$$

Discount Rate

$3,000 to be repaid at the end of one year, 12% discount rate

Interest charge: 0.12($3,000) = $360

Year-end payment: $3,000

$$\text{Annual percentage rate (APR) } (i_n)\text{:} \quad \$2{,}640 = \frac{\$3{,}000}{(1+i_n)}$$

$$i_n = 13.64\%$$

Simple Interest Rate

$3,000 loan for one year, 12% simple interest, repaid at end of year in one payment

$$\text{Interest } (i_s)\text{:} \; = \; \$3{,}000(0.12)(1) = \$360$$

$$\$3{,}000 = \frac{\$3{,}360}{(1+i_s)}$$

$$i_s = 12\%$$

$3,000 loan for 1 year, 1% monthly simple interest rate, repaid in 12 equal monthly installments

Repayment Schedule

End of Month	Monthly Payment	Interest Portion	Principal	Outstanding Principal Balance
January	$266.55	$30.00	$236.55	$2,763.45
February	266.55	27.63	238.92	2,524.53
March	266.55	25.25	241.30	2,283.23
April	266.55	22.83	243.72	2,039.51
May	266.55	20.40	246.15	1,793.36
June	266.55	17.93	248.62	1,544.74
July	266.55	15.45	251.10	1,293.64
August	266.55	12.94	253.61	1,040.03
September	266.55	10.40	256.15	783.88
October	266.55	7.84	258.71	525.17
November	266.55	5.25	261.30	263.87
December	266.51	2.64	263.87	0.00
Total	$3,198.56	$198.56	$3,000.00	

Effective interest rate: Monthly rate = 1%

Annual percentage rate (APR) = 12%

$$\text{Monthly payment} = \$3{,}000 \Big/ \sum_{i=1}^{12} \frac{1}{(1.01)^t}$$

finance charge, APR, the dollar magnitude of any down payment requirement, the number of payments, and final maturity. This prevents a lender from using one very attractive feature, such as no required down payment, to lure customers without disclosing all the terms. Assuming the borrower does not pay additional fees, the effective interest rates in Exhibit 15.7 are APRs.

Fair Credit Reporting

Lenders can obtain information on an individual's prior credit relationships from local credit bureaus when evaluating consumer loan requests. The Fair Credit Reporting Act enables individuals to examine their credit reports provided by credit bureaus. If any information is incorrect, the individual can have the bureau make changes and notify all lenders who obtained the inaccurate data. If the accuracy of the information is disputed, an individual can permanently enter into the credit file his or her interpretation of the error. The credit bureau, when requested, must also notify an individual which lenders have received credit reports.

There are three primary credit reporting agencies: Equifax, Experian, and Trans Union. Unfortunately, the credit reports that they produce are quite often wrong. One problem is that these credit bureaus make little effort to verify the information they receive from retailers, banks, and finance companies. In addition, the credit bureaus do not rush to correct their records when errors are found. A study released by the Federal Trade Commission in early 2013 indicated that 1 in 5 consumers' credit reports contained errors and that 5 percent had errors that would increase the cost of obtaining credit.[9] In 2013, Equifax was order to pay an Oregon woman $18.6 million for not correcting inaccurate information on her credit report. This award included $18.4 million in punitive damages.

For consumers, a credit score is like a bond rating. It is a single number that provides information to a lender, insurance company, or employer about the individual's financial performance. Some firms believe that how an individual handles credit reflects on his or her work ethic, willingness to file false claims (insurance), and general character. Get a high credit score, and more credit is available and the borrowing rate is lower. It is thus critical that each person recognize how his or her credit score is calculated and what behaviors can improve or worsen the score. Of course, individuals who do not use credit—typically, many of the elderly—do not have a credit score and often cannot borrow or even rent a car.

The data in Exhibit 15.8 demonstrate the factors that contribute to the credit score and the relative importance of each factor, expressed as a percentage, in calculating the score. Importantly, an individual's payment history—who provides credit, whether payments are made on time, etc.—contributes 35 percent of the score. The amounts owed relative to income contribute another 30 percent. Consumers who want to increase their score should not pay late or file for bankruptcy. They should use a small portion of their available credit, not continually apply for new credit (the number of applications counts against the individual); obtain credit from different sources (bank loans, credit cards, and a mortgage); and maintain a lengthy credit history.

Exhibit 15.9 provides a sample credit report for a hypothetical Alfonso B. Doe. It lists the names of companies that provide credit, the account numbers, the type of credit—whether it is for an individual account, joint account, and so on—the date the account was opened, the date of the last activity, the highest amount charged over the time

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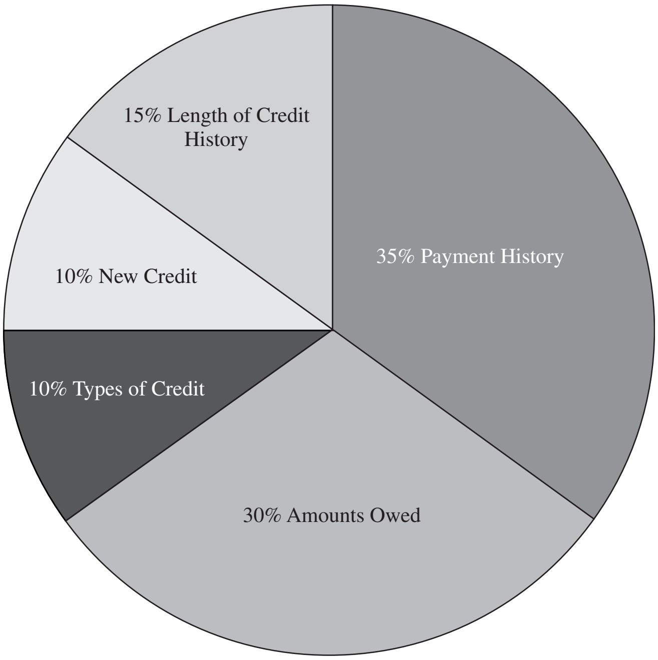
[9] See Gordon, Marcy, "Study: 1 in 5 Consumers Had Error in Credit Report." *The Associated Press*, February 11, 2013, http://www.dailyfinance.com/2013/02/11/credit-report-errors-ftc-agencies-bureaus/.

EXHIBIT 15.8 **Factors Contributing to an Individual's Credit Score**



Source: Fair Isaac, www.myfico.com.

period or the maximum amount of credit available, repayment terms, the key items related to the outstanding loan balance as of the date reported, whether any amount is past due, and the borrower's previous payment history. Lenders are especially interested in this part of the borrower's credit history as it indicates the historical record of payment and a borrower's propensity to be late or not pay. The courthouse record similarly indicates under public information whether the applicant has declared bankruptcy or whether any liens or judgments have been filed against him or her. Finally, the bottom indicates the companies that have requested the applicant's credit history and the dates of inquiry. Too many voluntary inquiries (where the applicant requests a credit card) often indicate a high credit risk.[10]

Community Reinvestment

The Community Reinvestment Act (CRA) was passed in 1977 to prohibit redlining and to encourage lenders to extend credit within their immediate trade area and the markets where they collect deposits. Redlining is the practice of not extending credit within geographic areas that are believed to be deteriorating. Its name comes from the reputed practice of outlining in red those areas of a city where a lender would automatically refuse credit because of location. It discriminates against borrowers from economically declining neighborhoods that represent the redlined areas. These areas typically represent low-income and minority neighborhoods. Community reinvestment has played an

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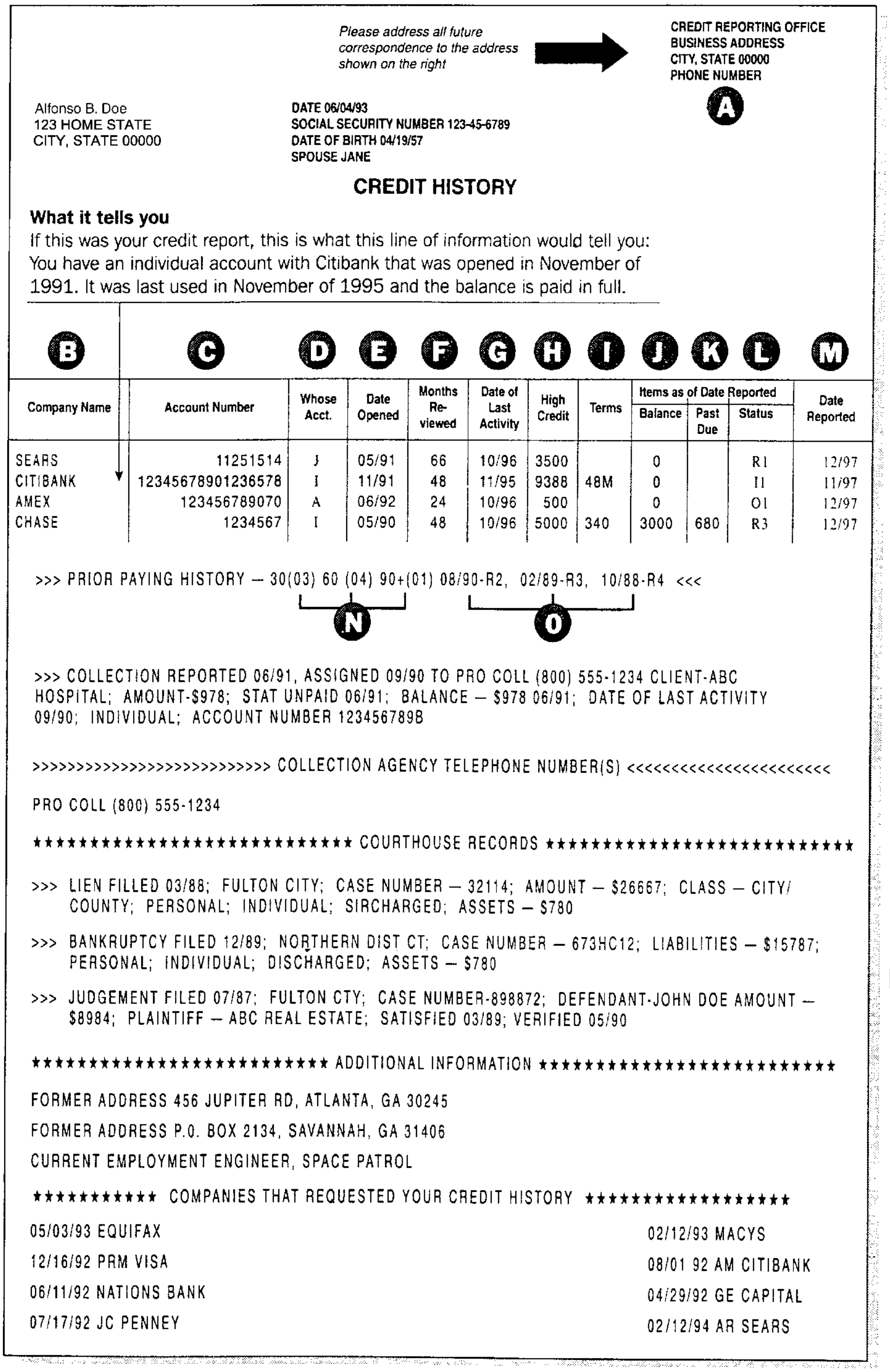
[10] Individuals can readily obtain a copy of their personal credit report over the Internet. They can also find instructions as to how to read a credit report and improve their credit score. See www.myvesta.org and www.fairisaac.com. Basic credit reports are now available free of charge once each year.

EXHIBIT 15.9 **Sample Credit Report**


A
B
C
D
E
F
G
H
I
J
K
L
M
N
O

Please address all future correspondence to the address shown on the right

CREDIT REPORTING OFFICE
BUSINESS ADDRESS
CITY, STATE 00000
PHONE NUMBER

Alfonso B. Doe
123 HOME STATE
CITY, STATE 00000

DATE 06/04/93
SOCIAL SECURITY NUMBER 123-45-6789
DATE OF BIRTH 04/19/57
SPOUSE JANE

CREDIT HISTORY

What it tells you

If this was your credit report, this is what this line of information would tell you: You have an individual account with Citibank that was opened in November of 1991. It was last used in November of 1995 and the balance is paid in full.

Company Name	Account Number	Whose Acct.	Date Opened	Months Re-viewed	Date of Last Activity	High Credit	Terms	Items as of Date Reported			Date Reported
								Balance	Past Due	Status	
SEARS	11251514	J	05/91	66	10/96	3500		0		R1	12/97
CITIBANK	12345678901236578	I	11/91	48	11/95	9388	48M	0		I1	11/97
AMEX	123456789070	A	06/92	24	10/96	500		0		O1	12/97
CHASE	1234567	I	05/90	48	10/96	5000	340	3000	680	R3	12/97

>>> PRIOR PAYING HISTORY – 30(03) 60 (04) 90+(01) 08/90-R2, 02/89-R3, 10/88-R4 <<<

>>> COLLECTION REPORTED 06/91, ASSIGNED 09/90 TO PRO COLL (800) 555-1234 CLIENT-ABC HOSPITAL; AMOUNT-$978; STAT UNPAID 06/91; BALANCE – $978 06/91; DATE OF LAST ACTIVITY 09/90; INDIVIDUAL; ACCOUNT NUMBER 123456789B

>>>>>>>>>>>>>>>>>>>>>>>>>>>> COLLECTION AGENCY TELEPHONE NUMBER(S) <<<<<<<<<<<<<<<<<<<<<<

PRO COLL (800) 555-1234

****************************** COURTHOUSE RECORDS *****************************

>>> LIEN FILLED 03/88; FULTON CITY; CASE NUMBER – 32114; AMOUNT – $26667; CLASS – CITY/COUNTY; PERSONAL; INDIVIDUAL; SIRCHARGED; ASSETS – $780

>>> BANKRUPTCY FILED 12/89; NORTHERN DIST CT; CASE NUMBER – 673HC12; LIABILITIES – $15787; PERSONAL; INDIVIDUAL; DISCHARGED; ASSETS – $780

>>> JUDGEMENT FILED 07/87; FULTON CTY; CASE NUMBER-898872; DEFENDANT-JOHN DOE AMOUNT – $8984; PLAINTIFF – ABC REAL ESTATE; SATISFIED 03/89; VERIFIED 05/90

*************************** ADDITIONAL INFORMATION ***************************

FORMER ADDRESS 456 JUPITER RD, ATLANTA, GA 30245

FORMER ADDRESS P.O. BOX 2134, SAVANNAH, GA 31406

CURRENT EMPLOYMENT ENGINEER, SPACE PATROL

*********** COMPANIES THAT REQUESTED YOUR CREDIT HISTORY ******************

05/03/93 EQUIFAX
12/16/92 PRM VISA
06/11/92 NATIONS BANK
07/17/92 JC PENNEY
02/12/93 MACYS
08/01 92 AM CITIBANK
04/29/92 GE CAPITAL
02/12/94 AR SEARS

ABC's of a credit report

A. The name and address of the office you should contact if you have any questions or disagreement with your credit report.

B. Identifies the business that is reporting the information

C. Your account number with the company reporting

D. Indicates who is responsible and type of payment participation with the account

E. Month and year account is opened with the credit grantor

F. Number of months account payment history has been reported

G. Date of last activity on the account and may be the date of last payment or the date of last change

H. Highest amount charged or the credit limit

I. Represents number of installments (M=months) or monthly payments

J. Amount owed on the account at the time it was reported

K. Indicates any amount past due at the time the information was reported

L. Status and type of account, and timeliness of payment

M. Date of last account update

N. Number of times account was either 30/60/90 days past due

O. Date two most recent delinquencies occurred plus date of most severe delinquency

Source: *The State* (newspaper), Columbia, SC, November 1997.

important role in the interstate banking movement. Out-of-state banks that acquire local banks must commit to continued lending in the area and not use acquired banks simply as deposit gatherers.

The Financial Institutions Reform, Recovery, and Enforcement Act (FIRREA) of 1989 raised the profile of the CRA by mandating public disclosure of bank lending policies and regulatory ratings of bank compliance. Specifically, regulators now rate banks as *outstanding*, *satisfactory*, *needs improvement*, or *in substantial noncompliance* in terms of their compliance with nondiscriminatory lending practices. Regulators publish CRA ratings with the intent to put pressure on banks that are not in compliance. It is assumed that negative publicity will harm their image and subsequent performance. Historically, few banks have been rated as outstanding, and only a very small number have been rated in substantial noncompliance. Many bankers cite these ratings when arguing that the costs of CRA compliance exceed the benefits to aggrieved consumers. Consumer groups, by contrast, argue that the regulators are too lenient in classifying banks.

Regulators must also take lending performance into account when evaluating a bank's request to charter a new bank, acquire a bank, open a branch, or merge with another institution. Consumer groups now routinely use claims of noncompliance under CRA to delay such requests, forcing the bank to demonstrate how performance will be improved. It is both good business and appropriate for every bank to comply with nondiscrimination legislation.

Bankruptcy Reform

Individuals who cannot repay their debts on time can file for bankruptcy and receive court protection against creditors. Court protection takes the form of exempting selected personal assets from creditors' claims and providing for an orderly repayment of debts. In 1978 and 1985, Congress modified the Federal Bankruptcy Code. The 1978 legislation liberalized the volume and types of assets that individuals could exempt and made unsecured loans extremely risky.

Individuals can file for bankruptcy under Chapter 7 or Chapter 13. Chapter 7 authorizes individuals to liquidate qualified assets and distribute the proceeds to creditors. The 1978 Bankruptcy Reform Act specifically exempted some assets—including an automobile, household furnishings, some jewelry, and a fraction of the individuals' equity in a primary residence—from liquidation. In some states, exemptions are even more liberal, and individuals can take advantage of the broadest exemptions.[11] An individual must pay all taxes, alimony, and child support owed in full. Cash received from the sale of nonexempt assets is allocated to other creditors on a pro rata basis, with secured creditors paid first. Because the list of exemptions was so broad after 1978, unsecured creditors rarely received any payment. Once the cash is distributed, the remaining debts are discharged.

Under Chapter 13, an individual works out a repayment plan with court supervision. The individual gets to keep his or her assets but commits to repay selected debts out of future earnings according to a schedule approved by all secured creditors. Once the scheduled debts are repaid, the remaining debt is discharged. Under the 1978 regulations, unsecured creditors again had no recourse and often received nothing under Chapter 13.

Reforms to the bankruptcy code in 1985 made it more costly for an individual to walk away from outstanding debt. Under Chapter 13 plans, lenders can obtain a court order

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[11] The 1978 regulations actually allowed one spouse to file for bankruptcy in state court while the other spouse filed in federal court, thereby doubling their exemptions. The 1985 provisions force a couple to file in just one jurisdiction.

that assigns a large fraction of a debtor's income to repay debt for three years after the date of filing. The reforms shortened the list of exempt assets and permitted the court to switch a Chapter 7 filing to Chapter 13 when it determined that an individual who was financially able was using bankruptcy simply to avoid paying all debts. Unsecured lenders were also protected by provisions that forced borrowers to repay all credit card purchases made during the three weeks prior to filing for bankruptcy.

In 1995, Congress created a bankruptcy commission that would recommend changes in bankruptcy law. By 1997, approximately 70 percent of bankruptcy filers selected Chapter 7, with the remaining 30 percent selecting Chapter 13. Clearly, many individuals used bankruptcy as a financial planning tool to get out of debt. The stigma was largely gone. This presents serious problems for lenders given recent consumer loan charge-off experience and the increase in bankruptcy filings noted in Exhibit 15.4. Many analysts believe that the U.S. bankruptcy process is abused too frequently, with up to 10 percent of filings being fraudulent and annual losses amounting to around $4 billion. In April 2005, Congress passed bankruptcy reform legislation that made it more difficult for individuals to completely avoid repaying their debts. In particular, an individual whose income exceeds the state median has to file for Chapter 13 and will repay at least a portion of his or her debts. In the past some states did not let creditors take possession of an individual's home as a result of bankruptcy. The provisions induced many wealthy individuals to buy or build expensive homes in such states in anticipation of bankruptcy. The law retains these protections, but only after the individual has owned the home for 40 months. The law also mandates credit counseling. The reforms make it more difficult to file for bankruptcy and more expensive, as filers would be forced to provide details on their spending habits and would have to earn below median income in their home state to qualify for the best protection.

Credit Analysis

The objective of consumer credit analysis is to assess the risks associated with lending to individuals. Not surprisingly, these risks differ substantially from those of commercial loans. Most consumer loans are quite small, averaging around $8,000. Because the fixed costs of servicing consumer loans are high, banks must generate substantial loan volume to reduce unit costs. This means dealing with a large number of distinct borrowers with different personalities and financial characteristics.

When evaluating loans, bankers cite the five Cs of credit: character, capital, capacity, conditions, and collateral. The most important—yet most difficult to assess—is character. A loan officer essentially must determine the customer's desire to repay a loan. The only quantitative information available is the borrower's application and credit record. If the borrower is a bank customer, the officer can examine internal information regarding the customer's historical account relationship. If the borrower is not a current customer, the officer must solicit information from local credit bureaus or other businesses that have extended credit to the individual. The ECOA stipulates what information can be required and prohibits discrimination. It also mandates how lenders must report information to the credit reporting agencies. Banks also rely heavily on subjective appraisals of the borrower's character. They normally obtain personal references, verify employment, and check the accuracy of the application. This is necessary because fraud is prevalent, and it is relatively easy for an individual to disguise past behavior. If the officer determines that a potential customer is dishonest, the loan is rejected automatically.

Capital refers to the individual's wealth position and is closely related to capacity, an individual's financial ability to meet loan payments in addition to normal living expenses and other debt obligations. For almost all consumer loans, the individual's income serves as the primary source of repayment. A loan officer projects what income will be available after other expenses and compares this with periodic principal and interest payments on the new loan. To ensure adequate coverage, the lender often imposes minimum down payment requirements and maximum allowable debt-service-to-income ratios. The loan officer verifies that the borrower's income equals that stated on the application and assesses the stability of the income source. Conditions refers to the impact of economic events on the borrower's capacity to pay when some income sources disappear as business activity declines.

The importance of collateral is in providing a secondary source of repayment. Collateral may be the asset financed by the loan, other assets owned by the individual, or the personal guarantee of a cosigner on the loan. Collateral gives a bank another source of repayment if the borrower's income is insufficient. Normally, a loan is not approved simply because the collateral appears solid. Often the collateral disappears or deteriorates in value prior to the bank taking possession, as with a damaged or older automobile. Finally, the bankruptcy code enables individuals to protect a wide range of assets from creditors, and it may be difficult to obtain a judgment.

Two additional Cs have been added, reflecting customer relationships and competition.[12] A bank's prior relationship with a customer reveals information about past credit and deposit experience that is useful in assessing willingness and ability to repay. Competition has an impact by affecting the pricing of a loan. All loans should generate positive risk-adjusted returns. However, lenders periodically react to competitive pressures by undercutting competitors' rates in order to attract new business. Still, such competition should not affect the accept/reject decision.

Policy Guidelines

Consumer loans are extended for a variety of purposes. The most common purposes are for the purchase of automobiles, mobile homes, and furniture and appliances, and for home improvement or home equity loans. Before approving any loan, the lending officer requests information regarding the borrower's employment status, periodic income, the value of assets owned, outstanding debts, personal references, and specific terms of the expenditure that generates the loan request. The officer verifies the information and assesses the borrower's character and financial capacity to repay the loan. Because borrowers' personal and financial characteristics differ widely, most banks have formalized lending guidelines. As an example, guidelines for acceptable and unacceptable loans might appear as listed below.

Acceptable Loans

Automobile

1. Limited to current-year models or models less than five years old.
2. Made on an amortizing basis with a minimum 10 percent down payment.
3. Advances against used models should not exceed National Automobile Dealer Association loan value.
4. New automobiles for business purposes are limited to 30-month amortization.
5. Insurance must be obtained and verified with a $250 maximum deductible.

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[12] See Larry White (1990) for a general discussion of the seven Cs of credit.

Boat

1. Limited to current-year models or models less than three years old.
2. Made on an amortizing basis with a minimum 20 percent down payment.
3. Marine survey must be obtained with large craft.
4. Insurance must be obtained and verified.

Home Improvement

1. Loans in excess of $2,500 should be secured by a lien.
2. Loans in excess of $10,000 require a property appraisal and title search.
3. A third lien position is not acceptable.
4. Bank should retain the right to cancel in all cases.

Personal—Unsecured

1. Minimum loan is $2,500.
2. Made only to deposit customers.
3. Limited to 1/12 of the applicant's annual income.

Single Payment

1. Limited to extraordinary purposes.
2. Require a verified, near-term source of repayment.
3. Insurance claims, pending estate settlements, and lawsuit settlements are not acceptable sources of repayment.

Cosigned

1. Applicant exhibits the potential to be a qualified, long-term bank customer.
2. Both the applicant and cosigner are depositors of the bank.
3. Applicant does not have an established credit history but does have the capacity to pay.
4. Cosigner has qualified credit history and the capacity to pay.
5. Cosigner is informed that the bank is relying totally on the cosigner for repayment in case of default.

Unacceptable Loans

1. Loans for speculative purposes.
2. Loans secured by a second lien, other than home improvement or home equity loans.
3. Any participation with a correspondent bank in a loan that the bank would not normally approve.
4. Accommodation loans to a poor credit risk based on the strength of the cosigner.
5. Single-payment automobile or boat loans.
6. Loans secured by existing home furnishings.
7. Loans for skydiving equipment and hang gliders.

Evaluation Procedures: Judgmental and Credit Scoring

Banks employ judgmental procedures and quantitative credit scoring procedures when evaluating consumer loans. In both cases, a lending officer collects information regarding the borrower's character, capacity, and collateral. With a pure judgmental analysis, the loan officer subjectively interprets the information in light of the bank's lending guidelines and accepts or rejects the loan. This assessment can be completed shortly after receiving the loan application and visiting with the applicant. With a pure quantitative analysis, or credit scoring model, the loan officer grades the loan request according to a statistically sound model that assigns points to selected characteristics of the prospective borrower. The model tallies the points—or score—and compares the total with statistically determined accept/reject thresholds.[13] If the total exceeds the accept threshold, the officer approves the loan. If the total is below the reject threshold, the officer denies the loan. Thus, high scores signify low risk and low scores signify higher risk. A lender can specify these thresholds consistent with how much risk it is willing to accept. Typically, the accept score is higher than the reject score. If a score falls within this range, it provides a statistically inconclusive evaluation of the characteristics. If the total falls within this gap, the officer makes a decision based on judgmental factors.

When developing the accept/reject scores, banks must obtain data on applicant characteristics when loans were originally requested, for both accepted and rejected loans. Actual performance on the loans is then evaluated to determine the extent to which different factors influenced the individual's ability to repay. Specifically, the analysis identifies borrower characteristics that have predictive power in determining when loans will be repaid or when borrowers will default. Good models assign high scores to a high fraction of performing loans and low scores to a high fraction of nonperforming loans. The importance of different factors is determined by the weights in the credit scoring formula. Information is generally obtained from prior loan applications and from credit bureaus. For nonmortgage consumer loans, the common borrower characteristics used include the applicant's monthly income, length of employment, outstanding debt and debt service requirements, and liquid financial asset holdings; whether the applicant owns a home or rents; the nature and number of bank accounts and relationships; the existence and frequency of prior delinquencies and/or defaults; and the number of voluntary credit inquiries. Many of these credit scoring models rely on eight or more factors.

Clearly, credit scoring procedures are more objective than judgmental evaluations. Credit decisions can be made quickly once the information is verified, often in less than 10 minutes when computers are used. Discrimination is largely eliminated because the ECOA does not allow credit scoring models to grade race, religion, or national origin. The benefits include lower costs if scoring and decision making are done mechanically, timely decisions, and avoidance of discrimination. The primary difficulty is that credit scoring models must be statistically verified and continually updated, which can be expensive. In fact, many small banks are precluded from developing their own models because of the high cost and a limited database.[14] Some nonbank institutions, such as

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[13] Credit scoring systems and accept/reject scores are empirically derived from either multiple regression analysis or multiple discriminate analysis. These statistical techniques use historical data regarding a bank's good and bad consumer loans to assess what characteristics identify a high percentage of good or bad borrowers. The accept/reject scores represent the weighted value of borrowers' characteristics. Recent efforts involve using Bayesian methods, option-pricing models, and neural networks to assign scores. See Gunter Loffler and Peter Posh (2007) for a summary of these techniques.

[14] Mester (1997) provides an excellent summary of consumer and small business credit scoring models.

insurance companies, have also discovered that an individual's credit score can be used to identify high and low insurance risks for property-casualty (particularly automobile and medical) insurance.

An Application: Credit Scoring a Consumer Loan

Credit scoring models are based on historical data obtained from applicants who actually received loans.[15] Statistical techniques assign weights to various borrower characteristics that represent each factor's contribution toward distinguishing between good loans that were repaid on time and problem loans that produced losses. These weights are then used as predictors of high-risk and low-risk loans, using data from new loan applications.

The use of credit scoring models can be demonstrated with an example. Suppose that a bank officer receives a loan application for the purchase of an automobile, as outlined in Exhibit 15.10. In the loan request, Rochelle Groome wants to buy a 2013 Jeep Cherokee. The application identifies the purpose, amount, and maturity of the loan, as well as information regarding the applicant's personal and financial circumstances, and recognizes ECOA guidelines. Before providing any information, Groome indicates that she is applying for individual credit and not relying on alimony, child support, or government income maintenance payments to repay the debt. The bank, therefore, cannot demand information regarding her marital status or information about joint applicants or cosigners.

The Credit Score. Exhibit 15.11 lists the factors and corresponding weights for the bank's credit scoring model. A loan is automatically approved if the applicant's total score equals at least 200. The applicant is denied credit if the total score falls below 150. Scores in between these accept/reject values are indeterminate. The weights indicate the relative importance of each characteristic. At University National Bank, five factors, including employment status, principal residence, monthly debt relative to monthly income, total income, and banking references, are weighted heaviest. Not surprisingly, these characteristics represent financial capacity and personal stability, which are important in determining repayment prospects. The bank also uses a local retail merchants association and a similar national association to check credit histories. Subsequent reports reveal the applicant's current list of outstanding debts, the highest balance outstanding at any one point, and whether the individual was ever late in making payments.

Groome's credit score totals 185, as indicated by the sum of the scores in the darkened areas within each category in Exhibit 15.11. Given the accept/reject scores, the model provides an inconclusive evaluation of the credit risk, and the loan officer must rely on judgmental factors. When discussing the application, Groome revealed that she moved to Denver after her husband, who worked for an oil field services company, died in an automobile accident. After searching for two months, she found work as a dental assistant with a dentist who had recently started his own business. She had experience in this field before she met her husband but quit her job to stay at home with their son. She is currently attending evening classes at a local university to complete a degree in accounting. She further indicated that the total cost of the Jeep she wanted to purchase was $20,500 but she intended to make a $5,000 down payment. This would lower her savings balance at the bank to $1,200. The loan officer verified this and determined that Groome's monthly checking account balance averaged around $150. Her monthly rent payment was $750. She had outstanding balances on a Visa card and a Target credit card that she was paying off over time.

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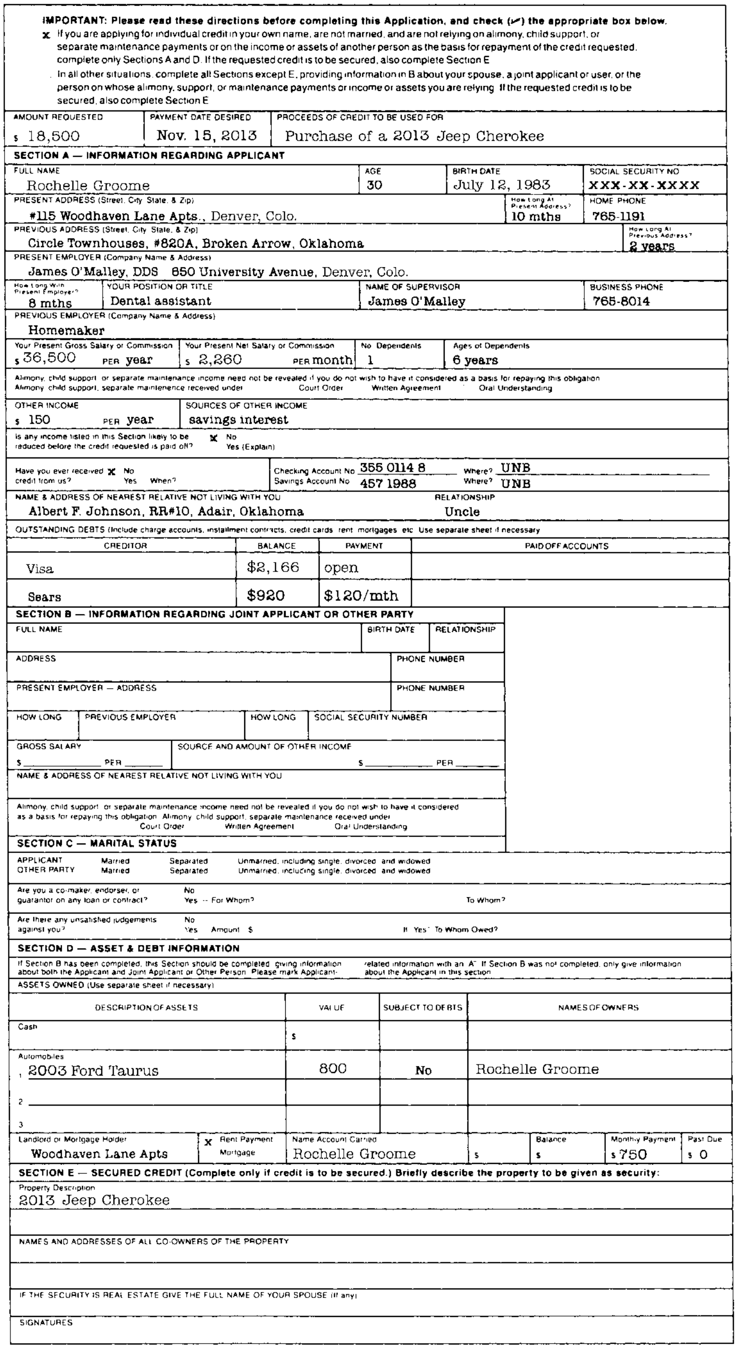
[15] The fact that the sample excludes applications that were rejected biases the model parameters because the characteristics of these applicants are ignored. The extent of the bias depends on whether good borrowers who would have repaid the loan on a timely basis were eliminated or whether all rejects were bad credit risks.

EXHIBIT 15.10 **Credit Application, University National Bank**



IMPORTANT: Please read these directions before completing this Application, and check (✓) the appropriate box below.

☒ If you are applying for individual credit in your own name, are not married, and are not relying on alimony, child support, or separate maintenance payments or on the income or assets of another person as the basis for repayment of the credit requested, complete only Sections A and D. If the requested credit is to be secured, also complete Section E

☐ In all other situations, complete all Sections except E, providing information in B about your spouse, a joint applicant or user, or the person on whose alimony, support, or maintenance payments or income or assets you are relying. If the requested credit is to be secured, also complete Section E

AMOUNT REQUESTED $ 18,500	PAYMENT DATE DESIRED Nov. 15, 2013	PROCEEDS OF CREDIT TO BE USED FOR Purchase of a 2013 Jeep Cherokee

SECTION A — INFORMATION REGARDING APPLICANT

FULL NAME: Rochelle Groome
AGE: 30
BIRTH DATE: July 12, 1983
SOCIAL SECURITY NO: XXX-XX-XXXX
PRESENT ADDRESS (Street, City, State, & Zip): #115 Woodhaven Lane Apts., Denver, Colo.
How Long At Present Address? 10 mths
HOME PHONE: 765-1191
PREVIOUS ADDRESS (Street, City, State, & Zip): Circle Townhouses, #820A, Broken Arrow, Oklahoma
How Long At Previous Address? 2 years
PRESENT EMPLOYER (Company Name & Address): James O'Malley, DDS 850 University Avenue, Denver, Colo.
How Long With Present Employer? 8 mths
YOUR POSITION OR TITLE: Dental assistant
NAME OF SUPERVISOR: James O'Malley
BUSINESS PHONE: 765-8014
PREVIOUS EMPLOYER (Company Name & Address): Homemaker
Your Present Gross Salary or Commission: $ 36,500 PER year
Your Present Net Salary or Commission: $ 2,260 PER month
No. Dependents: 1
Ages of Dependents: 6 years

Alimony, child support, or separate maintenance income need not be revealed if you do not wish to have it considered as a basis for repaying this obligation.
Alimony, child support, separate maintenence received under ☐ Court Order ☐ Written Agreement ☐ Oral Understanding

OTHER INCOME: $ 150 PER year
SOURCES OF OTHER INCOME: savings interest

Is any income listed in this Section likely to be reduced before the credit requested is paid off? ☒ No ☐ Yes (Explain)

Have you ever received credit from us? ☒ No ☐ Yes When?
Checking Account No. 355 0114 8 Where? UNB
Savings Account No. 457 1988 Where? UNB

NAME & ADDRESS OF NEAREST RELATIVE NOT LIVING WITH YOU: Albert F. Johnson, RR#10, Adair, Oklahoma
RELATIONSHIP: Uncle

OUTSTANDING DEBTS (Include charge accounts, installment contracts, credit cards, rent, mortgages, etc. Use separate sheet if necessary)

CREDITOR	BALANCE	PAYMENT	PAID OFF ACCOUNTS
Visa	$2,166	open	
Sears	$920	$120/mth	

SECTION B — INFORMATION REGARDING JOINT APPLICANT OR OTHER PARTY

FULL NAME:
BIRTH DATE:
RELATIONSHIP:
ADDRESS:
PHONE NUMBER:
PRESENT EMPLOYER — ADDRESS:
PHONE NUMBER:
HOW LONG:
PREVIOUS EMPLOYER:
HOW LONG:
SOCIAL SECURITY NUMBER:
GROSS SALARY: $______ PER ______
SOURCE AND AMOUNT OF OTHER INCOME: $______ PER ______
NAME & ADDRESS OF NEAREST RELATIVE NOT LIVING WITH YOU:

Alimony, child support, or separate maintenance income need not be revealed if you do not wish to have it considered as a basis for repaying this obligation. Alimony, child support, separate maintenance received under ☐ Court Order ☐ Written Agreement ☐ Oral Understanding

SECTION C — MARITAL STATUS

APPLICANT ☐ Married ☐ Separated ☐ Unmarried, including single, divorced, and widowed
OTHER PARTY ☐ Married ☐ Separated ☐ Unmarried, including single, divorced, and widowed

Are you a co-maker, endorser, or guarantor on any loan or contract? ☐ No ☐ Yes — For Whom? To Whom?

Are there any unsatisfied judgements against you? ☐ No ☐ Yes Amount $ If "Yes" To Whom Owed?

SECTION D — ASSET & DEBT INFORMATION

If Section B has been completed, this Section should be completed giving information about both the Applicant and Joint Applicant or Other Person. Please mark Applicant-related information with an "A". If Section B was not completed, only give information about the Applicant in this section.

ASSETS OWNED (Use separate sheet if necessary)

DESCRIPTION OF ASSETS	VALUE	SUBJECT TO DEBTS	NAMES OF OWNERS
Cash	$		
Automobiles 1 2003 Ford Taurus	800	No	Rochelle Groome
2			
3			

Landlord or Mortgage Holder		Name Account Carried		Balance	Monthly Payment	Past Due
Woodhaven Lane Apts	☒ Rent Payment ☐ Mortgage	Rochelle Groome	$	$	$ 750	$ 0

SECTION E — SECURED CREDIT (Complete only if credit is to be secured.) Briefly describe the property to be given as security:

Property Description: 2013 Jeep Cherokee

NAMES AND ADDRESSES OF ALL CO-OWNERS OF THE PROPERTY:

IF THE SECURITY IS REAL ESTATE GIVE THE FULL NAME OF YOUR SPOUSE (if any):

SIGNATURES:

The Credit Decision. The credit decision rests on the loan officer's evaluation of the applicant's character and capacity to repay the debt. The officer estimates that the monthly installment payment on the loan at current rates would equal $375 for the next four years. The officer ponders the following questions. Will the applicant remain in Denver

EXHIBIT 15.11 **Credit Scoring System, University National Bank, Applied to Credit Application for Purchase of a 2013 Jeep**

Annual Gross Income	<$10,000 5	$10,000–$20,000 15	$20,000–$40,000 30	$40,000–60,000 45	<$60,000 60	
$\frac{\text{Monthly Debt Payment}}{\text{Monthly Net Income}}$	<40% 0	30–40% 5	20–30% 20	10–20% 30	<10% 50	
Bank Relationship Checking/Saving	None 0	Checking only 30	Saving only 30	Checking & Saving 40	No answer 0	
Major Credit Cards	None 0	1 or more 30	No answer 0			
Credit History	Any derogatory within 7 yrs. <10		No record 0		Met obligated payments 30	
Applicant's Age	<50 yrs. 5	<50 yrs. 25	No answer 0			
Residence	Rent 15	Own/Buying 40	Own outright 50	No answer 15		
Residence Stability	<1 yr. 0	1–2 yrs. 15	2–4 yrs. 35	<4 yrs. 50	No answer 0	
Job Stability	<1 yr. 5	1–2 yrs. 20	2–4 yrs. 50	<4 yrs. 70	Unemployed 5	Retired 70

NOTE: Minimum score for automatic credit approval is 200; score for judgmental evaluation, 150 to 195; score for automatic credit denial is less than 150. Rochelle Groome's credit score is 185.

long enough to repay the loan? How stable is her job and income? Is her income high enough to cover normal monthly living expenses, debt payments, and extraordinary expenses? Should the officer reject the loan and encourage the applicant to reapply with a cosigner?

The loan officer has numerous grounds for denying credit. The applicant's credit history is limited to two credit cards, her local residence was established too recently, and she was employed too recently to establish job stability. Even if she were to get a cosigner, such as her employer, experience shows that many cosigners renege on their commitments. On the positive side, Groome appears to be a hard worker who is the victim of circumstances resulting from her husband's death. It is also unlikely that anyone who puts almost 30 percent down on a new model is going to walk away from a debt. The bank will likely lose Groome as a depositor if it denies the application. The resolution depends on the careful weighting of the costs and benefits. What would you recommend?

Your FICO Credit Score

In today's world, a FICO score summarizes in one number an individual's credit history.[16] Lenders often use this number when evaluating whether to approve a consumer loan or mortgage, and many insurance companies consider the score when determining whether to offer insurance coverage and how to price the insurance. Generally, the scores range from 300 to 850 with a higher figure indicating a better credit history. The higher the score is, the more likely it is that a lender or insurer will see the individual as making the promised payments in a timely manner. The national average is 670. If, for example,

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[16] Information in this section is based on data provided by Fair, Isaac & Co. (FICO) on its Web site, www.fairisaac.com.

an individual's FICO score is 540, the probability that the individual will be delinquent on one or more credit accounts is more than three times greater than that for the average scorer. A lender typically views this prospective borrower as much riskier than someone with a much higher score.

An individual's credit score is based on five broad factors: payment history (35 percent), amounts owed (30 percent), length of credit history (15 percent), new credit (10 percent), and type of credit in use (10 percent). As such, a score is determined by whether an individual has made promised principal and interest payments on prior debts on time, the amount of outstanding balances and available credit, how long the individual has been a borrower, recent trends in borrowing and payment activity, and the mix of loans. A lender who solicits a prospective borrower receives a list of reasons why the score is not higher along with the actual credit score. Such reasons range from "serious delinquency" to "too many accounts with outstanding balances." A lender then evaluates the score and reasons to assess whether to make the loan and if so, how to price the loan.

In 2012, Fair, Isaac, & Company, the firm that provides the statistical model that produces the FICO score, reported the distribution of scores provided in Exhibit 15.12. Note that 69.6 percent of individuals had scores of 700 or more, and 24 percent had scores under 600 in 2012. Because payment history is a key determinant of the credit score, the frequency of delinquencies and the number of days delinquent vary inversely with the score. When applying scores, lenders incorporate credit risk premiums that reflect the implied quality of the underlying borrower. Much like with bond ratings, individuals with lower credit scores pay higher rates.

If you are active in your spending and borrowing, it is important to review your credit score at least annually. It is not uncommon for erroneous information to find its way into a credit report, and it is often difficult to have it removed. It is also valuable to know how to improve your credit score, as your future borrowing potential and cost of borrowing will depend on your credit history as summarized in this figure.

An Application: Indirect Lending

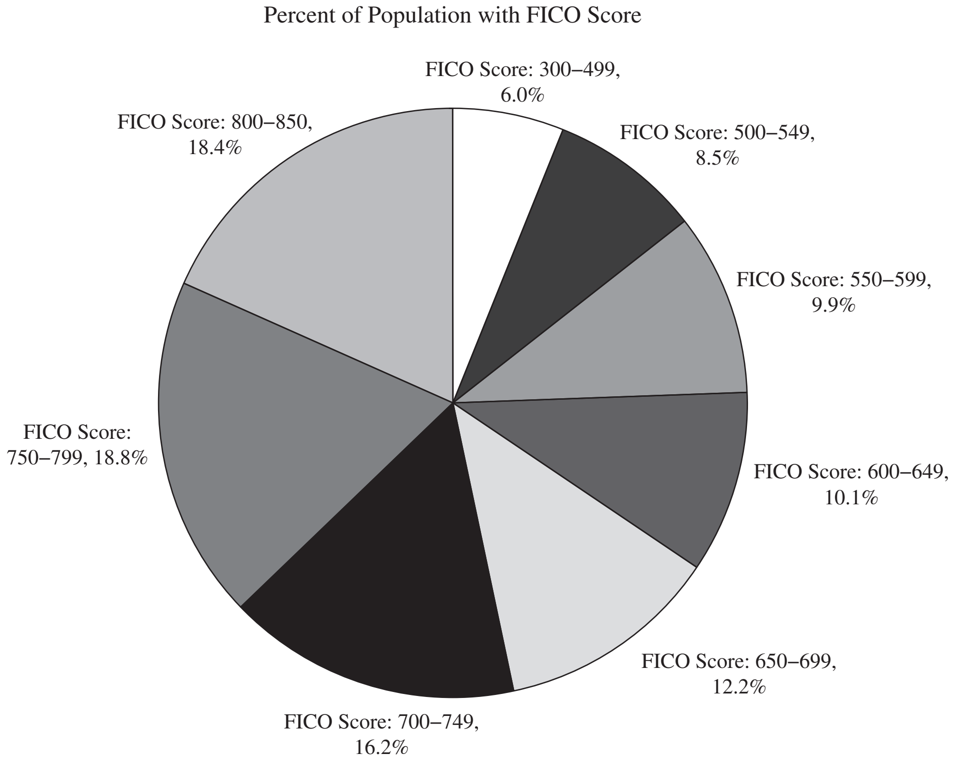
Indirect lending is an attractive form of consumer lending when a bank deals with reputable retailers. A retailer sells merchandise and takes the credit application when the consumer decides to finance the purchase. Because many firms do not have the resources to carry their receivables, they sell the loans to banks or other financial institutions. In most instances, a bank analyzes the credit application and makes the credit decision. These loans are collectively referred to as "dealer paper." Banks aggressively compete for paper originated by well-established automobile, mobile home, and furniture dealers.

Most banks involved in indirect lending provide a wide range of services to dealers in addition to buying their paper. For example, automobile dealers often finance their display inventory under floor plan arrangements. When the dealer sells a vehicle, the bank buys the paper and reduces the dealer's inventory loan by the loan value of the vehicle.

Dealers negotiate finance charges directly with their customers. A bank, in turn, agrees to purchase the paper at predetermined rates that vary with the default risk assumed by the bank, the quality of the assets sold, and the maturity of the consumer loan. A dealer normally negotiates a higher rate with the car buyer than the determined rate charged by the bank. This differential varies with competitive conditions but potentially represents a significant source of dealer profit.

Most indirect loan arrangements provide for dealer reserves that reduce the risk in indirect lending. The reserves are derived from the differential between the normal, or contract, loan rate and bank rate and help protect the bank against customer defaults

EXHIBIT 15.12 National Distribution of FICO Scores and Delinquency Rates



Source: FICO Banking Analytics Blog, http://bankinganalyticsblog.fico.com/2013/04/fico-score-distribution-remains-mixed.html.

Delinquency Rates and FICO Scores

FICO Score	Likelihood That Individual Will Be Delinquent
800+	1%
750–799	2%
700–749	5%
650–699	15%
600–649	31%
550–599	51%
500–549	71%
0–499	87%

Source: fivecentnickel.com.

and refunds. Consumers make their loan payments directly to the bank. Instead of immediately giving up the dealer's share of interest, a bank retains the interest in reserve. The reserve is used to cover defaults and the unearned portion of the dealer's share of interest. If the dealer chooses to approve a loan at a rate below the predetermined rate set by the bank for a preferred customer, this negative interest earned also reduces the reserve. A bank refunds a dealer's share of the differential only after the reserve equals some minimum amount, normally a negotiated fraction of total loans purchased.

Consider the following example in Exhibit 15.13 using automobile dealer paper. The dealer charges a customer a 15 percent APR—1.25 percent monthly—to finance the purchase of an automobile for $8,000. The bank has evaluated the credit application, and the transaction qualifies for a discounted 12 percent rate. By agreement, the bank retains 25 percent of the interest differential and transfers 75 percent to the dealer's account. The loan is written for three years, with 36 monthly payments of $277.32. The borrower pays $1,983.52 in total interest expense, of which $1,565.72 is credited to the bank, to yield 12 percent. Of the $417.80 interest differential, 75 percent is immediately allocated to the dealer, while 25 percent is retained in the reserve.

The reserve serves primarily to cover charge-offs. If the borrower defaults on the loan, the bank reduces the reserve by the unpaid principal outstanding. This ultimately lowers the dealer's profits, because the reserve must be replenished. The reserve also covers rebates of unearned interest. For example, suppose that the dealer charges the borrower a 9 percent add-on rate for three years, and the bank discounts it at a 7 percent add-on rate. With add-on interest, a lender receives some unearned interest if the borrower prepays. Interest rebates are commonly calculated according to the rule of 78s, which determines the fraction of total interest to be refunded at a point in time prior to maturity.[17]

Applicable rebate percentages at the end of each year are determined at the bottom of Exhibit 15.13 in the second column, assuming 36 monthly payments. A three-year loan prepaid after two years indicates that 11.71 percent of the interest is unearned (88.29 percent is earned). If, in this example, a borrower prepays the entire loan after two years and the bank takes interest into income by the sum of the digits method, the bank must rebate $252.93 to the customer at the 9 percent add-on rate. Because the bank earns interest at the 7 percent add-on rate, its unearned interest income equals only $196.73 after two years. The $56.20 difference between the rebate amount and unearned bank interest would be charged against the reserve. The rule of 78s penalizes borrowers by assuming that earned interest is greater than that actually generated on a loan's outstanding principal. For short-term loans, however, the error is small.

There are many different reserve agreements, the most common being full recourse and no recourse arrangements. As the name suggests, full recourse agreements place the dealer at risk. If a borrower defaults, the dealer absorbs the loss by either reducing the reserve at the bank or paying off the note on the bank's terms. No recourse agreements, by contrast, stipulate that banks assume the credit risk. All losses are charged directly against bank earnings. Finally, some reserve arrangements involve limited recourse. A bank may negotiate a plan whereby dealers are liable for any losses only during the first three months of the loan. Although these losses are immediately charged to the reserve, later losses are absorbed by the bank. The above example represents a full recourse arrangement.

Banks prefer to deal with well-established retailers that generate paper (loans) of predictable quality. Banks vary the predetermined discount rate according to the dealer's reputation and the nature of the recourse agreement. They charge lower rates under full

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[17] According to the rule of 78s, the applicable rebate percentage equals the sum of the integers from 1 to the number of payments remaining after prepayment, divided by the sum of integers from 1 to the total number of payments in the loan. The number 78 equals the sum of integers 1 through 12 and thus serves as the denominator for rebate fractions on all one-year, monthly payment loans. For example, a one-year loan with 12 monthly payments that is prepaid after the seventh month produces a rebate percentage of $(1 + 2 + 3 + 4 + 5)/(1 + 2 + \ldots + 12) = 19.23$ percent. The lender would take 80.77 percent of the finance charge and rebate 19.23 percent to the borrower.

EXHIBIT 15.13 **Role of Dealer Reserves in Indirect Lending: Automobile Paper**

Terms of the Dealer Agreement

Bank buys dealer paper at a 12 percent rate. Dealer charges customers a higher rate (15 percent APR), with 25 percent of difference allocated to a reserve.

Sample Automobile Loan

Principal = \$8,000

Maturity = 3 years, 36 monthly installments

Loan rate = 15% annual percentage rate (APR)

Monthly payment = $\$8{,}000/[(1/0.0125) - (1/0.0125(1.0125)^{36})] = \$277.32$

Allocation to the Dealer Reserve

Total interest expense to customer = \$1,983.52
Total interest income for bank = 1,565.72
Differential interest = \$ 417.80
75% allocated to dealer: 0.75(417.80) = \$313.35
25% allocated to reserve: 0.25(417.80) = \$104.45

Interest Refunds on Prepayments with Add-On Rates

Loan is written on a precomputed basis, and bank accrues interest using “rule of 78s.”*
Interest expense to customer = 0.09(\$8,000)(3) = \$2,160
Interest income for bank = 0.07(\$8,000)(3) = 1,680
Differential interest = \$ 480
75% allocated to dealer: 0.75(\$480) = \$360
25% allocated to reserve: 0.25(\$480) = \$120

End of Year	Interest Earned*	Total	Bank	Difference
1	54.96%	\$1,187.14	\$ 923.33	\$263.81
2	33.33	719.33	559.94	159.99
3	11.71	252.93	196.73	56.20
	100.00%	\$2,160.00	\$1,680.00	\$480.00

*Rule of 78s factors are 366/666, 222/666, and 78/666, respectively.

recourse plans because they assume less credit risk. Dealers that have the capability to assess credit quality prefer these arrangements, because their profits are potentially greater. Under no recourse arrangements, banks charge higher rates and review each application carefully, as if the loan were a direct one.

Recent Risk and Return Characteristics of Consumer Loans

Historically, banks have viewed themselves as being either wholesale or retail institutions, focusing on commercial and individual customers, respectively. Recent developments, however, have blurred the distinction, as traditional wholesale banks have aggressively entered the consumer market. The attraction is twofold. First, competition for commercial customers narrowed commercial loan yields so that returns fell relative to potential risks. As indicated earlier, consumer loans now provide some of the highest net yields for banks. Second, developing loan and deposit relationships with individuals presumably represents a strategic response to deregulation. The removal of interest rate ceilings substantially reduced banks' core deposits by making high-balance customers more price sensitive. On average, individuals hold small balances and move deposit accounts less frequently, providing a more stable deposit base. Thus, liquidity risk declines as a bank's retail deposit base increases.

Revenues from Consumer Loans

Banks earn significant revenues from interest on loans and associated fees. Because many usury ceilings have been eliminated or are no longer effective, banks can ration credit via price rather than by altering nonprice credit terms. This permits banks to quickly raise consumer loan rates as conditions require. When conditions permit, banks also delay lowering rates when their borrowing costs decline.

Consumer loan rates have been among the highest rates quoted at banks in recent years. Most consumer loans are made at fixed rates that banks do not change frequently. In a declining rate environment, consumer loans thus yield a larger spread relative to the bank's borrowing cost. When short-term rates rise, the spread narrows until banks raise loan rates. During the 1980s and early 1990s, the spread widened with the general decline in interest rates. However, the spread narrowed with the increased competition for consumer loans after the 1991 recession. With aggressive marketing campaigns at many banks and nonbank competitors, consumers are becoming increasingly sensitive to price such that credit card loan rates and fees now follow bank funding costs more closely.

Consumer groups still argue that consumer loan rates are too high, especially when the prime stays constant as other rates decline. They claim that lenders must be conspiring to fix prices. There are many reasons for large spreads, however. First, consumer loans are typically smaller in size and cost more to administer on a unit basis than commercial loans. Still, to eliminate "excess" profits that banks might earn when rates fall and the spread widens, noninterest costs from handling consumer loans would have to increase. There is no explanation for this. Second, consumer loans are longer term and often carry fixed rates. New car loans, for example, now average between four and five years until maturity. Banks include a premium in longer-term, fixed-rate loans to compensate for the risks of inflation and volatile funding costs. Third, individuals are more likely to default than businesses. The spread should be large enough to cover greater losses. Finally, many lenders still face state usury ceilings that may not be lifted when rates increase. These banks essentially make up for reduced profits during high-rate environments by keeping loan rates high when their financing costs fall. In response to this criticism, many banks now offer variable-rate credit cards as alternatives to fixed-rate cards.

In addition to interest income, banks generate substantial noninterest revenues from consumer loans. With traditional installment credit, banks often encourage borrowers to purchase credit life insurance on which the bank may earn premium income. Credit card operations also provide different types of fee income. Most banks now impose annual fees, ranging from $10 to $40 per customer, for the right to use the card and for access to related bank services. The customer essentially receives a line of credit with travel-related services, debit card privileges, and merchandise discounts also available. Banks bill cardholders monthly and expect the customer to repay the debt on a revolving credit basis with minimum payments equal to 5 percent of the outstanding balance.

Historically, customers have had the option to repay the entire balance within a specified grace period, such as 25 days, and avoid any interest. Experience has demonstrated that just under one-third of all customers take advantage of this interest-free period. Many banks have eliminated this option by charging interest on each transaction from the date of posting. Banks often impose other fees for late payments and cash advances and may impose a fee if customers do not charge sufficient amounts.

Consumer Loan Losses

Losses on consumer loans are normally the highest among all categories of bank credit. This reflects highly cyclical patterns in personal income as well as extensive fraud. Losses are anticipated because of mass marketing efforts pursued by many lenders, particularly with credit cards. In the first quarter of 2005, the consumer credit card charge-off rate averaged 4.6 percent such that losses amounted to more than $12 billion, of which 80 percent has historically represented outright defaults and 20 percent fraud. Not surprisingly, both losses and delinquent accounts rise during recessions and decline during high-growth periods. Many lenders simply factor losses into their pricing as a part of doing business.

Credit card fraud arises out of the traditional lender-merchant relationship. In most cases, banks give merchants credit for sales long before they are reimbursed by cardholders. The lag time can be upwards of 30 days depending on the credit card billing cycle. This allows fraudulent merchants to set up a temporary operation, bill card-issuing banks for bogus sales, and escape with the proceeds before the cardholders recognize billing errors or bogus charges. Much of this lag time, however, is avoided today as most customers have access to their credit card charges in real time over the Internet, or at least within a day or so of when the charges were made. This avoids and reduces the fraud of the older system when statements were mail just once every 30 days, but does not eliminate it!

To perpetrate the fraud, thieves need access to a retail business and cardholder account information. Frequently, the business front is nothing more than a telephone-based mail-order operation. Callers tell cardholders that they have won prizes but must provide account numbers, expiration dates, and billing addresses to collect. Alternatively, thieves can obtain credit card information by stealing credit cards or by copying information from the magnetic strip on the back of credit cards from legitimate businesses. Thieves use the information to make purchases or receive cash advances during the lag period. Unsuspecting cardholders eventually discover that fraudulent charges appear on their monthly statements. By the time the card-issuing bank recognizes the fraud, the thief has closed down the business and moved to greener pastures.

Interest Rate and Liquidity Risk with Consumer Credit

The majority of consumer loans are priced at fixed rates. New auto loans typically carry four-year maturities, and credit card loans exhibit an average 15- to 18-month maturity. In most cases, the borrower can prepay a loan without any penalty when rates decline. This creates difficult problems in trying to match-fund the consumer portfolio.

Bankers have responded in two ways. First, they price more consumer loans on a floating-rate basis. Such policies have been relatively successful in the mortgage market but require substantial discounts below fixed-rate loans to attract interest. Second, commercial and investment banks have created a secondary market in consumer loans that allows loan originators to sell a package of loans to investors with longer-term holding periods. The first efforts appeared in early 1985, when Marine Midland Bank, in conjunction with Salomon Brothers, sold automobile loans to secondary market investors. Salomon Brothers sold the loans in the form of collateralized securities, conveniently labeled certificates of automobile receivables (CARs). As with mortgage banking operations, Marine Midland agreed to service the loans for which it received servicing income. Banks now routinely sell certificates supported by credit card receivables and other consumer credit as a means of moving assets off the balance sheet, reducing capital requirements, and increasing noninterest income.

Summary

Commercial banks aggressively compete for consumer loans for a variety of reasons. For many types of loans, net yields exceed those on commercial loans. Default rates are above those on other loans, but the gross yield charged more than compensates for the higher losses. During 2008–2009, many banks experienced losses on home equity loans and other loans to consumers given the national housing crisis and economic slowdown. When rates decline, net profits on credit card and other fixed-rate loans rise sharply because consumer loan rates are relatively sticky. Individuals also typically maintain deposit accounts where they borrow. Retail deposits are relatively low cost and not nearly as interest rate sensitive as commercial deposits. Thus, the more that liquidity risk is reduced, the greater the volume of consumer deposits is at a bank. Consumer loans, however, exhibit greater interest rate risk than commercial loans. Most are fixed-rate loans, and many carry three- to five-year maturities. Banks wishing to reduce interest rate risk often try to match-fund these loans with longer-term deposits.

Loan officers consider the same basic issues applicable to commercial loans when evaluating the riskiness of consumer loans: use of proceeds, size of loan, cash-flow repayment sources, collateral, and the borrower's character. The fundamental difference is that personal financial statements are generally unaudited, and it is more difficult to forecast net cash flow. Evaluation procedures may involve the subjective interpretation of financial information provided directly by an individual on a credit application and obtained indirectly from credit bureaus and references. Alternatively, banks may use credit scoring models based on a numerical assessment of an acceptable-risk borrower's profile. This chapter introduces a basic credit scoring model and describes the risk and return features of various types of consumer loans, such as credit card transactions and the purchase of dealer paper. It also summarizes the factors that the most popular models incorporate in their scoring systems. A significant trend is that credit scoring has moved to small business loans. If such loans can be successfully securitized, they may become commodities more like mortgages, and their yields will decline. This will be especially problematic for community banks where small business loans often account for a substantial portion of annual profits.

Questions

1. Explain how an installment loan differs from revolving credit in terms of risk and the nature of the return to the lender.
2. What are the major expenses associated with making consumer loans? What is the average size of consumer installment loans at small banks? How does loan size affect loan rates that banks charge on consumer loans?
3. Examine the credit card loss rates and personal bankruptcy filings in Exhibit 15.4. What might explain the increase in both measures after 1994 in a period when

economic growth in the United States was strong and unemployment was low? Given the problems in 2008–2009, what will be the likely impact on future loss rates and bankruptcy filings?

4. Why are home equity loans attractive today? How do some banks tie home equity loans to a customer's credit card? How did the credit crisis and subprime problems of 2008–2009 change the attractiveness of home equity loans? How might this change in the future?
5. Explain how a direct installment loan differs from an indirect installment loan.
6. What are the key provisions of the ECOA? Why was such legislation necessary?
7. Describe how a bank should apply an objective credit scoring model when evaluating consumer loan requests. Given the information in Exhibits 15.10 and 15.11 and in the text, indicate why you would or would not approve Rochelle Groome's loan request.
8. Suppose that four college students check their FICO scores and discover the information listed below. Describe how lenders might price loans to the borrowers with lower scores versus the borrowers with higher scores in terms of rates and fees charged.

	Score
Vanessa	790
Martin	550
Jorge	685
Heather	505

9. What different sources of revenue are available from credit card lending? Outline the clearing process with a credit card transaction. What is the biggest risk in credit card loans?
10. The differential between fixed-rate credit card rates and a bank's cost of funds typically varies over the interest rate cycle. What is this relationship, and why does it exist? Does the differential between commercial loan rates and a bank's cost of funds behave similarly?
11. Calculate the effective annual rate on each of the following loans:
    a. A $5,000 loan for two years, 10 percent simple annual interest, with principal repayment at the end of the second year
    b. A $5,000 loan for two years, 10 percent add-on interest, paid in 24 equal monthly installments
    c. A $5,000 loan to be repaid at the end of two years, 10 percent discount rate
12. What is the purpose of a dealer reserve in indirect lending? When is a bank at risk with indirect loans?
13. What is the goal of the CRA? How do regulators enforce its provisions?
14. Subprime loans have higher loss rates than many other types of loans. Explain why lenders offer subprime loans. Describe the characteristics of the typical borrower in a subprime consumer loan.
15. Explain generally how smart cards, debit cards, and prepaid cards differ from traditional credit cards.

Problems

I. Buying Paper from a Used Car Dealer

Dealer reserves in indirect lending serve to protect a bank against loan losses and prepayments. Suppose that a bank enters into an agreement with a used car dealer to buy dealer paper at a 5.5 percent add-on rate and retain 25 percent of the interest differential relative to the rate the dealer charges the car buyer. Under the agreement, the bank charges losses and prepayments against the reserve, transferring any excess to the dealer periodically. Interest rebates on prepayments are computed according to the rule of 78s.

Consider the case where the dealer charges a customer a 7.5 percent add-on rate for the purchase of a $15,000 automobile to be financed over 36 months. Calculate the effective APR, the total interest expense to the customer, the bank's share, and the interest differential allocated to the dealer reserve. Suppose that the customer prepays the entire loan after 13 months. Determine how much interest the bank must rebate to the car buyer and any charge to the dealer reserve.

II. Credit Report

1. Examine the sample credit report provided in Exhibit 15.9. From a lender's perspective, explain the importance of information regarding the following:
   a. Number and type of businesses that report credit information
   b. Date the account was opened
   c. Date of last activity on the account
   d. Highest credit amount and terms
   e. Balance outstanding, amount past due, and status
2. How would you interpret the information provided for Alfonso B. Doe in the section of the report on courthouse records?

Activities

I. Credit Cards

Collect the following information on three nationally advertised credit cards and three locally offered credit cards. You can use the Internet to search for the best terms.

1. Annual fee
2. Interest rate and grace period
3. Additional services to credit availability

Is there a pattern of differences and similarities between the national versus local cards? Which card appeals most to you? Explain why.

II. Credit Reporting and Security

Go to the Web sites www.myvesta.org and www.fairisaac.com. Review the most recent delinquency rates by FICO score. What differential interest rates do lenders charge for different FICO scores? Provide reasoning for differential rates.

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16

Managing the Investment Portfolio

The world of bank investments has changed dramatically in recent years. From 2003 to 2008, many institutions bought Aaa-rated preferred stock issued by Fannie Mae and Freddie Mac, two government-sponsored enterprises (GSEs). In mid-2008, the U.S. Treasury eliminated dividend payments on these preferred stocks when it nationalized these firms, thereby driving the market values of these instruments toward zero. Consequently, many institutions that held these securities wrote them down to zero, thereby taking a direct hit (reduction) to capital. Other types of securities once thought to exhibit low credit and liquidity risk similarly fell in value. For example, holders of **auction-rate securities** could not sell them because buyers did not participate in the periodic auctions. Banks and money funds that traditionally purchased commercial paper largely withdrew from the market because the instruments are not collateralized, and investors were not confident that issuers would make the promised payments. Contrary to historical patterns, rates on municipal securities exceeded rates on comparable-maturity Treasury securities, even though interest on municipal securities is exempt from federal income taxes. In essence, the global economy experienced a crisis of confidence in the credit quality of securities issuers in 2008. Many participants were sufficiently concerned that they refused to lend anything on an unsecured basis, such that federal funds rates and LIBOR rates rose sharply. With the fear of defaults, many market participants bought default risk-free Treasuries in a "flight to quality." At the time, Treasury bill rates approached zero.

Commercial banks no longer find most municipal bonds attractive, because Congress changed the tax treatment of interest on municipal bonds. Specifically, Congress reduced—and in some cases, eliminated—the deductibility of interest expense associated with the investment in municipals. Not surprisingly, many banks shifted into other investments. Given regulations and the "safe haven" that investment-grade securities provided, most banks concentrated their purchases on investment-grade securities (those rated in the four highest categories, such as Baa, A, Aa and Aaa), with the expectation that credit risk was low. Unfortunately, during the financial crisis the rating agencies proved to be wildly overoptimistic in the ratings they assigned to many mortgage-related securities, such that banks that relied on ratings without conducting their own credit analysis found that many of these securities either defaulted or were downgraded to junk status. Banks subsequently took losses on these securities. The Dodd–Frank Act no longer allows banks to rely exclusively on ratings when buying bonds. They must conduct their own due diligence. Today, many banks concentrate their investments in taxable instruments, such as Treasury and federal agency bonds, high-quality mortgage-backed securities (MBSs), and corporate bonds. Each of these has sharply different risk and return features.

The focus on new investment instruments and mandatory due diligence presents both problems and opportunities. Problems arise because many banks purchase securities without fully understanding their risk and yield features. As noted previously, many banks historically relied on ratings from Moody's, S&P, and Fitch in order to decide which bonds to buy. They also routinely purchased large amounts of callable agency and MBSs for which they did not adequately understand the features of the call and prepayment options. Unfortunately, these options make it extremely difficult to accurately forecast both how much interest and principal investors will receive and when payments will be forthcoming. As such, the promised yield at time of purchase often differ sharply from any realized yield.

This chapter examines why banks own marketable securities. It initially provides an overview of the basic features of securities held in the investment portfolio and introduces policy guidelines that should help appropriate investment decisions. It then critiques various investment strategies that banks follow related to the maturity/duration choice, changing rates over the business cycle, the impact of embedded options, and differential income tax treatment across different types of securities.

Many commercial banks concentrate their asset management efforts on meeting loan customers' credit needs. Because this involves detailed credit analysis and direct negotiation of terms with borrowers, they maintain a large staff of loan officers. Managing investment securities often plays a secondary role, especially at small banks. Banks operate as price-takers because security yields are normally determined nationally in the money and capital markets. Basic investment decisions, including the amounts and types of securities to purchase, are often determined by senior management and implemented by a small staff.

The securities activities of large and small banks are fundamentally different. Many small banks buy securities and hold them in portfolio until maturity. In many cases, they work with large correspondent banks or bankers banks in deciding which securities to buy and how many. Large banks, in contrast, not only buy securities for their own portfolios, but also trade them more actively prior to maturity in an effort to make a profit. They also may manage a securities trading account and may have a subsidiary that helps municipalities and businesses underwrite securities. Underwriting securities involves helping the issuer (borrower or seller of equity) place debt securities and equities with investors.

Historically, bank regulators have limited the risks associated with banks owning securities. One way they did this was by encouraging the purchase of investment-grade instruments. Investment policy guidelines thus focus on controlling credit and interest rate risk within the securities portfolio. Regulators generally prohibit banks from purchasing common stock for income purposes and mandate that banks effectively monitor the credit quality of individual securities.[1] To provide greater liquidity, many banks keep security maturities or durations short-term because of the lower price volatility. Some banks pursue passive investment strategies, under which managers react to events, rather than active strategies. Active strategies involve buying and selling securities prior to maturity for profit in anticipation of changing economic conditions.

In recent years, an increasing number of banks have pursued active strategies in managing investments in the search for higher yields. Many managers now expect the investment portfolio to generate more interest income and periodic gains from security sales prior to maturity. Consequently, they manage their portfolio maturity/duration and composition more aggressively. The following analysis describes the function of bank trading accounts and characteristics of the most popular taxable and tax-exempt securities, as well as outlines the objectives and structure of the investment portfolio. It identifies the key facets of a bank's formal investment policy statement, then critiques specific strategies related to (1) the maturity/duration choice; (2) how the business cycle affects interest rates; (3) when embedded options will be exercised and the value of the options; and (4) the differential tax treatment of interest income.

Dealer Operations and the Securities Trading Account

When banks buy securities they must indicate the underlying objective for accounting purposes. The alternative classifications include held-to-maturity (HTM), available-for-sale, and trading purposes. **Held-to-maturity** securities are recorded at amortized cost on the balance sheet, with changes in value having no impact on the income statement. Unless the underlying quality of the securities worsens dramatically, banks must hold these securities until they mature. As the name suggests, banks designate securities as HTM when they believe they will not sell them either because they are pledged as collateral against specific borrowings, or their income features are particularly attractive. **Available-for-sale** (AFS) securities are reported at market value. Any increases or decreases in market value associated with interest rate changes are balanced by an entry in stockholders equity that recognizes unrealized gains and losses on securities. Again, there is no income statement impact. Because they can sell these securities at any time, banks designate securities that they may want to trade prior to maturity—generally to meet liquidity or yield objectives—as AFS. Finally, securities held for trading purposes are part of a trading account. A **trading account** represents an inventory of securities that a bank holds for resale to other investors. The securities can be of any type including Treasury, agency, and municipal securities, but the bank expects to own them only briefly until a long-term buyer is found. Such securities are listed separately on a bank's balance sheet as trading account securities and are marked-to-market. The bank generally profits from this activity by buying the securities at prices below the sales price, which produces a trading profit. However, all gains or losses from trading account transactions are reported on the income statement.

In this latter capacity, banks operate both as primary dealers with the Federal Reserve and as market makers with other participants. As a primary dealer, a bank (or bank subsidiary) normally buys U.S. Treasury securities at auction and in the

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[1] In certain situations, such as when common stock is taken as collateral against a loan, commercial banks can own equities. However, they must liquidate equities within a reasonable time interval. Banks can own non-investment-grade securities, but they must show that the securities are comparable in quality to similar investment-grade instruments.

secondary market and sells the securities to its customers. The Federal Reserve System trades only with primary dealers through its New York Bank when implementing open market purchases and sales. As market makers, banks perform the same service with U.S. Treasury, agency, and selected municipal securities, trading with all interested parties.

Banks perform three basic functions within their trading activities. First, they offer investment advice and assistance to customers managing their own portfolios. With their market expertise, they can help a smaller bank determine the appropriate type of investment and select specific instruments. If a customer needs to sell a security, they stand willing to buy. Second, they maintain an inventory of securities for possible sale to investors. The willingness to buy and sell securities is called *making a market*. Third, traders speculate on short-term interest rate movements by taking positions in various securities.

Banks earn profits from their trading activities in several ways. When making a market, they price securities at an expected positive spread, charging a higher price (lower interest rate) on securities sold than the price paid on securities purchased. Thus, a customer who contacts a bank's trading department will get two price quotes for the same instrument: a **bid price**, reflecting what the dealer is willing to pay; and an **ask price**, or offer price, representing the price at which a dealer will sell. Profits arise from a positive spread between the ask minus the bid prices.

Traders can also earn profits if they correctly anticipate interest rate movements. This is accomplished by taking long (ownership) and short (borrowed) positions consistent with their expectations or by adjusting maturities on repurchase agreements (RPs). Both long and short positions are normally financed via RPs. When traders expect interest rates to decline (prices to rise), they want to own securities, so they take a long position in selected instruments. In most cases, overnight financing is used so that the bank generates income from the spread between the yield on the asset owned and the cost of financing, and is also able to sell the asset for a price above that initially paid. When traders expect interest rates to rise, they want to sell securities or go short (sell securities not owned) to avoid holding assets that depreciate in value. Traders typically negotiate reverse RPs to obtain securities to short, and earn interest that varies daily with financing costs on the short position. The bank profits if rates rise and traders buy back the securities shorted at a lower price than that initially paid.

Dodd–Frank Act Provisions Affecting Bank Investments

Prior to the financial crisis, most banks relied heavily on ratings provided by the Nationally Recognized Statistical Rating Organizations (NRSROs), such as Moody's, S&P, and Fitch, to assess credit risk. Given the shockingly bad quality of these ratings as applied to sub-prime mortgages and related derivative products, Congress included provisions in the Dodd–Frank Act (Section 939A) that force banks to conduct more due diligence when buying investment securities. Specifically, starting in 2013, banks must independently determine that "full and timely repayment of principal and interest is expected" when buying securities. Banks must thus do their own due diligence and cannot rely exclusively on ratings provided by the NRSROs. The requirements differ for different securities (Treasuries require less due diligence), but banks must now maintain credit files on individual issues validating that expected default risk is low, or within policy guidelines.

Objectives of the Investment Portfolio

A bank's investment portfolio differs markedly from a trading account, as investment securities are held to meet one of six general objectives:

1. Safety or preservation of capital
2. Liquidity
3. Yield
4. Credit risk diversification
5. Help in managing interest rate risk exposure
6. Assistance in meeting pledging requirements

Not surprisingly, securities with different return and risk features meet each objective differently, so that the average portfolio varies in terms of composition and price sensitivity. Banks generally hold these securities for longer periods of time than trading account securities. Periodic interest payments appear on the income statement as interest income, while any gains or losses from sale prior to maturity appear separately as an income or expense item.

Accounting for Investment Securities

Decisions regarding the types of securities that banks buy and the length of time they are held in portfolio are driven, in part, by market value accounting rules that were put in place effective January 1994. These rules link the presumed motive for buying investment securities to the accounting for value on the balance sheet and for income on the income statement. Specifically, the Financial Accounting Standards Board's Statement 115 (FASB 115) requires banks to divide their securities holdings into three categories—Trading, HTM, and AFS—with the following accounting treatment:

- Trading: Securities purchased with the intent to sell in the near term; carried at market value on the balance sheet with unrealized gains and losses included in income.
- Held-to-Maturity (HTM): Securities purchased with the intent to hold to final maturity; carried at amortized cost (historical cost adjusted for principal payments) on the balance sheet; unrealized gains and losses have no income statement impact.
- Available-for-Sale (AFS): Securities that are not classified in either of the previous categories; carried at market value on the balance sheet with unrealized gains and losses included as a component of capital.

The distinction between motives is important because of the accounting impact. Remember that changes in interest rates can dramatically affect the market value of a fixed-rate security. A fixed-rate bond without options will sell at par if the market rate equals the coupon rate on the bond. If the market rate is above (below) the coupon rate, the market value is below (above) par value. This difference between market value and par value equals the unrealized gain or loss on the security, assuming a purchase at par value.

$$\begin{aligned}\text{Market value} - \text{par value} &= \text{Unrealized gain (if positive)} \\ &= \text{Unrealized loss (if negative)}\end{aligned} \qquad \textbf{(16.1)}$$

If a bank designates a security as HTM, changes in interest rates after purchase—and thus unrealized gains or losses—do not affect the accounting for the security either on the balance sheet or income statement. However, FASB 115 requires that banks carry all other securities at market value. Thus, if rates rise and there is an unrealized loss, the value of the security will decline on the balance sheet. For trading securities, the bank will report a loss on the income statement; for securities AFS, the bank will report a direct reduction in its capital account. If rates fall and there is an unrealized gain, the value of the security will rise on the balance sheet with a corresponding increase in earnings (trading) or a bank's capital account (AFS).[2] Importantly, the change in bank capital due to unrealized gains and losses on securities AFS does not directly affect risk-based capital ratios for banks under $250 billion in total assets.[3]

During the first quarter of 2008, financial institutions were required to apply FASB 157, which defined what "fair value" means, offered a procedure for measuring it, and determined how institutions would report it. Critics, particularly large investment and commercial banks that traded complex securities and derivatives, claimed that fair value accounting added unnecessary volatility to firm earnings and capital. The credit crisis that hit financial institutions and markets in 2008 further increased the attention on fair value accounting under FASB 157, because many institutions systematically reported large write-downs and subsequent losses on the income statement. For example, Citigroup reported $17 billion in losses from November 2007 through June 2008 associated with over $47 billion in asset write-downs. However, Dane Mott of JPMorgan Chase stated that "blaming fair value accounting for the credit crisis is a lot like going to a doctor for a diagnosis and then blaming him for telling you that you are sick."[4] In response to criticisms that market value accounting treatment was forcing financial institutions into insolvency, Congress granted the SEC authority to unilaterally suspend fair value accounting in 2008.

The primary impact of fair value accounting is that a bank's net income and equity capital position will be more volatile when securities are accounted for in market value terms. Investors see volatility as inherently bad and often require a risk premium as compensation. A bank's cost of capital will likely be higher with market value accounting, to the extent that investors do not already incorporate market values in their analysis. Many banks thus increasingly categorize securities as HTM versus AFS to avoid the capital hits and regulatory attention.[5]

Safety or Preservation of Capital

Banks assume considerable default risk in their commercial and consumer loan portfolios. They typically balance this by accepting much lower default risk in their investment

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[2] The presumed objective of market value accounting is to improve investors' and regulators' ability to evaluate the economic worth of a bank. Regulators see the added benefit of forcing banks to closely monitor how much interest rate risk they assume in their investment portfolios. If banks choose to minimize the adverse accounting effects, they will likely take less risk by buying shorter-term securities. The total amount of unrealized gains or losses on AFS securities is labeled accumulated other comprehensive income (AOCI), which appears as a component of equity. Basel III stipulates that AOCI is included as Tier 1 capital for the largest banks.

[3] In October 2013, the FDIC issued FIL-46-2013, Managing Sensitivity to Market Risk in a Challenging Interest Rate Environment. This guidance expressed concern that banks may not be sufficiently prepared for rising rates and increased volatility in rates. The guidance specifically stated that "although net unrealized losses on securities may not flow through to regulatory capital under certain circumstances, examiners consider the amount of unrealized losses in the investment portfolio and an institution's exposure to the possibility of further unrealized losses when qualitatively assessing capital adequacy and liquidity and assigning examination ratings." In other words, examiners may incorporate unrealized losses on HTM securities in their evaluations if they so choose.

[4] See "Fair Value Accounting and FASB 157," at www.BigPicture.typepad.com, September 30, 2008.

[5] As of early 2014, the five largest U.S. banks had increased the share of securities classified as HTM to 8.4 percent to avoid capital losses according to Shenn (2014).

portfolios. Thus, a primary objective is to preserve capital by purchasing securities where there is only a small risk of principal loss. Regulators encourage this policy by requiring that banks concentrate their holdings in high-quality securities. When they buy non-Treasury or non-guaranteed securities, banks must effectively maintain a credit file demonstrating that management periodically evaluates the borrower's ability to meet debt service requirements. The resulting profile should be consistent with management assigning an investment-grade rating to the instrument. Still, banks occasionally report losses on defaulted securities.

Liquidity

Commercial banks purchase debt securities to help meet liquidity requirements. Many banks, particularly small institutions that do not have ready access to the money and capital markets to borrow funds, rely on selling securities if a liquidity shortage appears. Because securities are more marketable than most commercial and consumer loans, banks often designate a portion of their investment portfolio as a liquidity reserve. This reliance on securities for liquidity has become less important as banks have joined the Federal Home Loan Bank (FHLB) system and rely on FHLB advances and other borrowed funds.

As indicated in Chapter 11, securities with maturities of under one year can typically be sold quickly for cash near par value and are classified as liquid investments. In reality, most securities with a market value above book value can also be converted to cash, regardless of maturity, because managers are willing to sell them. Although at first glance a security's market value may not appear to affect its liquidity, in practice most banks choose not to sell securities if their market values are below book values. The rationale is that they would have to report securities losses on the income statement, which would reduce net income and the bank's aggregate profit ratios. Managers are more willing to sell securities at a gain when market values exceed book values, and thus artificially inflate periodic net income.[6]

Thus, when evaluating the potential liquidity in a bank's investment portfolio, many managers simply compare a security's current market value with its book value. If the security's market price exceeds its book value (or amortized cost), it trades at a premium and is often viewed as liquid. The reasoning is that a sale produces a gain, which increases reported profits. In contrast, the sale of a security that trades at a discount with a market price below book value or cost will be viewed as less liquid because any sale produces a loss that lowers earnings. Of course, this type of analysis ignores the fact that the reason a bond sells at a premium (discount) is that market interest rates have fallen (risen) since purchase, and any reinvestment in a like-risk instrument will lower (increase) future coupon interest. As such, the sale of premium securities is often not a benefit over the long-term.

Yield

To be attractive, investment securities must pay a reasonable return for the risks assumed. The return may come in the form of price appreciation or periodic coupon interest. It may be fully taxable or exempt from federal income taxes and/or state and local income taxes. Chapter 6 documents how yields are quoted on different types of securities and explains why yields differ across securities depending on default risk, marketability, tax treatment, maturity, and whether the securities carry call or put

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[6] The costs and benefits of selling securities for a gain versus a loss and reinvesting the proceeds are discussed later in the section on security swaps. In general, selling to realize short-term gains is shortsighted because a bank sacrifices greater longer-term cash flow.

features. Clearly, bank managers must evaluate each security to determine whether its yield is attractive given its other features and the overall profile of the bank's portfolio. Portfolio managers who actively trade securities generally look at total return, not yield to maturity, when evaluating the risk and return trade-off.

Diversify Credit Risk

The diversification objective is closely linked to the safety objective and difficulties that banks have with diversifying their loan portfolios. Too often, particularly at small banks, loans are concentrated in one industry, such as agriculture, energy, or real estate, which reflects the specific economic conditions of the bank's trade area. In these situations, the loan portfolio is not adequately diversified even when loans are not concentrated among single borrowers, because values will deteriorate if conditions adversely affect the industry in question. Banks view the securities portfolio as an opportunity to spread credit risk outside their geographic region and across other industries.

Help Manage Interest Rate Risk Exposure

Investment securities are very flexible instruments for managing a bank's overall interest rate risk exposure. Although some are private placements, most are standardized contracts purchased through brokers. Thus, banks can select terms that meet their specific needs without fear of antagonizing the borrower. They can readily sell the security if their needs change. For example, if management chooses to become more liability sensitive in anticipation of falling rates, the bank can easily and quickly lengthen the maturity or duration of its securities portfolio. Contrast this with the difficulty in adjusting commercial or consumer loan terms, or calling a loan with undesirable pricing features. Managers can thus change the composition and price sensitivity of the investment portfolio at the margin to help achieve the desired rate sensitivity profile.

Pledging Requirements

By law, commercial banks must pledge collateral against certain types of liabilities. Banks that obtain financing via RPs essentially pledge some of their securities' holdings against this debt—specifically, the actual security that is "sold" to the lender. Similarly, banks that borrow at the discount window or from the FHLB must collateralize the loan with qualifying assets. Importantly, banks have some discretion in choosing what securities or loans to pledge at different entities. Specifically, Treasury and other high-quality securities are the most liquid and qualify as collateral for most lenders. Both the Federal Reserve and FHLB accept certain types of loans as collateral even though these loans are generally less liquid. In fact, banks typically pledge real estate-related loans against most FHLB advances. The Federal Reserve is typically the most generous regarding what it accepts as collateral. As such, banks should pledge the least liquid assets as collateral against borrowings from the Fed, so that more liquid assets remain free to be pledged going forward. Finally, banks that accept public deposits must also pledge government securities against the uninsured portion of deposits. Under federal regulations, 100 percent of uninsured federal deposits must be secured with Treasury and agency obligations valued at par or with municipals valued at 80 to 90 percent of par for collateral purposes. Pledging requirements for state and local government deposits vary according to specific regulations established by each deposit holder. In many instances, the public depositor values local municipal securities above par while valuing Treasury and agency securities at less than par for collateral purposes. The intent is to increase the attractiveness of local issues to potential bank investors.

Composition of the Investment Portfolio

A commercial bank's investment portfolio consists of many different types of instruments. Money market instruments with short maturities and durations include Treasury bills, large negotiable CDs and Eurodollars, bankers acceptances, commercial paper, security RPs, and tax and bond anticipation notes. Capital market instruments with longer maturities and durations include long-term U.S. Treasury securities, obligations of U.S. government agencies, municipal bonds, MBSs backed both by government and private guarantees, corporate bonds, foreign bonds, and other asset-backed securities. As of year-end 2013, U.S. banks in the aggregate owned more than $2.9 trillion of fixed-income investment securities.

The top part of Exhibit 16.1 documents the changing composition of bank investments from 1970 through 2013 in four broad categories by issuer. There are several obvious trends. First, the investment portfolio consistently fell as a fraction of total financial assets from a high of 29 percent in 1970 to just 20 percent in 1990 and 23.1 percent in 2013. This coincides with an increase in the proportionate contribution of loans. Second, municipal and Treasury securities were the dominant bank investments through 1980,

EXHIBIT 16.1 **Composition of U.S. Commercial Bank Investments: 1970–2013***

A. All Banks over Time

	Percentage of Total Financial Assets					
	1970	1980	1990	2000	2010	2013*
U.S. Treasury securities	12.1%	7.8%	5.4%	2.9%	1.9%	1.7%
Agency securities	2.7	4.1	8.4	11.2	13.5	13.6
Municipal securities	13.6	10.0	3.5	1.8	2.3	3.3
Corporate & foreign securities	0.6	0.5	2.7	4.1	4.9	4.5
Total (% of Total Assets)	29.0%	22.4%	20.0%	20.0%	22.6%	22.8%
Total Financial Assets**	$517	$1,482	$3,334	$6,469	$11,305	12,670

B. Percentage of Total Consolidated Assets, December, 2013

	Commercial Banks Grouped by Total Assets		
	<$100 Million	$100–1 Billion	>$1 Billion
Investment securities			
U.S. Treasury securities	0.8%	0.5%	1.5%
Other U.S. gov't. sec's	14.8	14.4	10.6
Municipal securities	9.1	7.0	1.6
Other Debt securities***	0.7	1.0	3.8
Foreign sec. & Equities	0.2	0.2	2.2
Total (% of Total Assets)	25.6%	23.1%	19.7%

*Data are for December 31 each year.

**Holdings in billions of dollars.

***Other debt securities include private-label mortgage-backed securities, commercial mortgage-backed securities, asset-backed securities and structured products.

Source: Flow of Funds Accounts (updated quarterly), Board of Governors of the Federal Reserve System; and Statistics on Banking, FDIC.

after which bank holdings fell sharply. As discussed later, this reflects the impact of the Tax Reform Act of 1986, which induced banks to withdraw as investors in most municipal securities, and other investors dominating the Treasury market. Finally, both agency and corporate/foreign securities increased sharply after 1980 as a fraction of financial assets, because banks sought out alternatives to municipals following the Tax Reform Act of 1986. The growth in agency securities is due to the growth of both callable bonds and MBSs, which have far different characteristics than traditional bank investments.

The bottom part of the exhibit indicates the proportionate security holdings of different-sized U.S. banks in 2013. The figures document significant differences in composition with the proportionate size of the portfolio as a percentage of total assets falling with asset size. Specifically, investment securities accounted for almost 25.6 percent of total assets for banks with less than $100 million in assets and just 19.7 percent for banks with more than $1 billion in assets. This indicates that smaller banks rely proportionately more on securities to meet liquidity needs. Large banks routinely borrow in the money markets to help meet deposit outflows and finance incremental loan demand. In addition, smaller banks hold large amounts of U.S. government agency securities, which include most MBSs, and municipals. These two categories account for 23.9 and 21.4 percent of assets at banks with less than $100 million and those with $100 million to $1 billion, respectively. The total for larger banks amounts to just 12.2 percent of assets. The concentration in municipals reflects the high demand for tax-exempt interest income at smaller banks, which do not use other means to shelter income. Large banks shelter proportionately more income via tax credits and accelerated depreciation generated from foreign operations and leasing activities. Other securities, including corporate and foreign bonds, private-label MBSs and equities, are significant at the largest banks, but comprise a smaller portion of the investment portfolio at the smallest banks.

Characteristics of Taxable Securities

Banks own a substantial amount of securities on which the interest is subject to federal income taxes. In order to meet liquidity and pledging requirements and earn a reasonable return, banks hold significant amounts of government and corporate securities that mature within one year, labeled *money market instruments*. Most are highly liquid because they are issued by well-known borrowers and because a deep secondary market exists. Banks own a larger amount of longer-term taxable securities, labeled *capital market instruments*. The following sections describe the basic characteristics of each. Exhibit 16.2 presents key terminology.

Money Market Investments

Repurchase Agreements (RPs or Repos). RPs involve a loan between two parties, with one party typically either a securities dealer or commercial bank. The lender or investor buys securities from the borrower and simultaneously agrees to sell the securities back at a later date at an agreed-upon price plus interest. The transaction represents a short-term loan collateralized by the securities because the borrower receives the principal in the form of immediately available funds, while the lender earns interest on the investment. If the borrower defaults, the lender gets title to the securities.

Consider an overnight RP transaction for $1 million at 5.4 percent between a bank as lender and a foreign government as borrower. RP rates are quoted on an add-on basis assuming a 360-day year. The bank would book an asset, securities purchased under

EXHIBIT 16.2 Important Terminology

ARM: Adjustable-rate mortgage—a mortgage where the contractual interest rate is tied to some index of interest rates and changes when supply and demand conditions alter the underlying index.

CBO: Collateralized bond obligation—a security backed by a pool of noninvestment grade (junk) bonds.

CD: Certificate of deposit—a large, negotiable time deposit issued by a financial institution.

CDO: Collateralized debt obligation—a security that is backed by a pool of individual loans or debt of different types. The securities may be separated into tranches with different degrees of credit, liquidity, and interest rate risk.

CMO: Collateralized mortgage obligation—a security backed by a pool of mortgages and structured to fall within an estimated maturity range (tranche) based on the timing of allocated interest and principal payments on the underlying mortgages.

Conventional Mortgage: A mortgage or deed of trust that is not obtained under a government-insured program.

FHA: Federal Housing Administration—a federal agency that insures mortgages.

FHFA: Federal Housing Finance Agency—created in 2008 to provide oversight of Fannie Mae, Freddie Mac, and the Federal Home Loan Banks.

FHLMC: Federal Home Loan Mortgage Corporation (Freddie Mac)—once a private corporation that operated with an implicit federal guarantee, it is now under conservatorship of the federal government; it buys mortgages financed largely by mortgage-backed securities

FNMA: Federal National Mortgage Association (Fannie Mae)—once a private corporation that operated with an implicit federal guarantee, it is now under conservatorship of the federal government; it buys mortgages financed largely by mortgage-backed securities.

GNMA: Government National Mortgage Association (Ginnie Mae)—a government entity that buys mortgages for low-income housing and guarantees mortgage-backed securities issued by private lenders.

GO: General obligation bond—municipal bond issued by a state or local government where the promised principal and interest payments are backed by the full faith, credit, and taxing authority of the issuer.

GSE: Government-sponsored enterprise—a quasi-public federal agency that is federally sponsored, but privately owned. Examples include the Farm Credit Bank, Federal Home Loan Banks (FHLBs), Federal Home Loan Mortgage Corporation (Freddie Mac), and Federal National Mortgage Association (Fannie Mae).

IDB: Industrial development bond—a municipal bond issued by a state or local government political subdivision in which the proceeds are used to finance expenditures of private corporations.

IO: Interest-only security representing the interest portion of a stripped Treasury or stripped mortgage-backed security.

MBS: Mortgage-backed security—a security that evidences an undivided interest in the ownership of a pool of mortgages.

PAC: Planned amortization class CMO—a security that is retired according to a planned amortization schedule, while payments to other classes of securities are slowed or accelerated. The objective is to ensure that PACs exhibit highly predictable maturities and cash flows.

PO: Principal-only security representing the principal portion of a stripped Treasury or stripped mortgage-backed security.

Revenue Bond: A municipal bond in which the promised principal and interest payments are backed by revenues from whatever facility or project the bond proceeds are used to finance.

RP: Repurchase agreement (repo)—an agreement by one party to buy back, under certain terms, the item that is originally sold to a second party. The underlying item is generally a U.S. Treasury, agency, or mortgage-backed security.

Secured Investor Trusts: Bonds secured by the cash flow from pieces of CMOs or related securities placed in trust. In most cases, the securities are high-risk instruments subject to substantial prepayment risk. The securities are labeled “kitchen-sink bonds” because they are backed by everything but the kitchen sink.

Tranche: The principal amount related to a specific class of stated maturities on a CMO.

VA: Veterans Administration—a federal agency that insures mortgages.

Z-Tranche: The final class of securities in a CMO exhibiting the longest maturity and greatest price volatility. These securities often accrue interest until all other classes are retired.

agreement to resell, and would lose deposit balances held at the Fed equal to $1 million. After one day the transaction would reverse, as deposit balances would increase by $1 million and the RP loan would disappear; also, the foreign government would pay the bank $150 in interest.

$$\text{Interest} = \$1{,}000{,}000 \times (0.054/360) = \$150 \tag{16.2}$$

If the foreign government defaults, the bank retains the securities as collateral on the loan. This transaction is technically labeled a *reverse RP*, because the bank is the lender while another party is the borrower. In a regular RP, a bank or securities dealer sells securities under an agreement to repurchase at a later date and thus represents the borrower. Every RP transaction involves both a regular RP and reverse RP, depending on whether it is viewed from the lender's or borrower's perspective.[7]

Banks operate on both sides of the RP market as borrowers and lenders. Although any securities can serve as collateral, most RPs involve Treasury or U.S. agency securities. Every RP transaction is negotiated separately between parties. The minimum denomination is generally $1 million, with maturities ranging from one day to one year. The rate on one-day RPs is referred to as the overnight RP rate, which plays an important role in arbitrage transactions associated with financial futures and options. Longer-term transactions are referred to as term RPs and the associated rate is referred to as the term RP rate. The RP rate typically varies from 5 to 15 basis points below the comparable federal funds rate because RP transactions are secured.

Treasury Bills. Banks are significant investors in both short-term Treasury bills and longer-term Treasury notes and bonds. Banks find Treasuries attractive because they pay market rates of interest, are free of default risk, and can be easily sold in the secondary market. Because they are default risk-free, Treasury securities pay a lower pretax yield than otherwise comparable taxable securities. They carry a tax advantage, however, because all interest is subject to federal income taxes but is exempt from state and local income taxes. In addition, the primary and secondary market for Treasury instruments is very competitive. Dealers keep bid-ask spreads low and maintain substantial inventories. This ease of purchase and sale lowers transactions costs and makes Treasuries highly liquid.

Treasury bills are marketable obligations of the U.S. Treasury that carry original maturities of one year or less. They exist only in book-entry form, with the investor simply holding a dated receipt. Treasury bills are discount instruments, and the entire return is represented by price appreciation as maturity approaches.

Each week the Treasury auctions bills with 13-week and 26-week maturities. Investors submit either competitive or noncompetitive bids. With a competitive bid, the purchaser indicates the maturity amount of bills desired and the discount price offered. Noncompetitive bidders indicate only how much they want to acquire. They agree to pay the average price posted for all competitive offers that the Treasury accepts but are limited to no more than $500,000 in maturity value. The auctions are closed in that sealed bids must be submitted by 1:30 P.M. each Monday, the normal sale date. The Treasury accepts all noncompetitive bids. It then ranks the competitive bids from the highest discounted price offered to the lowest price and accepts bids until the desired financing objective is met. Noncompetitive bidders then pay the average price of the accepted competitive bids.

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[7] Market terminology for RP transactions is viewed from the perspective of the Federal Reserve's relationship with securities dealers or banks. Reverse RPs are formally labeled *matched sales-purchase agreements*, because they involve the Fed initially selling securities to banks or securities dealers to contract the reserve base, then buying them back.

Banks participate in the auction process in two ways: by buying bills directly for their own portfolios, or by buying bills for inventory in their securities trading activity. Treasury bills are purchased on a discount basis so that the investor's income equals price appreciation. As with most money market yields, the Treasury bill discount rate (dr) is quoted in terms of a 360-day year, as indicated below:

$$\mathrm{dr} = \frac{[\mathrm{FV} - \mathrm{P}]}{\mathrm{FV}}(360/\mathrm{n}) \tag{16.3}$$

where FV is the dollar amount of face value, P is the dollar purchase price, and n equals the number of days to maturity.

For example, a bank that purchases \$1 million in face value of the 26-week (182-day) bills at \$980,560 earns a discount yield of 3.85 percent.[8]

$$\mathrm{dr} = 0.0385 = \frac{\$1{,}000{,}000 - 980{,}560}{1{,}000{,}000}(360/182)$$

The bank reports interest of \$19,440 over the 182 days if the bill is redeemed at maturity.

Certificates of Deposit and Eurodollars. Many commercial banks buy negotiable certificates of deposit and Eurodollars issued by other commercial banks. Domestic CDs are dollar-denominated deposits issued by U.S. banks with fixed maturities ranging from 14 days to several years. They are attractive because they pay yields above Treasury bills and, if issued by a well-known bank, can be easily sold in the secondary market prior to maturity. As with federal funds, interest is quoted on an add-on basis assuming a 360-day year. Eurodollars are dollar-denominated deposits issued by foreign branches of U.S. banks or by foreign banks outside the United States. Because only the largest banks can tap this market, the secondary market is quite deep. The Eurodollar market is less regulated than the domestic market so that the perceived riskiness is greater. Eurodollar rates subsequently exceed domestic CD rates for comparable banks.

Investing banks can choose from a variety of CDs in terms of yield characteristics and issuer. Although most CDs pay fixed rates to term, some carry floating rates that are pegged to an index such as LIBOR or a commercial paper rate. An investor commits the funds for up to five years, but the rate is reset periodically according to a preestablished formula. For example, a floating-rate CD may carry a rate equal to the prevailing three-month commercial paper rate plus 50 basis points, with interest paid quarterly, at which time the rate is reset. Two other CDs that pay above-average rates are Yankee CDs and Asian Dollar CDs. Yankee CDs are dollar-denominated deposits issued by branches of foreign banks in the United States, while Asian Dollar CDs are issued by banks in Singapore that pay interest in dollars, which varies with the Singapore interbank offer rate (SIBOR) as

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[8] Alternatively, a known discount rate (dr) produces a purchase price (P): $\mathrm{P} = \mathrm{FV}\,[1 - \mathrm{dr}\,(\mathrm{n}/360)]$

The discount rate understates the true percentage yield to an investor. *The Wall Street Journal* publishes a bond coupon-equivalent yield for Treasury bills at each auction, calculated in terms of Equation 16.3, but which instead compares the dollar return to the actual purchase price and uses a 365-day year. The coupon-equivalent rate (cer) or bond-equivalent rate ($\mathrm{i_{be}}$) for the 182-day bills in the example equals 3.98 percent.

$$\mathrm{i_{be}} = \mathrm{cer} = \frac{\$1{,}000{,}000 - 980{,}560}{980{,}560}(365/182) = 0.0398$$

The true (effective) yield is even greater, calculated generally as

$$\text{Effective yield} = \left[1 + \frac{\mathrm{FV} - \mathrm{PV}}{\mathrm{PV}}\right]^{365/\mathrm{k}} - 1$$

where k = the number of days until maturity. In this example, the effective yield equals 4.016 percent.

an index. Even though the issuers are well-known institutions, investors demand a risk premium over rates paid by the safest domestic institutions.

Commercial Paper. Commercial paper refers to unsecured promissory notes issued by corporations that use the proceeds to finance short-term working capital needs. Because these instruments are not FDIC-insured and are not backed by collateral, the issuers are presumably the highest-quality firms. However, several commercial issues have defaulted. In fact, the market is extremely sensitive to deterioration in any well-known borrower's financial condition. When a large firm is known to be in distress, virtually all issuers of new commercial paper must pay a substantial premium over T-bills to place their debt, regardless of their financial condition.[9] Most commercial paper is rated by different rating agencies to help investors gauge default risk. Issuers also typically obtain an irrevocable letter of credit from a bank that guarantees payment in case the issuer defaults. This guarantee mitigates default risk and improves marketability. Still, most investors hold commercial paper to maturity because the secondary market is thin.

In recent years, many large banks engaged in asset-backed commercial paper (ABCP) programs that ultimately generated losses and created havoc for the overall commercial paper market. With an ABCP, a bank creates a special-purpose entity that issues commercial paper and uses the proceeds to buy financial assets or make loans. These assets, in turn, serve as collateral for the commercial paper, such that commercial paper investors do have some protection. The special-purpose entity—often labeled a *structured investment vehicle (SIV)*—generates a profit by earning a higher yield on the assets versus what it pays on the commercial paper plus related fees. Its ability to meet its commercial paper obligations, in turn, relies on the quality of the assets it owns and the ability to roll over commercial paper financing.

The credit crunch of 2007–2008 caused the commercial paper market to effectively collapse, such that no liquidity existed. Much of this was triggered by the bankruptcy filing of Lehman Brothers in September 2008, after which the Reserve Primary Fund, a money market fund with almost $800 million of Lehman Brothers' paper, broke the buck when it let the value of its shareholders' units fall below $1. Investors in commercial paper subsequently fled the market regardless of which firm issued the paper. At the same time, the assets of many SIVs had deteriorated in quality (at least as perceived) to where holders of commercial paper would not roll over their investments because of uncertainty regarding the collateral value and the ability to collect. Originators of the SIVs typically extended credit to the SIVs to replace the commercial paper, with many originators eventually moving the entire SIV onto their own balance sheets. With low-quality assets (primarily problem mortgages and collateralized debt obligations), the originators eventually took large write-downs. As investors withdrew, many businesses—particularly GE and finance companies—could not obtain short-term financing from this source except at very high rates if it was even available. In October 2008, the U.S. government stepped in and effectively guaranteed commercial paper borrowings through the Federal Reserve's Commercial Paper Funding Facility in an attempt to inject liquidity into the markets

Historically, small banks purchased commercial paper as investments. For commercial paper, the minimum denomination is $10,000, and maturities range from 3 to 270 days. Interest rates are fixed to term and quoted on a discount basis, as with T-bills.

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[9] There are two basic types of commercial paper—direct paper and dealer paper. Direct paper constitutes the bulk of new commercial paper and is issued primarily by finance companies and large bank holding companies. Dealer paper (or industrial paper) refers to commercial paper issued primarily by nonfinancial firms through securities dealers.

Thus, the market price is always less than face value, and the entire principal plus interest is paid at maturity. The primary attraction is the yield premium over T-bills and the ability to match specific commercial paper maturities with the bank's planned holding period.

Bankers Acceptances. According to Federal Reserve Board Regulation A, a bankers acceptance is a "draft or bill of exchange … accepted by a bank or trust company, or a firm, company, or corporation engaged generally in the business of granting bankers acceptance credits." In essence it is a draft drawn on a bank by a firm that either exports or imports goods and services. Chapter 17 describes in detail how a bankers acceptance arises to assist in financing international trade.

From an investor's perspective, a bankers acceptance is a short-term interest-bearing time draft created by a high-quality bank. The acceptance has a fixed maturity ranging up to nine months and is priced as a discount instrument, like T-bills. Because default risk is relatively low, the promised rate is only slightly above the rate on a comparable-maturity T-bill. Banks find bankers acceptances attractive investments because they exhibit low default risk, pay a premium over T-bills, and can be used as collateral against discount window borrowings.

Capital Market Investments

The largest portion of bank securities consists of instruments with original maturities greater than one year that are labeled *capital market instruments*. In general, banks do not buy securities with substantive credit risk. The long-term taxable portfolio is thus dominated by Treasury and U.S. agency securities, corporate and foreign bonds, and agency MBSs. Of course, many banks owned private-label MBSs during the financial crisis, which produced losses. Each of these exhibits broadly different risk and return features.

Treasury Notes and Bonds. These long-term Treasury securities differ from Treasury bills in terms of original maturity and the form of interest payment. Notes have original maturities of 1 to 10 years. Bonds can carry any original maturity but typically are issued to mature well beyond 10 years. Most notes and bonds pay coupon interest semiannually. Since 1985 the Treasury has also issued zero coupon discount bonds that are comparable in form to bills. These zeros, labeled STRIPS (separate trading of registered interest and principal of securities), typically mature 20 to 30 years from origination and carry reported yields that assume semiannual compounding.

Like T-bills, Treasury notes and bonds are sold via closed auctions. In most cases, securities with a variety of maturities and coupon payments are sold, with buyers submitting either competitive or noncompetitive bids. The auctions normally take place every three months when large amounts of outstanding notes and bonds mature. The secondary market is extremely deep, due to the large volume of securities outstanding, low default risk, and wide range of investors who trade these securities. Banks buy these notes and bonds both in the auction and secondary markets. They are attractive because they exhibit low default risk, are highly liquid, and pay a market return.

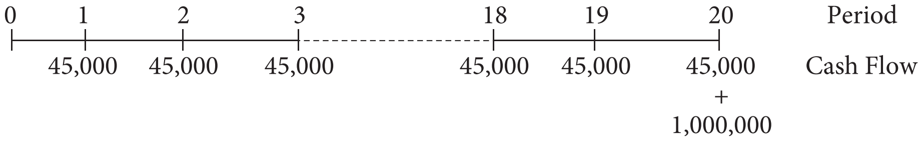
Unlike T-bill rates, yields are quoted on a coupon-bearing basis with prices expressed in thirty-seconds of a point. Each thirty-second is worth $31.25 per $1,000 face value ($1,000/32). Coupon interest is paid semiannually. For example, an investor might obtain a price quote of 96.24 on a 10 percent coupon, $10,000 par value Treasury note with exactly two years remaining to maturity. Interest equals 5 percent semiannually so that the investor receives four coupon payments of $500 at six-month intervals and

\$10,000 principal after two years. The quoted price equals 96.75 percent (96 plus 24/32) of par value, or \$9,675. The effective pretax yield to maturity can be calculated from the present value formula presented in Chapter 6 and equals 11.87 percent.[10]

During recent years, many banks have purchased zero coupon Treasury securities as part of their interest rate risk management strategies. Since 1985 the U.S. Treasury has allowed any Treasury with an original maturity of at least 10 years to be "stripped" into its component interest and principal pieces and traded via the Federal Reserve wire transfer system. Each component interest or principal payment thus constitutes a separate zero coupon security and can be traded separately from the other payments.

Consider a 10-year, \$1 million par value Treasury bond that pays 9 percent coupon interest or 4.5 percent semiannually (\$45,000 every six months). This security can be stripped into 20 separate interest payments of \$45,000 each and a single \$1 million principal payment, or 21 separate zero coupon securities.

Time Line



Each zero coupon security is priced by discounting the promised cash flow at the appropriate interest rate. If the market rate on the two-year zero—fourth periodic cash flow—equals 8 percent (4 percent semiannually), the associated price of the \$45,000 promised payment would equal \$38,466.[11]

The primary advantage of zero coupon Treasury securities is that a bank can lock in a fixed interest payment and yield for whatever maturity is selected. The above two-year zero, for example, would pay \$45,000 at maturity, thus providing \$6,534 in interest. Because there are no interim cash flows, there is no reinvestment risk, and the bank can be assured of receiving its promised yield of 8 percent. In terms of interest rate risk management advantages, the Macaulay duration of zero coupon securities equals maturity so a bank can more precisely balance its earnings sensitivity or duration gap profile with such STRIPS.

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[10] The yield to maturity (*y*) formula follows Equation 6.8 from Chapter 6 and can be expressed, solving for y, as

$$P_o = \sum_{t=1}^{n} \frac{C_t}{(1+y)^t} + \frac{P_n}{(1+y)^n}$$

where

P_o = current price
P_n = cash flow at maturity
C_t = dollar value of the cash flow (interest payment) received in period t
n = number of periods until the final cash flow y = periodic yield to maturity

Applied to the Treasury note, the annualized yield to maturity (y^*) is determined:

$$\$9{,}675 = \sum_{t=1}^{4} \frac{\$500}{(1+y^*/2)^t} + \frac{\$10{,}000}{(1+y^*/2)^4}$$

$$y^* = 11.87\%$$

[11] \$45,000/(1.04)^4

U.S. Government Agency Securities. Federal agencies can be separated into two groups. The first group represents organizations that are formally part of the federal government. As such, they obtain operating funds from the Treasury and borrow from the Federal Financing Bank, a political subdivision of the Treasury that borrows from the Treasury and lends to selected agencies. This intermediation function enables agencies to borrow at the Treasury rate but also raises total Treasury financing requirements. These agencies, including the Federal Housing Administration, Export-Import Bank, and the Government National Mortgage Association (GNMA) (Ginnie Mae), are effectively owned by the U.S. government.

The second group of government agencies are GSEs that are quasi-public entities. The quasi-public label represents the fact that even though the agencies are federally authorized and chartered, they are privately owned and often have publicly traded stock. They operate like any private corporation, issuing debt and acquiring assets that presumably provide revenues to cover operating expenses, pay interest and dividends, and add to capital. The U.S. government sponsors the agencies by encouraging and often subsidizing activities in favored markets such as housing and agriculture. Sponsorship also involves an implied guarantee to bail out any agency with financial problems as was evidenced by the bailout of Fannie Mae and Freddie Mac. Remember that in 2008 the federal government placed Fannie Mae and Freddie Mac into conservatorship under the auspices of the Federal Housing Finance Agency (FHFA). In this dramatic and controversial action, the Treasury eliminated the dividends on Fannie's and Freddie's common and preferred stock but continued to pay interest on their outstanding debt. Many banks held the preferred stock in portfolio because they were Aaa rated and paid substantial dividends. The net result was that holders of Fannie Mae and Freddie Mac bonds were kept whole, but holders of their preferred stock saw the value of their stocks fall to zero.

With the conservatorship, the debt of these two mortgage companies—not the preferred or common stock—effectively became an obligation of the U.S. Treasury. In general, GSE securities are not direct obligations of the Treasury and thus are not explicitly backed by the Treasury's tax and credit authority. Default risk is generally considered to be low, because investors believe that the U.S. Congress has a moral obligation to provide financial aid in the event of problems at specific agencies. This perception was dramatically challenged when banks were forced to write down their holdings of preferred stock issued by Fannie and Freddie. Common stock in these mortgage firms still trades, but does so at a low price relative to historical standards. Agency issues normally carry a risk premium of 10 to 100 basis points over comparable-maturity direct Treasury obligations due to this lack of a direct guarantee. Most of the GSEs are active in the areas of housing, agriculture, education, and small business.

GSEs generally borrow in both the money and capital markets. Most money market instruments are discount securities comparable to Treasury bills. Capital market instruments are similar to Treasury notes and bonds, except that original maturities are typically shorter. They represent attractive investments because of the low default risk, high marketability, and attractive yields relative to Treasury securities.

Callable Agency Bonds. One of the most popular bank investments during the past 15 years has been callable agency bonds. They exhibit both *call risk* and *market risk*. While these are securities issued by GSEs such that credit risk is low, they have call risk because the issuer has the option to call, or redeem, the bonds prior to final maturity. Typically, there is a call deferment period during which the bonds cannot be called. Such bonds contain an explicit call option where the issuer, such as the FHLB, buys the option to call the bonds and investors sell the option. The issuer pays by offering a higher promised yield relative to comparable noncallable bonds. The present value of this rate differential essentially represents the call premium. Some banks find these securities attractive because they initially pay a higher yield than otherwise similar noncallable bonds. Of course, the premium reflects call risk. If rates fall sufficiently, the issuer will redeem the bonds early, refinancing at lower rates, and the investor gets the principal back early. The principal must then be invested at lower yields for the same risk profile.

Consider the following callable agency bonds:

Issuer	Final Maturity	Call Deferment	Yield to Maturity	Price
FNMA	7 years	1 year	6.42%	$99.91
FHLB	5 years	3 months	5.84	100.00
FHLMC	10 years	1 year	6.55	99.625
FHLMC	10 years	2 years	6.37	99.10
FHLB	3 years	1 year	5.78	99.97
FHLMC	3 years	1 year	5.62	99.4375

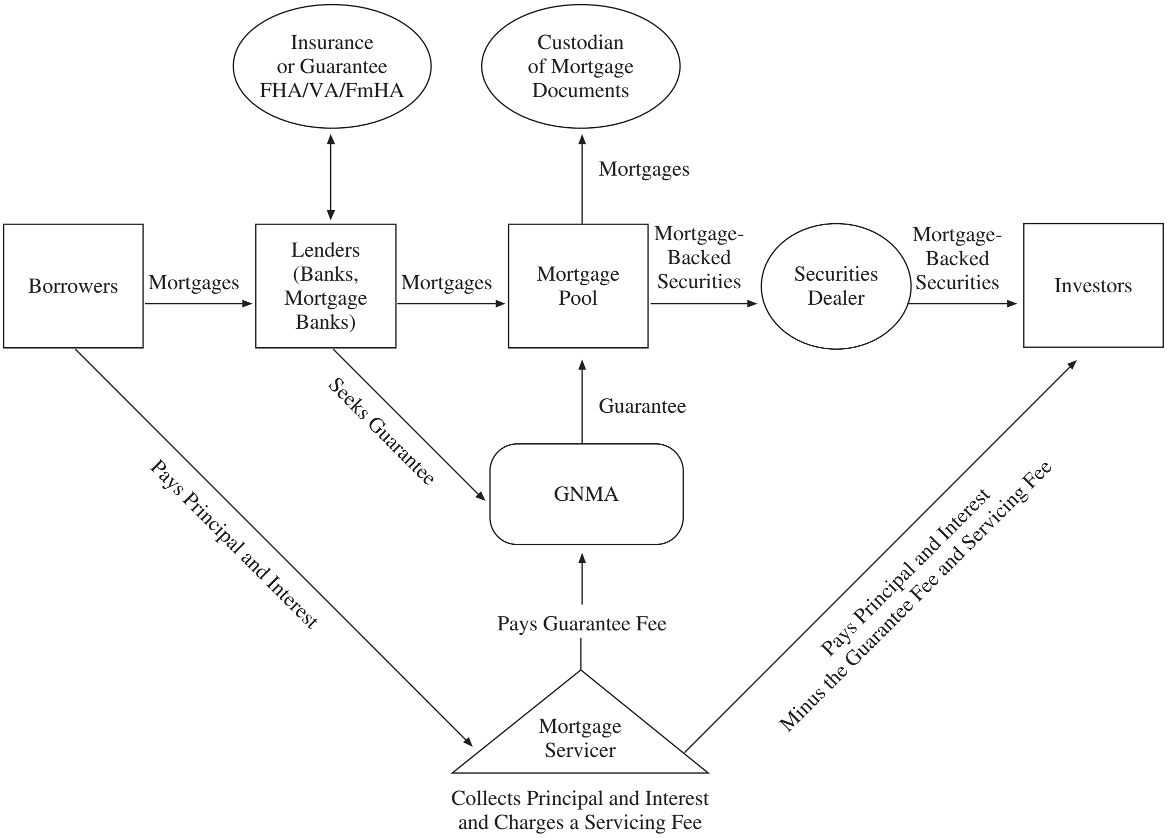
The first column of data lists the final maturity, while the second column indicates how much time must elapse before the issuer can call the security. The final two columns note the prevailing yield to maturity and market price per $100 par value. At this time, the Treasury yield curve was slightly upward-sloping. Note two things about these promised yields. First, as suggested by the FHLMC securities, the longer the call deferment period, the lower the yield. Investors know that they have call protection for a longer period, so they accept a lower yield, ceteris paribus. Second, the final two securities differ primarily by the amount of the discount from par. The call option is in the money when rates fall, such that the price rises above or equals $100. The greater the discount, the more that yields have to fall to move the call option into the money. These securities are thus more attractive, ceteris paribus. Like other fixed-income securities, callables exhibit market risk by which the market value of the securities varies over time with changes in market interest rates.

Conventional Mortgage-Backed Securities. Since passage of the Tax Reform Act of 1986 and implementation of risk-based capital standards, banks have been aggressive buyers of mortgage-backed securities (MBSs). Banks find MBSs attractive because default risk is generally low, and the securities offer higher promised yields than other instruments with comparable average maturities. The problem is that MBSs exhibit prepayment risk in which the underlying borrowers may choose to prepay their mortgages at far different speeds than that anticipated at purchase. The following discussion thus focuses on the characteristics of different MBSs and the nature of prepayment risk.

In order to understand prepayment risk, it is necessary to understand the characteristics of mortgages. Formally, a mortgage is the pledge of property, typically real estate, to secure a debt. Thus, a mortgage on a house represents the pledge of the house as payment for the loan in case of default by the borrower. Mortgage loans generally take the form either of fixed-rate loans where the associated interest rate is constant over the life of the loan, or adjustable-rate loans where the interest rate varies over time on the basis of movements in market interest rates. Mortgages are typically amortized, with monthly payments that include both interest and principal. For example, a 30-year, fixed-rate mortgage will have a constant monthly payment where the interest portion is quite high during the early years of the loan because the outstanding loan balance is large, but declines with each successive payment as the outstanding principal declines. The principal portion of the fixed payment similarly rises over the life of the loan.

Formally, an **MBS** is any security that evidences an undivided interest in the ownership of mortgage loans. The most common form of MBS is the pass-through security in which traditional fixed-rate mortgages are pooled, and investors buy an interest in the pool in the form of certificates or securities. Exhibit 16.3 demonstrates how a GNMA-guaranteed mortgage pass-through security is created based on residential mortgages. The originator of the mortgages makes the initial loans to individuals and contracts for the promised principal and interest payments. At this point, the mortgages may be insured or guaranteed by the Federal Housing Authority (FHA), Veterans Administration (VA), or Farm Home Administration (FmHA). The originator packages the mortgages into a pool and securitizes the pool. This involves working with a securities dealer to create securities that are collateralized by the original mortgages. Typically, the creator of the pool gets a federal government agency, such as GNMA, to guarantee the borrowers' interest and principal payments. A custodian is similarly designated to maintain the mortgage documents. The securities are then sold to investors.

EXHIBIT 16.3 **Structure of the GNMA Mortgage-Backed Pass-Through Security Issuance Process**


Insurance or Guarantee FHA/VA/FmHA
Custodian of Mortgage Documents
Mortgages
Borrowers
Mortgages
Lenders (Banks, Mortgage Banks)
Mortgages
Mortgage Pool
Mortgage-Backed Securities
Securities Dealer
Mortgage-Backed Securities
Investors
Seeks Guarantee
Guarantee
Pays Principal and Interest
GNMA
Pays Principal and Interest Minus the Guarantee Fee and Servicing Fee
Pays Guarantee Fee
Mortgage Servicer
Collects Principal and Interest and Charges a Servicing Fee

Operationally, a **mortgage servicer** collects principal and interest payments on the underlying mortgages, pays the guarantor a fee (around 5 basis points of the principal balance), charges a fee for processing and record keeping (around 12.5 to 25 basis points), and passes through the remaining interest and principal payments to investors. Thus, the term *pass-through* indicates that actual principal and interest payments minus fees are passed through to investors. Investors, in turn, receive a pro rata share of the payments that reflects their fractional ownership of the pool. If, for example, five investors each owned one-fifth of the securities, each would receive 20 percent of the total principal and interest payments. If borrowers default in this example, GNMA steps in and makes the promised payments.

This structure creates substantial differences in the features of different types of MBSs as well as differences between MBSs and conventional bonds. In contrast to conventional bonds, each payment on an MBS includes scheduled principal and interest plus principal prepayments. In addition, MBS payments occur monthly rather than semiannually. Finally, there are significant differences in price volatility due to prepayment risk on most MBSs that does not appear with conventional bonds. Characteristics of the most popular forms of MBSs are discussed later in this chapter.

GNMA Pass-Through Securities. The GNMA, or Ginnie Mae was established as part of the Department of Housing and Urban Development to provide support for the residential mortgage market. It does so primarily by guaranteeing the timely payment of interest and principal to the holders of pass-through securities, regardless of whether the promised mortgage payments are made.[12] As such, even though GNMA pass-through securities are issued by private institutions, they are backed by the federal government and thus exhibit low default risk and high liquidity. Investors willingly pay for this guarantee, so yields on GNMA pass-throughs are lower than yields on otherwise comparable MBSs.

The underlying mortgages in GNMA pools consist of mortgages insured by the FHA, VA, or Farmers Home Administration (FmHA). They can be of virtually any form, including both fixed-payment and adjustable-rate mortgages (ARMs). Generally, mortgages in the pool are quite homogeneous in that they are issued at roughly the same time, have approximately the same maturity, and carry rates that are similar.

FHLMC Securities. The Federal Home Loan Mortgage Corporation (FHLMC, or Freddie Mac) was established to support the market for conventional mortgages. Prior to September 2008, FHLMC was a private corporation, albeit one that operated with an implicit federal guarantee. With its nationalization, the Federal Housing Finance Board effectively manages the agency. FHLMC provides support by buying mortgages in the secondary market. It finances its purchases by issuing a variety of securities. It is these securities that banks and others purchase as investments.

FHLMC Participation Certificates are pass-through securities issued by FHLMC that are secured by conventional residential mortgages. Each participation certificate (PC) represents an undivided interest in the mortgages that make up the mortgage pool used as collateral. FHLMC guarantees monthly interest and principal payments to security holders whether or not the payments are actually received on the underlying mortgages. This is not the same as a federal guarantee, so investors demand a risk

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[12] The term *modified pass-through* is used to describe this guarantee feature of securities. GNMA also directly purchases mortgages at below-market interest rates where the mortgages are used to finance low-income housing.

premium. The risk premium can be volatile due to uncertainty regarding the credit quality of FHLMC's mortgage portfolio and questions about the viability of the implied federal guarantee.

FHLMC Guaranteed Mortgage Certificates are MBSs issued by FHLMC that are similar to bonds. Interest and principal payments on the certificates are again backed by a pool of mortgages, but interest is paid just semiannually and principal is repaid annually. FHLMC also backs these payments with its guarantee.

FHLMC Collateralized Mortgage Obligations are debt issues originated by FHLMC that are secured by a pool of mortgages in which payments are assigned to classes, or tranches, of the associated MBSs according to the securities' priority for the cash flows. The purpose of these tranches is described later in this chapter in the discussion of collateralized mortgage obligations (CMOs). Investors in all classes of CMOs receive semiannual interest payments until maturity.[13] Principal payments are also semiannual but are allocated initially to the class of CMOs with the shortest stated maturity, then sequentially to the remaining outstanding classes by maturity. Investors find CMOs attractive because they can better estimate the effective maturity of the securities compared with other types of pass-throughs.

FNMA Securities. The Federal National Mortgage Association (FNMA, or Fannie Mae) was created by the federal government in 1938 to support housing, but today is another private-corporation GSE that operates with an implicit federal guarantee. It operates much like FHLMC, buying mortgages and financing the mortgages with securities backed by pools of mortgages with features similar to FHLMC's PCs. FNMA similarly guarantees timely interest and principal payments so that default risk is generally perceived to be low.

Privately Issued Pass-Throughs. Commercial banks, savings and loans, and mortgage banks also issue mortgage-backed pass-through securities secured by pools of mortgages. The primary difference with federal agency MBSs is that there is no actual or implied guarantee by the federal government or agency. Instead, private issuers often purchase mortgage insurance either in the form of pool insurance by such groups as the Mortgage Guarantee Insurance Corporation, or via letters of credit. MBSs without agency backing are called *private-label MBSs*. In most cases, it is more profitable for mortgage lenders to use the agency programs. With certain mortgages, such as large mortgages where the outstanding principal balance exceeds the acceptable maximum set by the agencies, a private pass-through program is the only one available.

Prepayment Risk on Mortgage-Backed Securities

As indicated earlier, most MBSs carry a guarantee that principal and interest payments will be made to investors regardless of whether the payment on the underlying mortgages is made. Despite these guarantees, MBSs exhibit considerable risk, because they may fluctuate widely in price when interest rates change. This results from uncertainty over the timing of prepayments and thus what cash flows will actually be passed through to investors at various points in time.

Remember that investors receive the actual principal and interest payments made by borrowers on the underlying mortgages minus a servicing fee. These borrowers, in fact,

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[13] Holders of certain classes of interest accrual securities do not receive any interest payments until all interest and principal payments are made on the other classes of bonds. Interest continues to accrue, however, until received.

may prepay the outstanding mortgage principal at any point in time, for any reason, and often without penalty. Prepayments generally occur because of fundamental demographic trends, as well as from movements in interest rates. Demographic phenomena include factors affecting general labor mobility as individuals change jobs with fluctuations in regional economic activity, as well as changes in family structure attributable to events such as children leaving home or divorce. The important point is that the prepayment feature represents an option and is quite valuable to the borrower who buys the option and chooses when to exercise (prepay) it. It is risky to an investor who sells the option because the cash flows are unpredictable.

Consider the case where an investor buys a Ginnie Mae MBS based on a pool of mortgages paying 8.5 percent. Current mortgage rates are lower so that the security trades at a substantial premium for a promised yield of 8 percent. If rates remain constant, an investor might receive interest on the outstanding principal at the higher rate for seven or eight years. Suppose instead that mortgage rates fall sharply. Some mortgage borrowers will exercise their option and refinance their properties with new mortgages at lower rates because they can save on monthly interest payments. They subsequently prepay principal on the 8.5 percent mortgages so that MBS investors receive smaller interest payments. If prepayments are substantial, all outstanding principal may be quickly repaid so that the MBS effectively matures. Investors lose because they paid a premium expecting to receive high interest payments for several years. With the decline in rates, they not only receive considerably less interest over a shorter period of time, but they have to reinvest their cash receipts at lower rates. If prepayments are high enough, they may not even recover the premium paid. The total return can be negative.

Suppose, alternatively, that mortgage rates rise substantially. Prepayments will either slow or remain constant because fewer individuals will move and interest rates will induce fewer refinancings. The effect on investors in MBSs is threefold. First, the outstanding principal will be higher than originally anticipated. Thus, interest received will be higher as repayment slows. Second, the security will remain outstanding longer so that interest payments will be received for more periods. This lengthening of final maturity is labeled *extension risk*. Third, all cash receipts can be reinvested at higher rates. Of course, the increase in rates at least partly offsets this by lowering the market value of the MBS.

Exhibit 16.4 demonstrates the general interest sensitivity of an MBS. The vertical axis represents the market value of a $1 million interest in a pool of 30-year mortgages carrying 5 percent rates. Assume that the expected rate of prepayments over the life of the mortgages is 6 percent per year. This type of *constant prepayment rate (CPR)* is typically measured as the annualized fraction of principal prepaid during a specific period, such as a year.[14] The dashed line represents the value of the MBS if the prepayment rate remains at 6 percent regardless of the level of mortgage rates. The solid line indicates the value of the MBS if the prepayment rate varies from 6 percent at different interest rate levels. At a current market rate of 5 percent, the MBS is valued at $1 million. As interest rates rise or fall, the value of the MBS declines or rises, respectively. Note, however, the differences in the two values at different rate levels. An increase in rates lowers the actual price of the MBS below the price at a C, because prepayments will slow and an investor will receive below-market interest payments for a longer period of time than originally anticipated. A decrease in rates raises value, but the sharp increase in prepayments at low rates limits the

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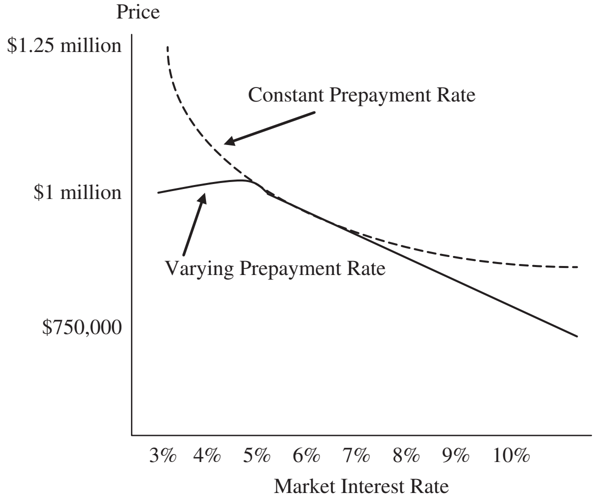
[14] Suppose that a pool of mortgages contained $100 million in principal. A 6 percent annual CPR means that prepayments equal $6 million during the first year, $5.64 million (0.06 × $94) during the second year, and so forth. If $6 million in principal was prepaid during the first three months, the annualized CPR would equal 24 percent. CPR does not include normal amortization.

EXHIBIT 16.4 Interest Sensitivity on Mortgage-Backed Securities



price appreciation. Thus, prepayments increase potential capital losses to investors, while they decrease potential capital gains. The limit on potential gains is labeled premium resistance.

This would not be a problem if investors could accurately forecast prepayments. Unfortunately, this is difficult to do. Pools of mortgages differ by geographic region, by the type of home or commercial property financed, by the age of the mortgages (how long they have been in existence), and by the actual interest rates on the underlying mortgages. Fixed-rate mortgages prepay at different rates than ARMs. After an early increase in prepayments after origination, mortgages prepay at slower rates as they age. Thus, prepayment experience will vary widely between pools of mortgages even at the same point in time. This problem is mitigated somewhat by the fact that the federal government collects and reports data on the prepayment experience of selected mortgage pools. Securities dealers similarly track prepayment experience to assist investors when buying MBSs. While such information helps distinguish between pools, past prepayment experience is not always useful in predicting prepayments.

Alternative Mortgage-Backed Securities

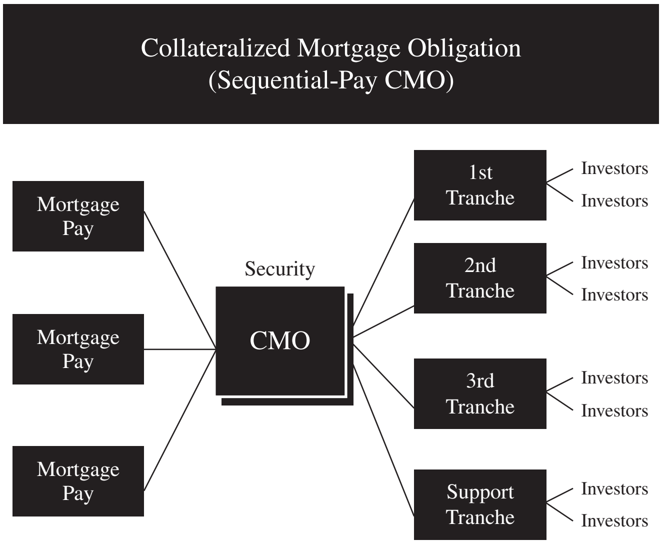
The existence of prepayment risk complicates the valuation and marketing of MBSs. Issuers have created many hybrids to mitigate these risks and have structured MBSs so that they appeal to more investors. Several of the more prominent hybrids are introduced below.

Collateralized Mortgage Obligations. Freddie Mac first introduced CMOs in 1983 to try to circumvent some of the prepayment risk associated with the traditional pass-through security. This was accomplished by converting pass-throughs to securities with more predictable maturity and yield features comparable to those of well-known fixed-income securities. CMOs are essentially bonds. An originator combines various mortgage pools that serve as collateral and creates classes of bonds with different maturities secured by the collateral. Consider a sequential CMO. The first class of bonds, or tranche, has the shortest maturity, because all principal payments on the underlying mortgages are allocated to these securities so that repayment occurs first and on schedule. Interest is paid on these and most other bonds at all times that the securities are outstanding. Once these bonds have been fully repaid, principal payments are allocated to a second class (or tranche) of bonds until they are paid off, and so forth. The primary advantage is that bonds in the first CMO tranches exhibit less prepayment uncertainty. An investor can subsequently better forecast the effective maturity and overall yield. In some instances the last class, a Z-tranche, consists of an accrual bond in which no interest or principal is paid until all other classes of bonds have been repaid. These securities are higher risk and represent a hybrid form of zero coupon bond.

As an example, consider the CMO structure in Exhibit 16.5. The CMOs are based on 30-year, fixed-rate conforming residential mortgages that carry a market rate of 5%. The CMO bonds that are collateralized by the mortgages are divided into four tranches or classes of bonds with different maturities and cash-flow features. Given the sequential principal payments described previously, prepayment risk is low for securities in the first tranche but increases systematically to securities in the subsequent tranches. There is also substantial interest rate risk with the uncertain prepayments and thus uncertain final maturity for bonds in all tranches, but the risk is greatest for the third and fourth tranches. As expected, the coupon rates and promised yields increase with estimated maturity to compensate investors for the additional risk. Finally, the bonds may be guaranteed by Fannie Mae or Freddie Mac such that investors assume little default risk.

There are many different types of CMOs. For example, *planned amortization class* CMOs (PACs) have principal payments that are allocated according to a fixed amortization schedule. Specifically, as long as prepayments fall within a predetermined range, the principal of a PAC will be repaid in a predictable, timely fashion. If actual prepayment rates fall outside this range, principal allocated to other non-predetermined amortization class tranches is reduced or accelerated to ensure that the PAC CMO is paid as scheduled. Such non-PAC CMOs are labeled *support*

EXHIBIT 16.5



Source: Freddie Mac.

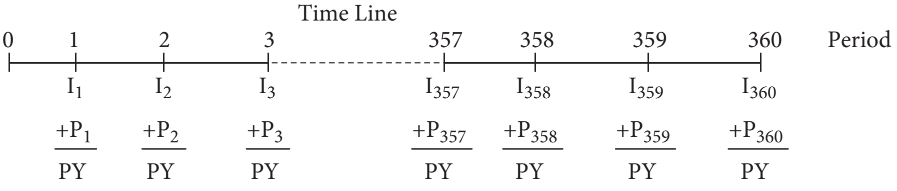
(SUP) tranches. The result is that PAC bonds exhibit relatively low prepayment risk, as long as the PAC prepayment range (band) is wide, but the non-PAC tranches exhibit great prepayment risk.

CMOs provide several advantages over traditional MBSs. First, they exhibit less prepayment risk. Second, by segmenting the securities into maturity classes, CMOs appeal to different investors who have different maturity preferences. Banks, for example, often prefer first tranche securities, because the short maturities and durations better match their cash-flow obligations with deposit liabilities. Insurance companies, by contrast, often prefer later tranches where the bonds have much longer effective maturities. Third, most CMOs exhibit little default risk because the collateral backing the bonds are generally agency securities that carry explicit guarantees, or the issuer purchases private insurance. Thus, many CMOs are Aaa and Aa rated. In addition, many early classes of bonds are overcollateralized because the actual cash flows from the collateral exceed cash flow required to pay bondholders. Finally, like MBSs, CMOs are priced at a spread over Treasury securities so that changes in yields are fairly predictable.

CMOs also have several disadvantages. They are less liquid because the secondary market is less developed. Transactions costs are also subsequently higher. In addition, an investor may find it difficult to obtain an accurate price quote when trying to sell a CMO. This is particularly true for the latter tranches, which exhibit far greater price volatility. Banks and other investors have occasionally had serious trouble estimating prepayment speeds, and thus the interest rate risk with CMOs has been extraordinary. Regulators have tried to limit the riskiness of a CMO for banks by forcing banks to mark-to-market all CMOs that do not meet well-defined price and extension volatility criteria. Finally, all CMO interest is taxable at the federal, state, and local government levels, unlike Treasury securities, which are subject only to federal income taxes.

Stripped Mortgage-Backed Securities. Stripped Treasury securities, introduced earlier, are nothing more than zero coupon instruments that represent either a principal payment or coupon interest payment on a Treasury obligation. These securities are generally labeled principal only (PO) and interest only (IO). The previous time line for the 10-year Treasury reveals 20 distinct IOs paying $45,000 each at maturity and one PO of $1 million. These stripped Treasury securities exhibit no default risk and no interest rate risk if held to final maturity. An investor can therefore lock in a guaranteed return if he or she matches the holding period with a stripped Treasury of the same maturity.

Stripped MBSs are much more complicated in terms of their structure and pricing characteristics. This reflects the design of mortgage contracts and the impact of mortgage prepayments. Consider a 30-year, 12 percent, fixed-rate mortgage that is fully amortized. There will be 360 scheduled principal and interest payments equal to a fixed dollar amount per month (PY). The following time line demonstrates the cash-flow pattern of interest (I) and principal (P) payments where the subscripts refer to the month in which the payment is made.



Loan amortization requires that the early period principal payments are small relative to the total payment so that $P_1 < P_2 < \ldots . < P_{360}$. Interest payments are large during the early periods when the outstanding principal is high and decline over time as the principal is reduced. Thus, $I_1 > I_2 > \ldots . > I_{360}$.

Unlike Treasury securities, there is more than one principal component as each payment is part principal. Furthermore, MBSs are typically stripped into just two securities, with the PO representing the entire stream of principal payments, and the IO representing the entire stream of interest payments. Thus, each payment is not a separate security, and the strips are no longer simple zero coupon instruments. More importantly, MBSs are subject to prepayment risk, which affects the underlying principal and interest payments and thus makes mortgage-backed POs and IOs highly interest sensitive.

Suppose that an investor purchased the PO security represented by the stream of principal payments in the above time line when the market rate and coupon rate both equaled 10 percent. Given normal demographic trends, prepayments are expected to equal 6 percent annually. Now suppose that the prevailing mortgage rate drops to 8 percent so that prepayments accelerate and the CPR jumps to 20 percent. The investor will receive principal payments earlier than originally anticipated. In addition, the payments will be discounted at a lower rate so that the price of the PO will rise substantially. Similarly, a rise in mortgage rates will not slow prepayments because they are already at the minimum 6 percent, but the cash flows will be discounted at a higher rate so the price of the PO will fall. If the PO originally carried a higher coupon rate, prepayments would have slowed, and the price decline would be even greater. In short, a mortgage-backed PO behaves much like a typical MBS or conventional bond except that it is more price sensitive.

Suppose that another investor bought the IO security represented by the stream of interest payments at the 10 percent coupon rate. A decline in the market rate to 8 percent would accelerate principal payments, and the outstanding principal balance would fall below that anticipated. The IO investor would thus receive much lower interest payments than originally anticipated. In the extreme case when the entire outstanding principal balance is repaid, the IO investor would receive no interest payments. Not surprisingly, the price of an IO is quite volatile. If prepayments are high enough, the drop in the dollar value of interest received can swamp any effect from discounting at a lower rate so that the price of an IO will fall. In a similar vein, suppose that the investor purchased the IO when the prevailing mortgage rate was 6 percent, or 4 percent below the 10 percent coupon rate on the underlying mortgages. The initial forecast would call for a high prepayment speed such that the IO could be purchased at a relatively low price. If the market rate increased to 8 percent, prepayments would slow substantially, outstanding principal would be greater than that initially anticipated, and interest payments would rise sharply. If the prepayment effect was large enough, it could swamp discounting at a higher rate such that the value of the IO might rise. These IO instruments can have prices that move in the same direction as market interest rates.

The essential point is that mortgage-backed IOs are extremely price sensitive to changes in interest rates, and the price/yield relationship may be positive. When prepayments rise sharply with a drop in interest rates, relative to prepayments that were anticipated, the value of the IO similarly falls. When prepayments fall sharply with an increase in rates relative to expectations, the value of the IO will similarly rise. Thus, IOs may vary in price in the opposite direction of that normally observed for traditional fixed-income securities. In securities parlance, these IOs exhibit negative convexity. To compensate for their high risk, IOs often carry yields that are 4 to 5 percent above comparable-duration Treasury yields.

It is very difficult to predict prepayments and thus the value of IOs and POs when rates change. They are extremely risky because they are extremely interest sensitive. There are many better hedging tools, such as interest rate swaps and options on futures, with more predictable cash flows and changes in value. Bank regulators have subsequently encouraged banks to stay away from IOs.

Corporate, Foreign, and Taxable Municipal Bonds

Banks also purchase taxable fixed-income securities in the form of corporate bonds and foreign government bonds. At year-end 2013, they held $570 billion in corporate and foreign bonds, which was 36 percent more than their holdings of municipals. Banks generally do not purchase junk bonds, because they are restricted to investment-grade securities unless they want to maintain a credit file on the issuer. In some instances, banks are willing to buy nonrated municipals to support their local communities and because they believe the risk versus return trade-off is attractive. By regulation, banks can invest no more than 10 percent of capital in the securities of any single firm. These bonds typically pay interest semiannually and return the entire principal at maturity. In most cases, banks purchase securities that mature within 10 years.

Occasionally, banks also purchase municipal bonds that pay taxable interest. The Tax Reform Act of 1986 eliminated the tax-exempt status of certain types of municipal revenue bonds. These entities have subsequently issued debt that pays taxable interest to meet their financing needs. The pretax yields are comparable to those on corporate securities even though the borrower is affiliated with a municipal government.

Asset-Backed Securities

Until recently, many banks actively securitized business, credit card, and other nonmortgage loans that they originated. This trend slowed sharply with the 2007–2008 credit crisis. Conceptually, an asset-backed security (ABS) is comparable to a mortgage-backed security in structure, but the underlying collateral is not a mortgage. Any type of loan that has sufficiently standardized features can be grouped into a pool. An ABS is created when a firm issues securities to investors where the principal and interest payments on the underlying loans in the pool are used to make the promised payments on the securities. The securities are effectively pass-throughs, because promised interest and principal payments are secured by the payments on the specific loans pledged as collateral.

Two of the more popular forms of asset-backed securities are collateralized automobile receivables (CARS) and certificates for amortizing revolving debt (CARDS).[15] As the names suggest, CARS are securities backed by automobile loans to individuals, and CARDS, in turn, are securities backed by credit card loans to individuals. In recent years, credit card loans and retail auto loans have dominated loan securitizations, followed by home equity, auto, and equipment leases. CARS may be structured either as conventional pass-throughs or as CMOs. Automobile loans representing installment contracts with maturities up to 60 months are placed in a trust. CARS represent an undivided interest in the trust. An investor receives the underlying monthly principal and interest payments less a servicing fee. As with CMOs, CARS may be multiple-class instruments in which cash flows pay interest to all security holders, but repay principal sequentially from the first class of bonds to the last. Default risk is reduced, because the issuer may either set up a reserve fund out of the payments to cover losses, purchase

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[15] CARS and CARDS are formally labels originally copyrighted by Salomon Brothers for its specific issues of asset-backed securities, but will be used generically in the discussion to refer to any similar securities.

insurance, or obtain a letter of credit. Such credit enhancements typically provide the securities the AAA credit rating. CARS are attractive to investors because they have maturities of five years or less, exhibit little prepayment risk, and carry rates that are approximately 1 percent over rates on comparable-duration Treasury securities. Prepayment risk is low, because automobile loan rates are somewhat sticky and there are limited incentives to prepay. The primary negative is that liquidity is reduced compared with many other securities.

CARDS are structured much like CARS except that the collateral is credit card receivables. An issuer places credit card accounts in a trust and sells participations. The securities generally have stated maturities around five years, with only interest being paid monthly during the first one and a half to two years. Principal payments begin thereafter. Because many cardholders repay their debts quickly, the principal may be repaid well before the stated maturity. Thus, prepayment risk is higher for CARDS than CARS. Still, issuers establish a reserve fund or obtain explicit guarantees via letters of credit so that the securities are rated similarly.

Collateralized Debt Obligations. With the popularity of securitization, many financial institutions find it attractive to offer collateralized debt obligations (CDOs), which are securitized interests in pools of assets, typically bank loans and/or bonds. When the underlying collateral is loans or bonds, these securities are labeled *CLOs* or *CBOs*, respectively. Investors in these securities assume the credit risk that the underlying collateral will generate cash flows sufficient to service the debt. As with CMOs, the originator creates tranches, typically labeled *senior, mezzanine*, or *subordinated* (or *equity*). Promised payments go initially to service senior debt followed by mezzanine and subordinated debt, respectively.

The credit crisis that arose in 2007 demonstrated significant weaknesses in the originate-to-distribute model of banking. Loan originators who securitized the underlying loans were less concerned about the credit risk of the collateral than they would and should have been, because they planned to sell it to investors. The rating agencies compounded the problem by applying inappropriate models of credit risk. To generate increasing volumes of business, originators made loans to increasingly risky borrowers and followed the norm of creating tranches of securities carrying different amounts of credit risk. The rating agencies, in turn, erroneously applied valuation models that assigned ratings that, in retrospect, were much too high. It was not unusual, for example, for Aaa-rated securities (mortgages and CDOs) to go into default within the first year of issue. Not surprisingly, the appeal and effectiveness of securitization has declined.

Mutual Funds. In recent years, regulators have allowed banks to purchase certain types of mutual fund shares as an investment. The shares must be in funds that purchase only securities that banks would be allowed to own directly for their own account, such as Treasury and agency obligations, MBSs, and investment-grade corporates. The presumed benefit is that small banks might be better able to diversify credit risk, because they would own shares in a pool of securities rather than individual securities. Regulators further limit mutual fund purchases to no more than 10 percent of a bank's capital plus surplus.

After initial interest during the latter 1980s, U.S. banks generally ignored mutual funds through 1996, but increased their holdings from almost \$14 billion in 1996 to \$76 billion by 2013. The primary reason is that regulations require that mutual fund shares be marked-to-market rather than reported at book values. Funds that do not have fixed share prices fluctuate in value with changes in interest rates, which translates into fluctuating values reported on a bank's balance sheet. Such volatility looks bad in periodic financial statements, because it presents an appearance of high risk.

Characteristics of Municipal Securities

At year-end 2013, U.S. commercial banks owned $404 billion in municipal securities, or 11 percent of total municipals outstanding, more than any other investor group. Individuals, either directly or via mutual funds, owned $2.57 trillion in municipals, which represented 70 percent of the total. This reflects changes in federal income tax laws that resulted in many municipals yielding less to banks than taxable bonds with comparable maturity and risk characteristics.

Municipals are generally attractive investments because their interest is exempt from federal income taxes. Interest on in-state issues is also normally exempt from state or local income taxes. This tax treatment lowers quoted yields below pretax yields on taxable securities of comparable maturity and risk, because municipal yields effectively represent after-tax returns. Such investments also support local business development and growth, in addition to essential public services.

Municipal securities are formally issued by state and local governments and their political subdivisions, such as school corporations, water treatment authorities, and river authorities. Nonprofit organizations and nonfinancial corporations also effectively issue municipals, because they get the use of the proceeds at reduced rates, even though a municipal unit's name actually goes on the debt. Government units distinguish between short-term and long-term municipals, because they are used for different purposes and are subject to different restrictions. Short-term securities are used to finance temporary imbalances between the timing of operating receipts and expenditures or to provide interim financing of construction outlays. By law, most governmental units are forced to run balanced operating budgets, meaning that current operating revenues must be sufficient to cover operating expenses. State and local governments are not allowed to issue long-term bonds to finance short-term operating budget deficits.

Today, long-term municipals are used primarily to finance capital expenditures for such purposes as education facilities, hospitals, housing, and public utilities. The benefits to these facilities presumably arise over long periods so that future taxes should cover the interest and principal payments. The intent is that higher taxes will be paid by those who benefit. **General obligation bonds** are municipals in which principal and interest payments are backed by the full faith, credit, and taxing authority of the issuer. As such, they are the closest thing to a Treasury bond because the issuer can raise taxes or issue new debt to repay the bonds. **Revenue bonds** are municipals in which principal and interest payments are backed by revenues generated from whatever facility or project the bond proceeds are used to finance. An example is bonds issued by a water treatment facility which are backed by fees or assessments on users of the treated water. For a pure revenue bond, no tax receipts back the promised payments. For many years, a large share of long-term municipal debt effectively financed the expenditures of private corporations in the form of **industrial development bonds** (IDBs), a special form of industrial revenue bond. For example, it is not unusual for a private corporation, such as Boeing, to negotiate a deal with a state or municipality to locate a manufacturing facility within the state or city if the government entity would form a local economic development unit, have the unit issue debt, and then let Boeing pay the debt service with lease payments to the economic development unit. The advantage to the private firm is that it can effectively borrow at lower tax-exempt interest rates. The advantage to the community is that it attracts new business that presumably brings jobs and services. The Tax Reform Act of 1986 sharply reduced the issuance of tax-exempt IDBs so that they now represent a much smaller share of the municipal market.

Most long-term municipals are serial bonds, with a fraction of the total principal maturing in consecutive years. This is shown in Exhibit 16.6 for the $30 million issue

EXHIBIT 16.6 Summary of Terms for a Municipal School Bond

Sequoia Union High School District $30,000,000

General Obligation Bonds Election of 2001
Dated: May 1, 2002
Due: July 1, 2003 through July 1, 2031
Callable: July 1, 2011 at 102.0% of par, declining to par as of July 1, 2013
Winning Bid: Salomon Smith Barney, at 100.0000,
True interest cost (TIC) of 5.0189%

Other Managers: Bear, Stearns & Co., Inc., CIBC World Markets Corp.

Due Date	Amount	Coupon	Yield
7/1/03	$225,000	7.00%	2.00%
7/1/04	$520,000	7.00%	2.50%
7/1/05	$545,000	7.00%	3.00%
7/1/06	$575,000	7.00%	3.25%
7/1/07	$605,000	7.00%	3.50%
7/1/08	$635,000	7.00%	3.70%
7/1/09	$665,000	7.00%	3.80%
7/1/10	$700,000	4.00%	3.90%
7/1/11	$735,000	4.00%	4.00%
7/1/12	$765,000	4.125%	4.125%
7/1/13	$800,000	4.25%	4.25%
7/1/14	$835,000	4.375%	4.375%
7/1/15	$870,000	4.50%	4.50%
7/1/16	$910,000	4.60%	4.60%
7/1/17	$950,000	4.70%	4.70%
7/1/18	$995,000	4.80%	4.80%
7/1/19	$1,045,000	4.90%	4.90%
7/1/20	$1,095,000	5.00%	5.00%
7/1/21	$1,150,000	5.00%	5.00%
7/1/22	$1,210,000	5.00%	5.00%
7/1/23	$1,270,000	5.00%	5.00%
7/1/24	$1,335,000	5.00%	5.00%
7/1/25	$1,405,000	5.00%	5.20%
7/1/26	$1,480,000	5.00%	5.21%
7/1/31	$8,650,000	5.125%	5.21%

Source: The Bond Buyer, Results of Competitive Sales, April 25, 2002.

by the Sequoia Union High School District. This new issue indicates that the offering has 25 serial components of different amounts that mature annually from 2003 through the year 2026. Serialization enables a municipality to spread out principal and interest payments to stay within annual debt service capability. Issues may also have term components where the entire principal comes due at a set maturity. The state of Washington issue has a separate term component of bonds with $8.65 million in principal that matures in 2031, 29 years after the issue date. The firms listed at the top, with Salomon Smith Barney as the lead, are the investment banks that served as underwriters.

From a bank's perspective, serial issues allow portfolio managers to select instruments with the precise maturities that best meet the bank's risk and return preferences. For example, a bank with many short-term liabilities may choose to concentrate investments near term. Similarly, banks that choose to use municipals to lengthen their asset-rate sensitivity profile may select longer-term issues. With a serial issue, the manager can simply select the appropriate maturity instrument, because credit and liquidity risk are held constant.

Money Market Municipals

Municipal notes are issued to provide operating funds for government units. **Tax and revenue anticipation notes** are issued in anticipation of tax receipts or other revenue generation, typically from the federal government. These securities enable governments to continue to spend funds even when operating revenues decline, then repay the debt as revenues are received. **Bond anticipation notes** provide interim financing for capital projects that will ultimately be financed with long-term bonds. For example, a school district may begin construction of new schools with note proceeds, because it believes that current long-term municipal rates are temporarily high. Long-term bonds will be issued after rates decline, with the proceeds used to retire the notes. Most notes carry a minimum denomination of $25,000, with maturities ranging from 30 days to one year. Maturities on bond anticipation notes may extend to three years.

Project notes and **tax-exempt commercial paper** also play important roles in the municipal market. Local housing authorities issue project notes to finance federal expenditures for urban renewal, local neighborhood development, and low-income housing. The notes are repaid out of revenues from the projects financed. In the event that revenues are not forthcoming, the Department of Housing and Urban Development agrees to make the obligated interest and principal payments, so the notes carry an implied federal guarantee. Tax-exempt commercial paper is issued by the largest municipalities, which regularly need blocks of funds in $1 million multiples for operating purposes. Because only large, well-known borrowers issue this paper, yields are below those quoted on comparably rated municipal notes.

Banks buy large amounts of short-term municipals. They often work closely with municipalities in placing these securities and have a built-in need for short-term liquidity given that most bank liabilities are highly rate sensitive near term. Thus, short-term municipals are in high demand, and short-term municipal rates are relatively low compared with rates on longer-term municipals. The Sequoia Union High School District issue in Exhibit 16.6 demonstrates this rate relationship. Consider the serial bond issues that mature from 2003 through 2026. The coupon column refers to the coupon rate, while the yield column indicates the market rate. A coupon rate equal to the market rate means that the security sells at par. A coupon rate above (below) the market rate indicates that the bond sells at a premium (discount). Note that the one-year serial bond pays 2 percent, which is lower than all other market rates, which generally increase with maturity. Long-term municipals carry higher yields than short-term municipals.

Capital Market Municipals

General Obligation Bonds. Interest and principal payments on general obligation bonds are backed by the full faith, credit, and taxing power of the issuer. This backing represents the strongest commitment a government can make in support of its debt. At the extreme, governments promise to raise taxes, attach real property, and issue new debt to meet promised debt service payments. The Sequoia Union High School District issue in Exhibit 16.6 is such a bond. Because this guarantee is so broad, issuers must generally obtain voter approval via referendum to issue new general obligation debt. Actual default risk depends on the viability of the issuer's tax base and its willingness to live up to the terms of the debt.

Occasionally, a municipality's taxing authority is limited, typically by a maximum allowable tax rate. In these cases, the bonds are still classified as general obligations but are referred to as *limited tax* bonds. In addition, municipalities often issue general obligations that are also secured by revenues independent of issuer general funds. Such bonds are referred to as *double barrel* bonds because of the dual backing.

Revenue Bonds. Revenue bonds are issued to finance projects whose revenues are the primary source of repayment. An example is bonds issued to finance an airport expansion that are supported by fees obtained from the sale of landing rights and the city's share of parking and concessions. Other common public-purpose revenue bond projects include toll roads and bridges, port facilities, hospital facilities, university dormitories, and water/sewer treatment plants. The revenue sources of these bonds can be identified by a label: tolls, port entry and exit charges, hospital charges, student fees, and water/sewer user charges, respectively. In general, revenue bonds exhibit greater default risk than general obligations. The risk associated with specific bonds, however, depends on the strength of the revenue source supporting each project. Thus, some revenue bonds supported by substantial cash flows trade at rates below those on general obligations. Many revenue bonds are sufficiently complex that an investor must read the bond prospectus carefully to determine what the primary revenue source is and what group is ultimately responsible for ensuring that investors are paid. Unlike general obligation bonds, revenue bonds do not need voter approval prior to issue.

Banks buy both general obligation and revenue bonds. The only restriction is that the bonds be investment grade or equivalent. Banks generally have a preference, however, for general obligations because they are more marketable and more closely associated with essential public purposes. Since the Tax Reform Act of 1986, banks no longer buy IDBs because they carry no tax advantage.

Credit Risk in the Municipal Portfolio

Until the 1970s, few municipal securities went into default. However, deteriorating conditions in many large cities ultimately resulted in defaults by New York City (1975), Cleveland (1978) and more recently, Detroit (2013). The Washington Public Power & Supply System (WPPSS) similarly defaulted in 1983 on $2.25 billion of revenue bonds issued to finance two nuclear power plants.[16] In September 2008, Jefferson County, Alabama, similarly defaulted on $3 billion in sewer bonds. This municipal subdivision used interest rate swaps to help hedge its exposure to rates and found that it was not able to service the debt and swap payments as short-term rates increased. For the past several years, the pricing of Puerto Rico bonds has signaled that many investors recognize the real possibility of default as offered rates on Puerto Rico municipals have far exceeded rates on comparable maturity general obligation bonds issued by other states and municipalities. Municipal credit spreads generally widened in 2012–2013 as investors anticipated problems with many issuers' financials, driven largely by pension problems.

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[16] Better disclosure of municipal bond prices by dealers since 2004 has also produced greater transparency regarding what municipal investors buy and/or own.

Unfortunately, the diversity of municipal borrowers and disparate types of issues make it difficult to categorize municipal securities. Many issuers do not purchase bond ratings, so their securities are nonrated. Although these securities may be low risk, an investing bank is responsible for documenting that they are equivalent to investment-grade securities. Much like the rating agencies, banks must examine the issuer's existing debt burden, the soundness of the operating budget, the strength of the tax base, cash-flow support for revenue issues, and local demographic trends, all of which should be recorded in a credit file. With many securities, it is extremely difficult for an investor to trace the web of revenue sources and guarantees to determine which group is ultimately responsible for meeting debt service requirements. Thus, it is often difficult to assess the credit risk associated with nonrated issues.

Many municipal issuers purchase bond insurance to reduce perceived default risk and increase the marketability of their debt. The insurance is an unconditional guarantee by a property and casualty insurance company to pay promised coupon interest and principal if the issuer defaults. The municipality pays for the insurance when the securities are issued, and the policy is nonrefundable and noncancelable over the life of the securities. During 2007, almost 70 percent of new issues carried some form of insurance or third-party guarantee. Municipalities that purchase insurance benefit from reduced interest costs because ratings on most insured bonds improve to the triple-A or double-A level. Such issues paid rates 10 to 25 basis points below rates on otherwise comparable noninsured bonds, which can be viewed as the price investors pay for the reduced credit risk. Of course, the value of the guarantee is only as good as the insurance company. Three well-known insurers, the American Municipal Bond Assurance Corporation (AMBAC), the Municipal Bond Insurance Association (MBIA), and Financial Guaranty Insurance Company (FGIC), provide most insurance coverage in the municipal market. In 2007, insured municipal bonds comprised almost one-half of all new debt issues. With the crisis, the insurers had their own debt ratings lowered sharply given their exposure to sub-prime (high risk) insured mortgages. Not surprisingly, the volume of insured municipals fell sharply to where insured bond sales (dollars) represented just under 4 percent of new debt sales in 2013.

Liquidity Risk

Municipals exhibit substantially lower liquidity than Treasury or agency securities. The secondary market for municipals is fundamentally an over-the-counter market. Small, nonrated issues trade infrequently and at relatively large bid-ask dealer spreads. Large issues of nationally known municipalities, state agencies, and states trade more actively at smaller spreads. Name recognition is critical, as investors are more comfortable when they can identify the issuer with a specific location. Insurance also helps by improving the rating and by association with a known property and casualty insurer.

Still, municipals are less volatile in price than Treasury securities, a characteristic that is generally attributed to the peculiar tax features of municipals.[17] The municipal market is segmented by maturity. On the supply side, municipalities cannot shift between short- and long-term securities to take advantage of yield differences because of constitutional restrictions on balanced operating budgets. Thus, long-term bonds cannot be substituted for short-term municipals to finance operating expenses. On the demand side, banks once dominated the market for short-term municipals so that their rates were a set fraction of Treasury rates. Today, individuals via tax-exempt money market mutual

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[17] Stock and Schrems (1987) compare the relative price volatility of municipals and Treasuries. They conclude that the volatility of short-term municipals is much lower, which is attributed to substantial short-term municipals investments by commercial banks. Relative volatility with longer-term securities is more similar.

funds dominate the short-maturity spectrum. The investment activity of banks and money market mutual funds at the short end stabilizes municipal bond prices, because these groups purchase most of the short-term municipals offered. This does not hold at longer maturities, where individuals represent the marginal investor. As such, short-term municipals do not vary sharply in price over time relative to short-term Treasuries.

Establishing Investment Policy Guidelines

Each bank's asset and liability or risk management committee (ALCO) is responsible for establishing investment policy guidelines. These guidelines define the parameters within which investment decisions help meet overall return and risk objectives. Because securities are impersonal loans that are easily bought and sold, they can be used at the margin to help achieve a bank's liquidity, credit risk, and earnings sensitivity or duration gap targets. Investment guidelines identify specific goals and constraints regarding the composition of investments, preferred maturities or durations, quality ratings, pledging requirements, and strategies underlying any portfolio adjustments.

Return Objectives

A bank's ALCO policy statement specifies overall return objectives in terms of return on equity, return on assets, and net interest margin. Investment policy guidelines complement this by identifying what portion of interest income should be generated by securities. In particular, they establish targets for the contribution of both taxable interest and tax-exempt interest to net income. Guidelines also outline the potential costs and benefits of taking tax losses or gains on security sales. The guidelines generally assume that the bank has an interest rate forecast and structures its portfolio to take advantage of rate changes.

Portfolio Composition

Investment guidelines concerning portfolio composition directly address the bank's targeted liquidity, credit risk, and interest rate risk position. The guidelines generally specify the types of securities that can be purchased, target mix by security type, credit risk objectives (by rating and due diligence), acceptable maturity ranges at different stages of the interest rate cycle, and those securities that should be pledged as collateral against public deposits. Examples of areas for specific guidelines follow.

Liquidity Considerations

1. What volume of federal funds transactions is desirable?
2. To what financial institutions should the bank sell federal funds, and from what institutions should the bank purchase security RPs?
3. Which Treasury, agency, or municipal securities should the bank pledge as collateral?
4. What amount of short-term securities (under one year) should be held as a potential liquidity reserve?
5. With which banks or securities dealers should the bank establish a trading relationship?
6. What collateral is available to pledge against potential borrowings from the FHLB?
7. What collateral should be pledged against borrowing from the Federal Reserve?
8. What is the appropriate mix between Treasuries, agencies, MBSs, and municipals?

Credit Risk Considerations

1. What amount of municipal, corporate, and foreign securities is optimal?
2. How much (what percentage) should the bank hold in each of the top four rating categories?
3. What is the maximum amount that can be invested in any one issuer's securities?
4. What information should credit files for nonrated municipals and all corporate and foreign bonds contain?
5. Which issuer's securities should be avoided?
6. Should the bank purchase insured municipals?
7. Should the bank purchase agency preferred stock?

Interest Rate Risk Considerations

1. What maturity distribution of Treasuries, agencies, and municipals (separately) is desirable?
2. What duration characteristics are desirable?
3. What planned holding period is desirable?
4. To what extent should the bank purchase discount (or zero coupon) securities?
5. What prepayment probabilities are associated with specific MBSs?
6. What is the convexity of specific MBSs, and how does it vary according to the underlying coupon rate on the mortgages?

Total Return versus Current Income

1. To what extent will the bank actively manage its securities portfolio? Will management attempt to time interest rate movements relative to the business cycle?
2. Will management look to total return or yield to maturity (current income) as the measure of performance?
3. How will reinvestment income be calculated? Should management forecasts or forward rates be used for expected reinvestment rates?
4. Should management index its fixed-income portfolio?

What Are Suitable Investment Securities?

Not all securities should be considered as suitable investments. Each bank establishes its own policies regarding what is acceptable, but management must be especially careful in identifying specific instruments. Given the limited background and knowledge that many community bankers have in the investments arena, it is important to know exactly what the bank is buying when it commits funds. Ed Krei with The Baker Group offers a series of basic questions to ask before purchasing a security. They are:

1. Does the security meet one or more of the bank's stated objectives?
2. Does management understand the security's underlying cash flows and can changes in the cash flows be reasonably forecast under different interest rate and economic scenarios?

3. Can the bank readily sell the security at a reasonable price because there is an active secondary market for it?
4. Can the security be used to meet pledging requirements so that the bank can borrow against it?

The answers to each question must be YES or the security is not "suitable." Consider question number 3. If the only buyer for the security is the broker/dealer that sold it to the bank, it will be more difficult to get a reasonable price and often difficult to get an estimate of true market value.

Active Investment Strategies

Portfolio managers can buy or sell securities at the margin to achieve aggregate risk and return objectives without the worry of adversely affecting long-term depositor or borrower relationships. Investment strategies can subsequently play an integral role in meeting overall asset and liability management goals regarding interest rate risk, liquidity risk, credit risk, the bank's tax position, expected net income, and capital adequacy.

Unfortunately, not all banks view their securities portfolio in light of these opportunities. Many smaller banks passively manage their portfolios using simple buy-and-hold strategies. The purported advantages are that such a policy requires limited investment expertise and virtually no management time; lowers transaction costs; and provides for predictable liquidity. Other banks actively manage their portfolios by adjusting maturities, changing the composition of taxable versus tax-exempt securities, and swapping securities to meet risk and return objectives that change with the external environment. The presumed advantage is that active portfolio managers can earn above-average returns by capturing pricing discrepancies in the marketplace. The disadvantages are that managers must consistently outpredict the market for the strategies to be successful, and transaction costs are high.

The remainder of this chapter examines general factors that affect most investment decisions and active portfolio strategies that help achieve specific risk and return objectives. The analysis begins with a discussion of the traditional interest rate cycle and maturity/duration strategies that take advantage of broad-based rate movements. It then describes the impact of interest rates on mortgage prepayments, the likelihood that callable bonds will be called, and the subsequent impact on price. The final sections address how to determine the after-tax yields and optimal holdings of taxable and tax-exempt securities, and the use of security swaps as a strategy to meet risk and return targets.

The Maturity or Duration Choice for Long-Term Securities

Portfolio managers consider many factors when determining which securities to buy or sell. Perhaps the most difficult to quantify is the optimal maturity or duration. Difficulties arise because it is virtually impossible to consistently forecast interest rates better than the forecasts embodied in forward rates. Management must also be aware of the bank's overall interest rate risk position to make investments that will achieve the targeted risk and return profile. Many managers justify passive buy-and-hold strategies because they lack the time and expertise to evaluate investment alternatives and monitor performance in an attempt to outperform the market. As a result, they select securities with maturities that they hope will generate average returns over the entire business cycle. Other managers actively trade securities in an effort to earn above-average returns.

Passive Maturity Strategies

Specific policies frequently follow one of two models. The first model, the **ladder** (or staggered) maturity **strategy**, stipulates that management should initially specify a maximum acceptable maturity or holding period. Securities are held-to-maturity, and managers acquire bonds expecting to earn fixed yields over the life of the instruments. Under this strategy, securities are spaced approximately evenly throughout the maturity range so that an equal proportion of the entire portfolio matures each year. Bonds near maturity represent a liquidity buffer, with the proceeds simply reinvested at maturity in securities with the longest acceptable maturity, regardless of prevailing yields. If, for example, management wants all securities to mature within 10 years, it will have 10 percent of the portfolio maturing each year. As securities mature, the proceeds will be reinvested in new 10-year maturity instruments. The only decision involves selecting 10-year securities of acceptable credit quality. Managers, therefore, do not attempt to forecast interest rates but rather recognize that the bank earns average yields over the interest rate cycle.

The second model, the **barbell** maturity **strategy**, differentiates between bonds purchased primarily for liquidity versus income purposes. Management invests a fraction of the portfolio, typically 25 to 40 percent, in short-term securities that pay market rates and normally trade at prices close to par. These instruments are held primarily to meet liquidity requirements. All remaining funds are invested at long-term maturities, typically 10 to 15 years, to maximize coupon interest income. The long-term bonds are sold prior to maturity and the proceeds reinvested long term once the remaining maturity falls into the intermediate range. With an upward-sloping yield curve, long-term securities pay higher initial yields. If the level of interest rates does not increase, banks sell the securities at a capital gain when less than 10 years remain to maturity, thereby increasing the total return.[18] During periods of relatively stable interest rates, this barbell strategy increases the total return from holding short- and long-term bonds above that for the ladder maturity strategy, because coupon interest is higher, reinvestment income is greater, and the long-term bonds are sold for a gain.

With the ladder strategy, a constant portion of the portfolio matures each year. With the barbell strategy, short-term and long-term maturities dominate, as most of the portfolio matures at these extreme periods. The first strategy requires the portfolio manager to purchase a long-term maturity security whenever a bond matures. The second picks yields off the short and long end of the maturity spectrum so managers are reinvesting proceeds more frequently. Both strategies are mechanical and have the advantage of reducing transaction costs over active portfolio management. The disadvantage is that banks that follow these strategies sacrifice short-term returns for risk reduction, so they may miss extraordinary profit opportunities.

Active Maturity Strategies

Active portfolio management involves taking risks to improve total returns by adjusting maturities, swapping securities, and periodically liquidating discount instruments. To do this successfully, a bank should exhibit a strong capital base and broad-based earnings power. It must also avoid the trap of aggressively buying fixed-income securities at relatively low rates when loan demand is low and liquidity is high.

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[18] Total return is the zero coupon equivalent return an investor receives from the coupon payments, the reinvestment income on these coupons, and the price appreciation or depreciation at sale or maturity. See Chapter 6 for details.

An integral part of active portfolio management involves having a substantial amount of securities classified as AFS. In addition, active portfolio strategies recognize both liquidity needs and income requirements. For liquidity purposes, a bank should maintain a portion of its portfolio with market values at or above book values. Such instruments can always be sold at par or a gain, regardless of maturity. While this is not always easily accomplished, banks can keep their portfolios trading near par if they purchase instruments of short-term maturity or duration or variable-rate instruments, or if they willingly sell securities at a loss and reinvest the proceeds in other marketable securities when rates increase. The primary advantage of this liquidity focus is that a bank can substitute between long- and short-duration instruments as long as a portion of the portfolio exhibits price appreciation. If an acceptable amount of long-term securities is currently priced above book value, management can invest any remaining funds at maturities or durations consistent with its interest rate forecasts and desired risk position. The primary disadvantage is that losses may arise from inaccurate forecasts.

One strategy has banks actively adjusting their GAP and earnings sensitivity profile in line with interest rate forecasts. Regular ALCO meetings identify the portfolio interest sensitivity and potential volatility of the bank's net interest margin to rate changes. Banks that are liability sensitive or have a positive duration gap may reduce their earnings sensitivity or shorten the aggregate duration of assets by purchasing short-duration securities if they intend to reduce their risk exposure. This would be consistent with an environment where rates are expected to rise above those suggested by the market. Alternatively, such banks may choose to increase their exposure by buying long-term or long-duration securities, thereby increasing the degree of liability sensitivity and the duration gap. This might occur when the bank has sufficient liquidity and management forecasts a long-term decrease in interest rates. Banks that are asset sensitive or have a negative duration gap might similarly buy long-duration securities to reduce their risk exposure when rates are expected to decline, or do the opposite when rates are expected to rise. The key point is that a bank's maturity or duration choice depends on its aggregate goals for interest rate risk and return. By adjusting security maturities and durations it may be speculating on future rate movements. If management consciously assumes greater risk in the security portfolio, it assumes that it can forecast rates better than the market such that its interest rate forecast is better than forward rates implied by current yields.

Riding the Yield Curve. Another example might be a portfolio manager who attempts to ride the yield curve. It works best when the yield curve is upward-sloping and rates are stable. The strategy involves buying securities with a maturity longer than the planned holding period and selling the securities prior to maturity. There are three basic steps. First, identify the appropriate investment horizon, such as five years. Second, buy a par-value security with a maturity longer than the investment horizon where the coupon yield is high in relation to the overall yield curve. Third, sell the security at the end of the holding period when time still remains until maturity. If market rates stay relatively constant or fall, the total return will exceed the return from simply buying the security that matches the planned investment horizon. The reason is that the holder receives more in coupon interest, reinvests the higher coupons to earn greater reinvestment income, and probably sells the security at a gain.

Consider the example summarized in Exhibit 16.7. A portfolio manager has a 15-year investment horizon or holding period. A risk reduction strategy might involve buying a 5-year security yielding 7.6 percent and holding it to maturity. Alternatively, if the manager felt that rates would remain roughly constant over the next five years, another alternative would be to buy a 10-year security paying 8 percent, and sell the security after

EXHIBIT 16.7 **Effect of Riding the Yield Curve on Total Return when Interest Rates Are Stable**

Cash Flows	Buy a 5-Year Security		Buy a 10-Year Security and Sell It after 5 Years	
Period: Year-End	**Coupon Interest**	**Reinvestment Income at 7%**	**Coupon Interest**	**Reinvestment Income at 7%**
1	$ 7,600	—	$ 8,000	—
2	7,600	$ 532	8,000	$ 560
3	7,600	1,101	8,000	1,159
4	7,600	1,710	8,000	1,800
5	7,600	2,362	8,000	2,486
Total	$38,000	$5,705	$40,000	$6,005
5	Principal at Maturity = $100,000		Price at Sale after 5 years = $101,615 when rate = 7.6%	

Expected total return:*

5-Year Security :

$$i = \left[\frac{(100{,}000 + 38{,}000 + 5{,}705)}{100{,}000}\right]^{1/5} - 1$$

$$i = 7.52\%$$

10-Year Security :

$$y = \left[\frac{(101{,}615 + 40{,}000 + 6{,}005)}{100{,}000}\right]^{1/5} - 1$$

$$y = 8.10\%$$

Difference in Total Returns : $y - i = 0.58\%$

*Realized yield with an assumed reinvestment rate different from the yield to maturity.

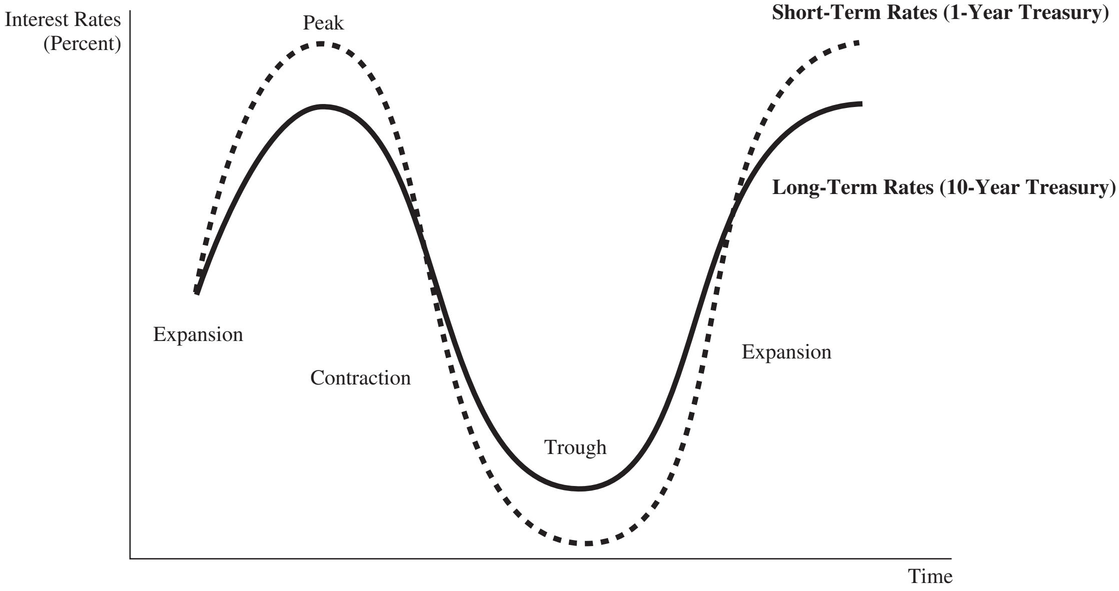
five years. If rates are stable, a 5-year security will yield the same 7.6 percent in five years, and the bond can be sold at a gain. In addition, the 10-year security carries a higher coupon so that periodic interest payments are higher and reinvestment income will be greater. As indicated, the 5-year security pays $7,600 in interest annually that is assumed to be reinvested each year at 7 percent. The 10-year security, by contrast, pays $8,000 in annual interest so that actual coupon and reinvestment income will be greater with the same assumed 7 percent annual reinvestment rate. After five years, the 5-year bond returns principal of $100,000. If rates are constant, the 10-year bond sells for $101,615 with five years remaining to maturity. The bottom part of the exhibit demonstrates that the total return from riding the yield curve is 58 basis points greater than the total return for the matched holding period strategy. Of course, this active strategy involves greater risk. If rates rise substantially, the bond would have to be sold for a loss that could potentially wipe out the incremental coupon and reinvestment income earned.

To implement active investment strategies, portfolio managers must understand the interest rate environment in which they operate. They should continuously monitor recent movements in the level of rates and the magnitude of various rate differentials to formulate an interest rate forecast. Most importantly, portfolio managers must understand their bank's specific risk and return objectives and current financial position. No one can accurately forecast specific interest rates over long periods of time. However, managers can often position their portfolios to take advantage of long-term trends in rates.

Interest Rates and the Business Cycle

Most portfolio managers structure security maturities relative to the business cycle. Exhibit 16.8 characterizes the general relationship between when the yield curve first inverts and the length of time until a U.S. recession begins. The exhibit suggests that the term-structure of Treasury yields follows predictable patterns within the business cycle. Generally, the Fed and analysts look at the 1-year Treasury rate versus the 10-year Treasury rate. If the 10-year rate exceeds the 1-year rate, the yield curve is upward-sloping. This generally occurs during periods that coincide with monetary ease which is accompanied by low short-term rates. The 1-year rate exceeds the 10-year rate (the yield curve is inverted) when rates increase to their cyclical peak and thereafter as the Federal

EXHIBIT 16.8 **Interest Rates over the Business Cycle with Constant Inflation Expectations**



The inverted U.S. Treasury yield curve has predicted these recessions:

Date when 1-Year Rate First Exceeds 10-Year Rate	Length of Time until Start of Next Recession
April 1968	20 months (December 1969)
March 1973	8 months (November 1973)
September 1978	16 months (January 1980)
September 1980	10 months (July 1981)
February 1989	17 months (July 1990)
December 2000*	3 months (March 2001)
December 2005*	24 months December 2007
	14 months average

*Three-month rate first exceeded 10-year rate

Reserve restricts money growth. The consensus is that the shape of the yield curve contains information regarding the market's consensus forecast of interest rates.[19] When the yield curve is upward-sloping, the market forecast is that short-term rates are going to rise from their relatively low levels. Because long-term rates represent an average of current and expected short-term rates, they too will increase with expected increases in short-term rates. When the yield curve is inverted or downward-sloping, the market forecast is that short-term rates will decline, thus lowering long-term rates.

Data at the bottom of Exhibit 16.8 demonstrate that in all but one of the seven recent periods in which the U.S. Treasury yield curve inverted, a recession followed in the United States within 3 to 24 months. The average length of time between recessions was 14 months. The implication is that the 10-year to 1-year Treasury yield differential serves as a good indicator of an economic downturn.

Consensus forecasts obviously represent averages. Individual traders may have substantially different views of economic conditions and the likely movement in interest rates. As they take different positions, the yield curve shifts to reflect the new, market-driven consensus. Thus, any implied interest rate forecast simply reflects the market's current guess about future rates, based on prevailing information.

Passive Strategies over the Business Cycle. One popular passive investment strategy follows from the traditional belief that a bank's securities portfolio should consist of primary reserves and secondary reserves. This view suggests that banks hold short-term, highly marketable securities primarily to meet unanticipated loan demand and deposit withdrawals. Once these primary liquidity reserves are established, banks invest any residual funds in long-term securities that are less liquid but offer higher yields. These residual investments, or secondary reserves, thus focus on generating income.

A problem arises because banks normally have excess liquidity during contractionary periods when consumer spending is low, loan demand is declining, unemployment is rising, and the Fed starts to pump reserves into the banking system. Interest rates are thus relatively low. Banks employing this strategy add to their secondary reserve by buying long-term securities near the low point in the interest rate cycle. Long-term rates are typically above short-term rates, but all rates are relatively low. With a buy-and-hold orientation, these banks lock themselves into securities that depreciate in value as interest rates move higher. Bankers who follow these passive strategies are often unwilling to sell securities at a loss. They end up holding the low-coupon securities until maturity, thereby forgoing opportunities to enhance investment returns.

Passive investment strategies can avoid these difficulties only if the bank buys securities when yields are at cyclical peaks, or if the bank restricts its purchases to securities with short maturities. In both cases, the bank will find that the market value of its portfolio consistently exceeds or at least equals its cost. At rate peaks, the economy is growing rapidly as spending and loan demands are high. The Fed, concerned about rising inflation expectations, slows reserves growth such that short-term rates move above long-term rates as rates increase. With high loan demand, banks do not have sufficient funds to invest in securities in the belief that meeting loan demand is more important than buying securities. Of course, it is extremely difficult to accurately forecast interest rate turns, so banks cannot systematically time investments at interest rate peaks. The fundamental problem with short-term investments is that interest income is

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[19] Discussion of the three theories of yield curves—the unbiased expectations theory, the liquidity premium theory, and the market segmentation theory—can be found in most financial markets textbooks. This analysis focuses only on the role of expected interest rates. One can also derive forward rates from prevailing yields.

relatively unpredictable beyond one year. The bank also forgoes any opportunity to earn above-average returns by locking in high-coupon yields or selling securities with substantial price appreciation.

Active Strategies and the Business Cycle. Many portfolio managers attempt to time major movements in the level of interest rates relative to the business cycle and adjust security maturities accordingly. Some try to time interest rate peaks by following a contracyclical investment strategy defined by changes in loan demand. The strategy entails both expanding the investment portfolio and lengthening maturities when loan demand is high, and alternatively contracting the portfolio and shortening maturities when loan demand is weak. As such, the bank goes against the credit (lending) cycle. A review of Exhibit 16.8 indicates that the yield curve generally inverts when rates are at their peak prior to a recession. Note the data at the bottom of the exhibit, which relate the date when the 1-year Treasury rate first exceeded the 10-year Treasury rate. In all but one instance since World War II, a recession followed within 20 months after the Treasury yield curve inverted.[20] In 1967, the 1-year rate exceeded the 10-year rate and a recession did not follow. This date coincided with the Vietnam War, and many analysts attribute the lack of a recession to massive federal government spending.

A contracyclical strategy involves buying long-term securities when the yield curve is inverted. The yield curve inversion signals a gradual decline in rates that active portfolio managers try to anticipate by substituting bonds for loans and lengthening bond maturities with impending recession. If a recession is likely, banks should reduce their loan exposure because loan charge-offs will eventually increase. A bank that follows such a contracyclical strategy is much more likely to purchase securities when the level of interest rates is high. These yields can in turn be locked in for long periods of time. The disadvantage is that a bank either has to restrict credit to loan customers or rely on relatively expensive, short-term debt instruments such as federal funds to finance the loans. Because the yield curve is inverted, many investment officers feel pressure to continue buying short-term securities due to their higher yields. If rates follow the cycle, these high short-term rates will be only temporary. Investment officers also feel pressure from lenders who are being asked not to make loans when loan demand is strong. Of course, if a recession follows, loan problems typically increase, and effective loan yields after charge-offs fall.

The contracyclical strategy also suggests that when loan demand is weak, banks should keep investments short term. This is a time of relatively low yields, as indicated by the trough in Exhibit 16.8. The obvious problem is that without loans, banks need to find higher-yielding investments to maintain net interest income. Thus, the tendency is to lengthen maturities because the yield curve is upward sloping and banks are in search of higher yields. If rates do increase, the bank will ultimately have to sell the securities at a loss or keep them in its portfolio and simply not realize the loss but earn a below-market yield.

It is important to remember that efforts to time interest rate changes are risky. If management guesses incorrectly and positions the bank accordingly, it may have to take capital losses when it sells securities, or it will forgo income that it could have earned alternatively. Because it is a riskier strategy, the volatility of returns will be greater than with passive strategies.

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[20] The yield curve did invert in 1999 when the U.S. Treasury announced a program to use federal budget surpluses to repurchase outstanding long-term Treasury securities. Not surprisingly, participants immediately bid long-term rates lower in anticipation of future Treasury purchases. Thus, the yield curve inversion was materially independent of general economic conditions. Current analysis focuses on a comparison of the 3-month yield with the 10-year yield, as the Treasury no longer regularly issues 1-year securities.

The Impact of Interest Rates on the Value of Securities with Embedded Options

Banks have been heavy buyers of a wide range of MBSs and callable agency securities. Each of these carries *embedded options* in the sense that the security issuers (borrowers) can prepay the outstanding principal at their discretion. This feature makes it more difficult for an investor to value the security because the value will depend on the likelihood that the option will be exercised as well as the terms of exercise. The following discussion addresses issues that must be considered when deciding whether to buy such securities and how valuable the securities are.

Issues for Securities with Embedded Options

Whenever a bank buys a callable agency security or mortgage-backed security, it must value the embedded option to determine the risk and return profile of the instrument. There are three direct questions to address. First, is the investor the buyer or seller of the option? Second, how much does the option cost, or how much is the seller being compensated? Third, when will the option be exercised and what is the likelihood of exercise? Answers to each of these questions indicate how the option affects the security's value.

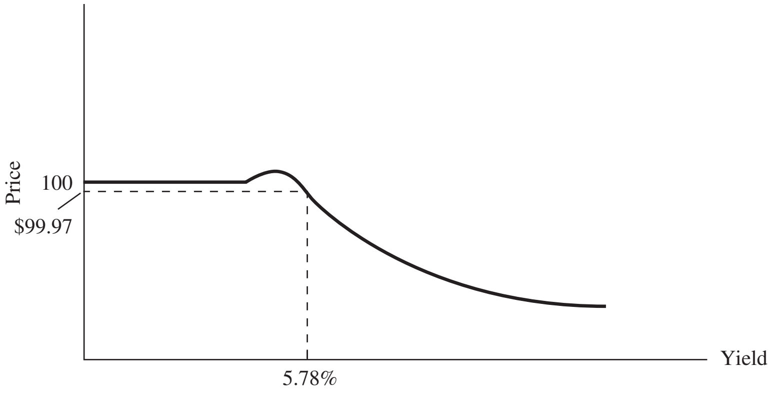
The answer to the first question is straightforward. The buyer of the option is the party that controls the option exercise. In the case of a callable bond or MBS, the borrower chooses when to exercise the option; that is, when to call the bond or refinance the underlying mortgage. Thus, the investor sells the option to the borrower. How does the investor get paid? Generally, the investor receives a higher yield on a security with an option than on a similar security without the option. Several models exist to estimate how much the option is worth and help an investor decide whether to buy the security. A model that uses option-adjusted spread (OAS) analysis is introduced later in the chapter. Finally, these embedded options will generally be exercised when they are in the money and it is in the borrower's best interest to refinance or prepay. In the case of callable agencies and MBSs, option exercise normally occurs when interest rates fall sufficiently below the current coupon and borrowers can replace the existing debt with lower-cost debt. Uncertainty regarding when these options will be in the money and exercised makes it more difficult to estimate the market value of such securities.

Consider the FHLB bond introduced earlier in the chapter. This bond was callable at $100 par value, it had a three-year final maturity, the issuer could not call the bond for one year, and it was priced at $99.97 to yield 5.78 percent. Part A of Exhibit 16.9 indicates the general price-yield relationship. At the quoted price and yield, the option is at the money. Note that if market rates rise, the bond's price will fall, much like an option-free bond. However, as rates fall, the call option moves in the money. Because the bond cannot be called for one year, the price may rise above $100, but it will not increase much above par and will move toward the $100 call price as the call deferment period ends. Unlike an option-free bond, there is little potential price appreciation for this bond because an investor knows it will be called when possible if rates fall. A noncallable FHLB bond with a three-year maturity will carry a lower initial yield, but would increase in price were rates to fall. Thus, the value and price sensitivity of the callable bond versus the noncallable bond will vary sharply depending on whether rates rise or fall over time and whether the bond is called.

Now consider the high-coupon, IO MBS with the price-yield relationship characterized in Part B of Exhibit 16.9. This security carries an 8 percent coupon, but the prevailing mortgage rate is 5.5 percent. Given the rate differential, the mortgages underlying

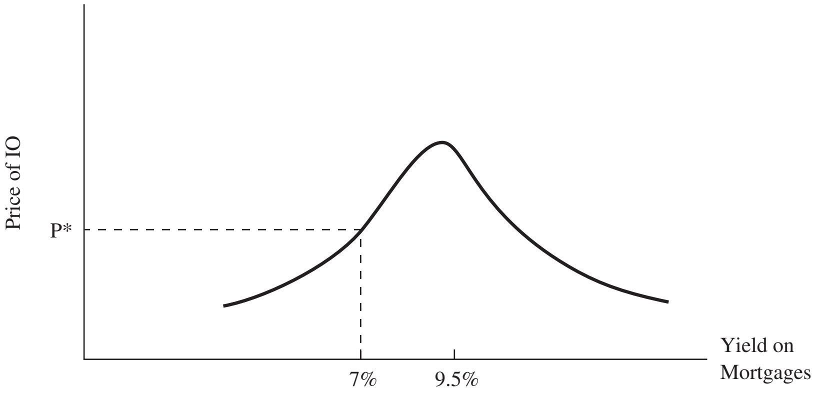
EXHIBIT 16.9 Price-Yield Relationship for Securities with Embedded Options

A. Callable Agency Bond



Three-Year, $100 Par Value FHLB Bond, Callable after
One Year, Priced at $99.97

B. High-Coupon, Interest-Only Mortgage-Backed Security



the IO are prepaying at a CPR of 30 percent, which produces a market price of P*. At this CPR, the IO has an estimated life of just 1.5 years, so an investor will receive the high-coupon interest only briefly. If the rate on the underlying mortgages rises, prepayments will slow, and the investor will receive the high coupons for a longer period of time than the 1.5 years currently expected. The price of the IO will typically increase in this situation. However, if the underlying mortgage rate decreases, the prepayment rate will increase, and the coupons will be received for a shorter time period. Not surprisingly, the IO's price will generally fall. Over the range of mortgage rates below 8 percent, the IO's price varies directly with changes in the mortgage rate.

How different is this from option-free bonds where the price of fixed-income securities varies inversely with market interest rates? At mortgage rates above 8 percent, the IO will decline in price as the CPR falls toward 6 percent and the expected cash flows are discounted at higher rates. Again, the point is that the value and price sensitivity of the IO varies with whether the option is in the money and the likelihood that it will move in or out of the money.

The Roles of Duration and Convexity in Analyzing Bond Price Volatility

Most option-free bonds exhibit predictable price-yield relationships because valuation involves straightforward present value analysis of promised cash flows. The analysis is complicated when bonds with call and put options are valued. Prepayments with MBSs make pricing difficult because prepayment effects can swamp discounting effects resulting from the same change in interest rates. The case where an IO decreases in value when mortgage rates decrease serves as an example. Many bond analysts use the concepts of duration and convexity to measure price sensitivity.

Duration for option-free securities measures the weighted average of the time until cash flows are made on a security. The weights equal the present value of each cash flow divided by the price of the security. Alternatively, duration is an approximate elasticity measure. As such, it measures the relative price sensitivity of a security to a change in the underlying interest rate. Consider a three-year, $10,000 par bond with a 10 percent coupon that pays $500 interest at six-month intervals and $10,000 at maturity. The bond is option free. The curved line in Exhibit 16.10 shows the relationship between the bond's price and market yield according to the present value formula. Notice that the shape of the curve is nonlinear. The Macaulay duration of the bond appears at the bottom of the exhibit and is measured in semiannual periods. Duration can be represented by the slope of the price-yield relationship at various yields, and approximated by the following equation:

$$\text{Duration} = \frac{\Delta P/P}{\Delta i/(1+i)} \tag{16.4}$$

where P equals the price of the bond and i equals the market yield. Rearranging terms,

$$\Delta P \cong -\text{Duration}[\Delta i/(1+i)]P \tag{16.5}$$

Equation 16.5 can be applied in the following manner. Suppose that the prevailing yield on the bond is 10 percent so that duration equals 5.329 six-month periods (2.665 years). If the underlying market rate falls to 8 percent, the bond's price increases to $10,524.21 according to the present value formula. Equation 16.5 approximates the price change as:

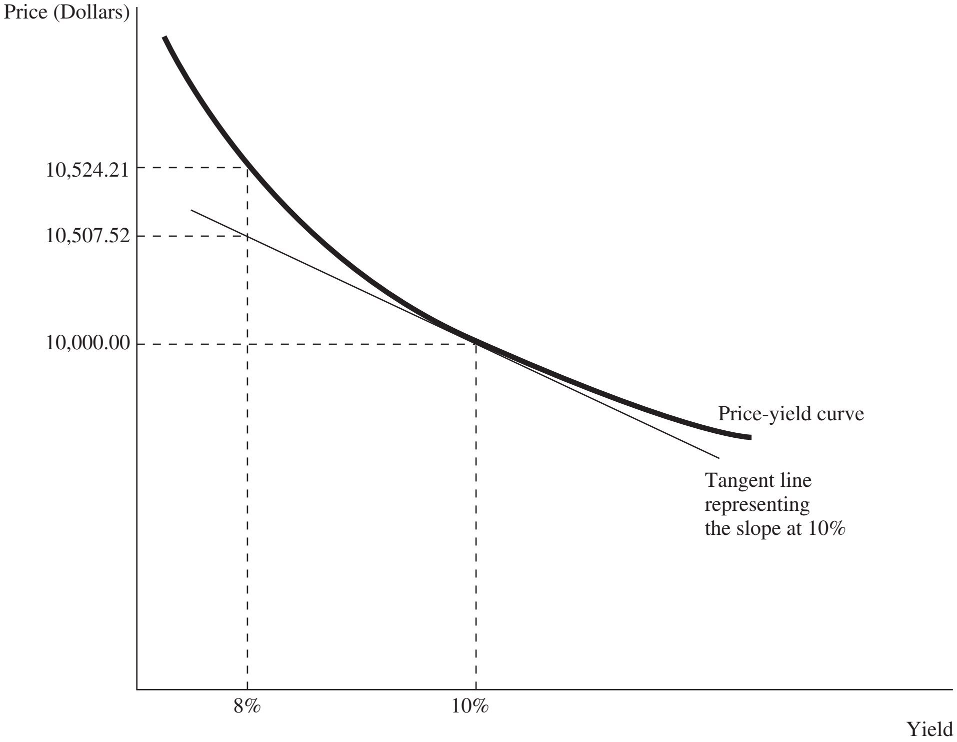
$$\begin{aligned}\Delta P &= -5.329\ (-0.01/1.05)\ \$10{,}000\\ &= 507.52\end{aligned}$$

The estimated price of $10,507.52 can be read off the straight line in Exhibit 16.10 as representing the slope of the price-yield curve at a 10 percent yield. The pricing error is thus $16.69. Interestingly, a 2 percent increase in market rate will lower the bond price by only $491.73, which is less in absolute value than the price increase when the market rate fell by 2 percent. The pricing error ($15.79 in this instance) is also lower when rates increase.

A careful inspection of Exhibit 16.10 reveals several important conclusions:

- The difference between the actual price-yield curve and the straight line representing duration at the point of tangency equals the error in applying duration to estimate the change in bond price at each new yield.
- For both rate increases and rate decreases, the estimated price based on duration will be below the actual price.
- Actual price increases are greater and price declines less than that suggested by duration when interest rates fall or rise, respectively, for option-free bonds.

EXHIBIT 16.10 Price-Yield Relationships and Duration for an Option-Free Bond



Yield	Price	Price – $10,000	Duration*
8%	$10,524.21	$524.21	5.349
9	10,257.89	257.89	5.339
10	10,000.00	0.00	5.329
11	9,750.00	(249.78)	5.320
12	9,508.27	(491.73)	5.310

*Macaulay's duration in semiannual periods.

Source: Timothy Koch, "The Roles of Duration and Convexity in Analyzing Bond Price Volatility." In *Bank Asset/Liability Management*. New York: Warren, Gorham & Lamont, 1989.

- For small changes in yield, such as yields near 10 percent, the error is small.
- For large changes in yield, such as yields well above or well below 10 percent, the error is large.

The fundamental implication is that duration reasonably approximates price volatility on an option-free bond only when yield changes are small.

Convexity, by contrast, characterizes the rate of change in duration when yields change. It attempts to improve upon duration as an approximation of price volatility. Notice from Exhibit 16.10 that the slope of a line tangent to the price-yield curve will increase as yields fall below 10 percent, and will decrease as yields rise above 10 percent. In essence, the duration of the bond lengthens as yields fall and shortens as yields rise. The percentage price decrease is smaller, in turn, than the percentage price increase for the same change in rates. This characteristic is called *positive convexity*, signifying that the underlying bond becomes more price sensitive when yields decline and less price sensitive when yields rise. This is a positive feature of price sensitivity, because it increases a security's gain and decreases a security's loss when rates change. With negative convexity, the bondholder gets little or no price appreciation when rates fall.

Formally, convexity can be defined as the second derivative of a bond's price with respect to the interest rate, divided by the bond's price. A bond's convexity can be combined with duration to better estimate true price volatility from yield changes. The additional convexity measure captures a portion of the error associated with using duration alone. The previous example demonstrates the value of convexity. From 10 percent to 8 percent, the estimated price change due to duration equals $507.52, as described earlier. At 10 percent, the estimated convexity of the bond in Exhibit 16.10 is 16.23 semiannual periods. The estimated price change due to convexity thus equals $16.23 with the assumed 1 percent decline in the semiannual rate.

$$\Delta P \text{ due to convexity} = \text{Convexity} \ \ (\Delta i)^2 p \tag{16.6}$$

or

$$\begin{aligned} &= 16.23(0.01)^2 \ \$10{,}000 \\ &= \$16.23 \end{aligned}$$

The estimated price change due to duration and convexity together equals $523.75, or just $0.46 less than the actual price change. Knowing a bond's duration and convexity allows for improved forecasts of price sensitivity even when yields change substantially.

Impact of Prepayments on Duration and Yield for Bonds with Options

The previous discussion about duration and convexity addresses option-free securities. Securities with options potentially exhibit far different price sensitivities, as indicated in Exhibit 16.9. These embedded options affect the estimated duration and convexity of such securities.

Even though participants cannot forecast prepayments precisely, it is important to know how they affect the duration and thus the price and yield of MBSs. In general, market participants price MBSs by following a three-step procedure. First, participants estimate the duration of the MBS on the basis of an assumed interest rate environment and the corresponding prepayment speed. Second, they identify a zero coupon Treasury security with the same (approximate) duration. Third, the MBS is priced at a markup over the Treasury. Specifically, the MBS yield is set equal to the yield on the same-duration Treasury plus a positive spread. This spread can range from 20 basis points to 3 percent depending on market conditions. Thus, MBS yields reflect the zero coupon Treasury yield curve plus a premium.[21]

Different MBSs will exhibit different durations and different price sensitivities depending on their specific characteristics. The most important characteristics are those that influence the prepayment rate, and include the coupon rate, mortgage age, and related demographic factors. The coupon rate is important because it is generally just below the rate that borrowers pay on the underlying mortgages. If the current mortgage rate is substantially below the coupon rate, prepayments should be substantial. The greater are prepayments, the shorter is a security's duration, because an investor receives the underlying principal and interest payments earlier. If prepayments slow, duration

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[21] Alternatively, securities with options may be priced based on the LIBOR interest rate swap curve such that yields are quoted as a spread to the swap curve.

lengthens because larger cash flows are received later. Mortgage age is important because most borrowers won't refinance immediately after taking out a new mortgage. Specifically, during the first 30 months after origination, mortgage prepayments are relatively low and increase slowly over time. Without any special rate inducements, prepayments typically increase through five years, then slowly decline. Finally, demographic factors affect prepayments because of labor mobility and the age of the underlying population. A younger population is normally more mobile, as is the entire labor force when a specific geographic labor market is booming.

Chapter 6 demonstrated that option-free securities have well-defined price and yield relationships. This is not true for securities with embedded options. Specifically, as rates rise (fall), Macaulay's duration for an option-free security declines (increases). Option-free securities exhibit *positive convexity*, because as rates rise, the percentage price decline is less than the percentage price increase associated with the same rate decline. Securities with embedded options may exhibit *negative convexity*. This characteristic means that the percentage price increase is less than the percentage price decrease for equal negative and positive changes in rates. The callable bond and high-coupon IO described in Exhibit 16.9 reveal such negative convexity. In fact, as market rates fall and the option moves in the money, in both cases the duration of the security declines and the price either stays unchanged (callable FHLB bond) or falls (high-coupon IO).

Analysts use measures of *effective duration* and *effective convexity*, provided in Equations 16.7 and 16.8, to describe the price sensitivity of securities with options:

$$\text{Effective duration} = \frac{P^- - P^+}{P^*(i^+ - i^-)} \tag{16.7}$$

$$\text{Effective convexity} = \frac{P^- + P^+ - 2p^*}{P^*[0.5(i^* - i^-)]^2} \tag{16.8}$$

where

P^- = price if the market rate falls by z basis points
P^+ = price if the market rate rises by z basis points
P^* = initial price
i^- = initial market rate minus z basis points
i^+ = initial market rate plus z basis points

A careful review suggests that effective duration is an approximation and may, in fact, be negative. A negative value would arise if the price associated with a rate decrease does not end up above the price associated with a rate decrease. This outcome might arise if the prepay option fell deep into the money in a declining-rate environment.

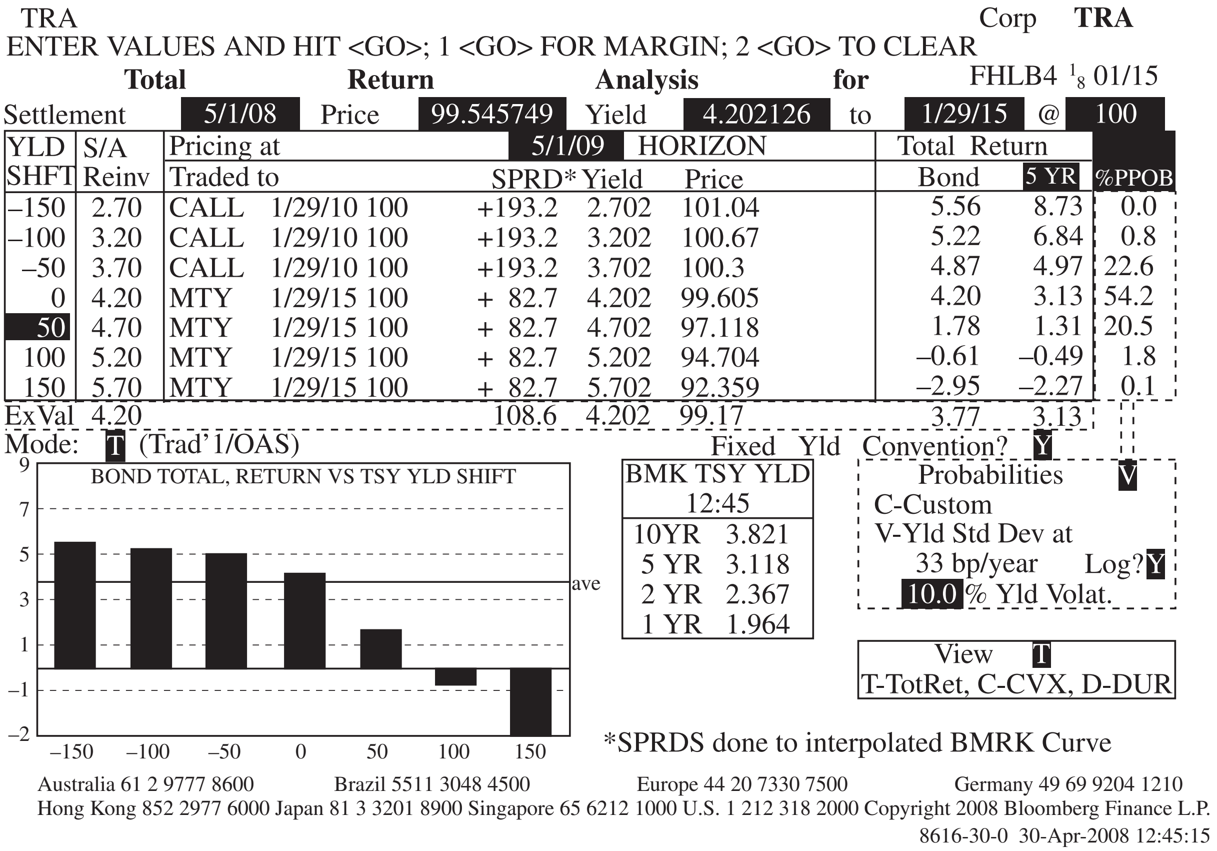
Total Return and Option-Adjusted Spread Analysis of Securities with Options

When buying securities with options, many investors conduct *total return analysis* to estimate the potential return on the security. This is valuable because investors do not know when the options may move in the money and how cash flows may change from that expected. Such cash-flow changes may, in turn, dramatically influence the return actually realized. Investors also frequently consider a security's *option-adjusted spread* as an estimate of the value of the option that is being sold to the security issuer.

Total Return Analysis. An investor's actual realized return should reflect the coupon interest, reinvestment income, and value of the security at maturity or sale at the end of the holding period. When the security carries embedded options, such as the prepayment option with MBSs, these component cash flows will vary in different interest rate environments. For example, if rates fall and borrowers prepay faster than originally expected, coupon interest will fall as the outstanding principal falls, reinvestment income will fall because rates are lower when the proceeds are reinvested and less coupon interest is received, and the price at sale (end of the holding period) may rise or fall depending on the speed of prepayments. When rates rise, borrowers prepay slower so that coupon income increases, reinvestment income increases, and the price at sale (end of the holding period) again may rise or fall.

Consider the total return analysis for the FHLB bond in Exhibit 16.11. On April 30, 2008, the bond had just over six and one-half years until maturity, carried a 4.125 percent coupon rate, and was callable (one-time) at par on January 29, 2009. It was priced at $99.5457 to yield 4.20 percent to maturity. The data provide the results of a rate shock analysis in which the Treasury yield curve is assumed to shift up and down by 50, 100, and 150 basis points from prevailing levels (0 yield shift position) as represented by the different rows of data. Focus on the two columns of data under the heading "Total Return." The first column under "Bond" indicates the estimated total return on the callable FHLB bond, while the second column under "5 YR" indicates the total return on a five-year, option-free Treasury as an alternative investment. The horizon notation indicates that the assumed holding

EXHIBIT 16.11 Total Return Analysis for a Callable FHLB Bond



TRA Corp **TRA**

ENTER VALUES AND HIT <GO>; 1 <GO> FOR MARGIN; 2 <GO> TO CLEAR

Total Return Analysis for FHLB4 ⅛ 01/15

Settlement 5/1/08 Price 99.545749 Yield 4.202126 to 1/29/15 @ 100

YLD SHFT	S/A Reinv	Pricing at 5/1/09 HORIZON Traded to		SPRD*	Yield	Price	Total Return Bond	5 YR	%PPOB
–150	2.70	CALL	1/29/10 100	+193.2	2.702	101.04	5.56	8.73	0.0
–100	3.20	CALL	1/29/10 100	+193.2	3.202	100.67	5.22	6.84	0.8
–50	3.70	CALL	1/29/10 100	+193.2	3.702	100.3	4.87	4.97	22.6
0	4.20	MTY	1/29/15 100	+ 82.7	4.202	99.605	4.20	3.13	54.2
50	4.70	MTY	1/29/15 100	+ 82.7	4.702	97.118	1.78	1.31	20.5
100	5.20	MTY	1/29/15 100	+ 82.7	5.202	94.704	–0.61	–0.49	1.8
150	5.70	MTY	1/29/15 100	+ 82.7	5.702	92.359	–2.95	–2.27	0.1
ExVal	4.20			108.6	4.202	99.17	3.77	3.13	

Mode: T (Trad'l/OAS) Fixed Yld Convention? Y

BMK TSY YLD 12:45	
10YR	3.821
5 YR	3.118
2 YR	2.367
1 YR	1.964

Probabilities V
C-Custom
V-Yld Std Dev at
33 bp/year Log? Y
10.0 % Yld Volat.

View T
T-TotRet, C-CVX, D-DUR

*SPRDS done to interpolated BMRK Curve

Australia 61 2 9777 8600 Brazil 5511 3048 4500 Europe 44 20 7330 7500 Germany 49 69 9204 1210
Hong Kong 852 2977 6000 Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2008 Bloomberg Finance L.P.
8616-30-0 30-Apr-2008 12:45:15

Source: Bloomberg Terminal.

period is one year (May 1, 2009) from settlement. The column of data under "S/A Reinv" indicates the assumed reinvestment rate, and the data under "Price" indicate the estimated price of the FHLB bond at different interest rate levels.

Compare the two total returns at different rate levels. If rates stay constant over the year, the callable bond's total return will equal 4.20 percent, while the Treasury's total return will equal 3.13 percent. If rates fall as indicated by the negative values for the yield shift, both total returns will be higher due to the increased price for each bond. Note that the holding period ends nine months before the call date. If rates rise as indicated in the bottom three rows of data, both total returns fall over the year due primarily to the falling prices. The analysis indicates in general what an investor's "bet" is if he or she buys the callable bond versus a five-year Treasury. Specifically, with a one-year holding period, the investor would be better off buying the callable bond only if rates remain constant or rise no more than 0.50%. If rates fall, the callable bond will not appreciate much in price because it will likely be called nine months later.

Option-Adjusted Spread. The previous discussion demonstrates that the standard calculation of yield-to-maturity is inappropriate with prepayment risk. Many analysts instead use an OAS approach when pricing callable agency and MBSs. An OAS approach accounts for factors that potentially affect the likelihood and frequency of call and prepayments.[22] Before discussing OAS, it is important to understand static spread, which is commonly used to describe the yield on a security with options versus that of an option-free Treasury. Specifically, the static spread is the yield premium, in a percentage, that when added to Treasury spot rates (zero coupon Treasury rates) along the yield curve, equates the present value of the estimated cash flows for the security with options to the prevailing price of the matched-maturity Treasury. It is an average spread over the entire spot yield curve that indicates the incremental yield to an investor in the security relative to yields on zero coupon Treasuries with options. It does not directly take into account the value of the option or its frequency of exercise.

OAS analysis is one procedure used to estimate how much an investor is being compensated for selling an option to the issuer of a security with options. Stephen Smith (1991) summarizes the process for MBSs via the diagram shown in Exhibit 16.12. Briefly, the approach starts with estimating Treasury spot rates (zero coupon Treasury rates) using a probability distribution and Monte Carlo simulation, identifying a large number of possible interest rate scenarios over the time period that the security's cash flows will appear. The analysis then assigns probabilities to various cash flows based on the different interest rate scenarios. For mortgages, one needs a prepayment model and for callable bonds, one needs rules and prices indicating when the bonds will be called and at what values. OAS analysis involves three basic calculations:

1. For each scenario, a yield premium is added to the Treasury spot rate (matched-maturity zero coupon Treasury rate) and used to discount the cash flows.
2. For every interest rate scenario, the average present value of the security's cash flows is calculated.
3. The yield premium that equates the average present value of the cash flows from the security with options to the prevailing price of the security without options is the OAS.

Conceptually, OAS represents the incremental yield earned by investors from a security with options over the Treasury spot curve, after accounting for when and at what

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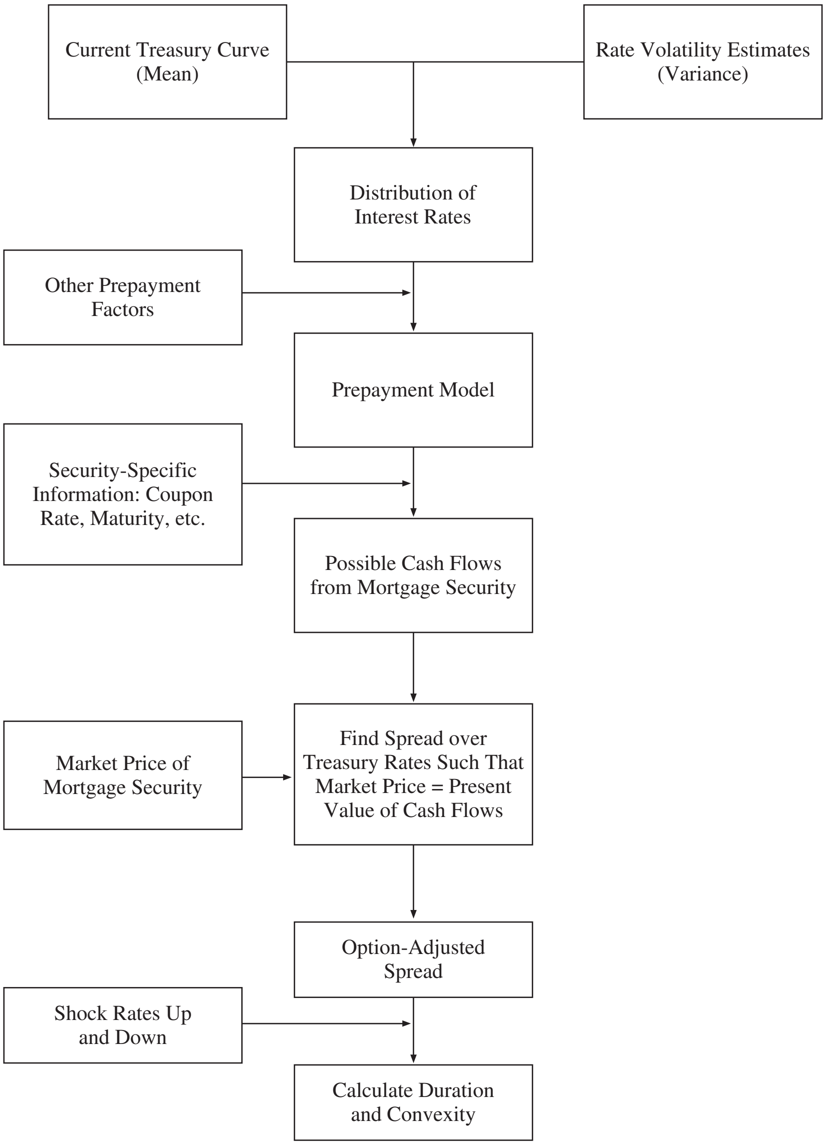
[22] Fabozzi, Bhattacharya and Berliner (2010) provide an excellent summary of static spread, OAS and other valuation metrics for mortgage-backed securities.

EXHIBIT 16.12 **Steps in Option-Adjusted Spread Calculation**


Current Treasury Curve (Mean)
Rate Volatility Estimates (Variance)
Distribution of Interest Rates
Other Prepayment Factors
Prepayment Model
Security-Specific Information: Coupon Rate, Maturity, etc.
Possible Cash Flows from Mortgage Security
Market Price of Mortgage Security
Find Spread over Treasury Rates Such That Market Price = Present Value of Cash Flows
Option-Adjusted Spread
Shock Rates Up and Down
Calculate Duration and Convexity

Source: Stephen Smith, "Mortgage-Backed Securities: Analyzing Risk and Return," *Economic Review*, Federal Reserve Bank of Atlanta, January/February 1991.

price the embedded options will be exercised. The advantage is that an OAS reflects consensus expectations regarding the interest rate environment. Importantly, OAS allows a comparison of the attractiveness of callable agencies and MBSs relative to Treasuries over different time periods.[23]

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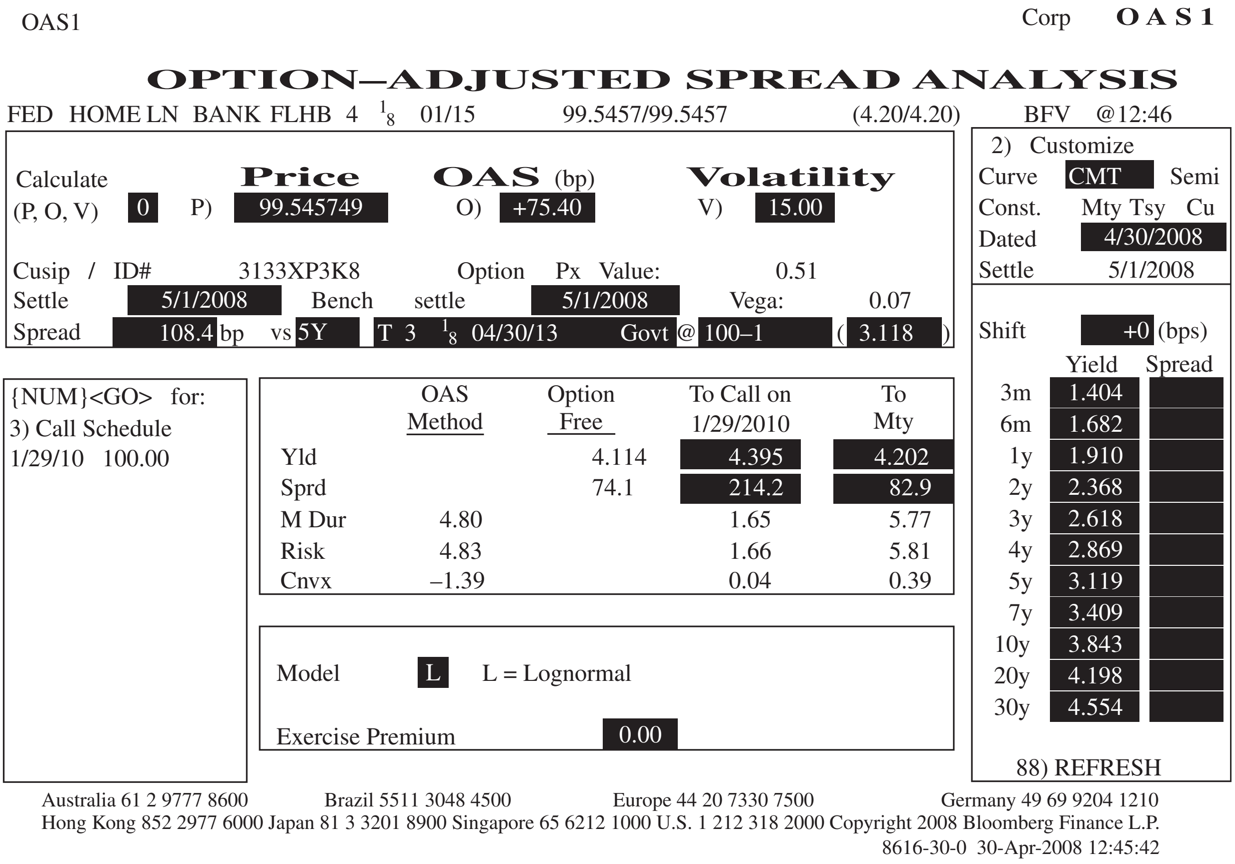
[23] OAS analysis is also frequently applied using the LIBOR swap curve as the benchmark rather than the Treasury spot curve. In recent years, the slope of the Treasury spot curve was downward-sloping while the slope of the LIBOR swap curve was upward-sloping. The different slopes reflected, in part, the Treasury's buyback program at long maturities. At the time, the OAS calculated against the Treasury benchmark was much higher, on average, than the OAS using the LIBOR swap curve.

EXHIBIT 16.13 Option-Adjusted Spread Analysis for a Callable FHLB Bond



OAS1 Corp OAS1

OPTION–ADJUSTED SPREAD ANALYSIS

FED HOME LN BANK FLHB $4\frac{1}{8}$ 01/15 99.5457/99.5457 (4.20/4.20) BFV @12:46

Calculate (P, O, V)	Price	OAS (bp)	Volatility
0	P) 99.545749	O) +75.40	V) 15.00

Cusip / ID# 3133XP3K8 Option Px Value: 0.51
Settle 5/1/2008 Bench settle 5/1/2008 Vega: 0.07
Spread 108.4 bp vs 5Y T 3 $\frac{1}{8}$ 04/30/13 Govt @ 100–1 (3.118)

2) Customize
Curve CMT Semi
Const. Mty Tsy Cu
Dated 4/30/2008
Settle 5/1/2008

Shift +0 (bps)

	Yield	Spread
3m	1.404	
6m	1.682	
1y	1.910	
2y	2.368	
3y	2.618	
4y	2.869	
5y	3.119	
7y	3.409	
10y	3.843	
20y	4.198	
30y	4.554	

88) REFRESH

{NUM}<GO> for:
3) Call Schedule
1/29/10 100.00

	OAS Method	Option Free	To Call on 1/29/2010	To Mty
Yld		4.114	4.395	4.202
Sprd		74.1	214.2	82.9
M Dur	4.80		1.65	5.77
Risk	4.83		1.66	5.81
Cnvx	–1.39		0.04	0.39

Model L L = Lognormal

Exercise Premium 0.00

Australia 61 2 9777 8600 Brazil 5511 3048 4500 Europe 44 20 7330 7500 Germany 49 69 9204 1210
Hong Kong 852 2977 6000 Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2008 Bloomberg Finance L.P.
8616-30-0 30-Apr-2008 12:45:42

Source: © Bloomberg L.P. All rights reserved. Reprinted with permission.

Exhibit 16.13 provides data related to calculating the OAS for the six and one-half year maturity FHLB bond that was callable after 21 months. In April 2008, the bond was priced to yield 107 basis points (4.20%–3.13%) more than the five-year Treasury. Using the constant-maturity Treasury (CMT) curve as the benchmark, OAS was estimated at 75.4 basis points (assuming a 15 percent volatility in rates).[24] This OAS figure suggests that an investor might expect to earn a 75 basis-point yield premium over the entire Treasury spot yield curve, given the current level and volatility of rates, and the likelihood that the bond will be called prior to maturity. The issue is whether this premium is sufficient to compensate the investor for the greater risk and cost, in terms of required capital, of owning the callable bond.

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[24] Changing the assumed volatility in interest rates can have a dramatic effect on OAS. Conceptually, the call option will have greater value when rates are more volatile. As such, increasing (decreasing) the assumed volatility of rates will lower (raise) the OAS given the fixed price at which the bond is purchased and against which OAS is calculated.

Comparative Yields on Taxable versus Tax-Exempt Securities

A bank's effective return from investing in securities depends on the amount of interest income, reinvestment income, potential capital gains or losses, whether the income is tax-exempt or taxable, and whether the issuer defaults on interest and principal payments. When making investment decisions, portfolio managers compare expected risk-adjusted, after-tax returns from alternative investments. They purchase securities that provide the highest expected risk-adjusted return.

Interest on most municipal securities is exempt from federal income taxes and, depending on state law, from state income taxes.[25] Some states exempt all municipal interest. Most states selectively exempt interest from municipals issued in-state but tax interest on out-of-state issues. Other states either tax all municipal interest or do not impose an income tax. Capital gains on municipals are taxed as ordinary income under the federal income tax code. This makes discount municipals less attractive than par municipals because a portion of the return, the price appreciation, is fully taxable.

The net effect of the tax treatment is that municipal securities trade at yields well below yields on comparable-risk taxable securities. Thus, when a 10-year taxable security yields 8 percent, a comparable-risk 10-year municipal might yield just 6 percent. The difference in pretax yields reflects the tax benefit to an investor in municipals.

After-tax and Tax-equivalent Yields

The importance of income taxes on yields can be easily shown. Suppose that we are comparing yields on two securities of comparable maturity and risk. For the moment, ignore state and local income taxes as well. Let

R_m = pretax yield on a municipal security
R_t = pretax yield on a taxable security
t = investor's marginal federal income tax rate

Once an investor has determined the appropriate maturity and risk security, the investment decision involves selecting the security with the highest after-tax yield. The relevant yield comparison is

$$R_m \overset{\geq}{\underset{\leq}{}} R_t(1-t) \tag{16.9}$$

Using the 6 percent and 8 percent pretax yields for R_m and R_t, respectively, an investor who pays taxes at the 36 percent rate would buy the municipal because it pays 0.6 percent more after taxes.

$$6\% > 8\%(1-0.36) = 5.12\%$$

An investor who pays taxes at the 15 percent rate would prefer the taxable security because it offers 0.8 percent more in yield.

$$6\% < 8\%(1-0.15) = 6.8\%$$

Municipals are often marketed to investors using a modified form of the relationship in Equation 16.9. Consider the following question: What tax rate would make an investor indifferent as to whether he or she should invest in a taxable versus tax-exempt

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[25] Some securities issued by states and local governments and their political subdivisions, while still municipal bonds, pay interest that is subject to federal income taxes. They are labeled *taxable municipals.*

municipal security where indifference means that the after-tax yields are equal? The answer is obtained by solving the relationship shown in Equation 16.9 as an equality. Using the above data, an investor would be indifferent at the margin if his or her tax rate were 25 percent. In general, this indifference tax rate (t^*) is solved by Equation 16.10.

$$t^* = 1 - \frac{R^m}{R_t} \tag{16.10}$$

The investment decision is then made by comparing an investor's actual marginal tax rate with the indifference rate. The following rules determine the appropriate choice:

If $t > t^*$, then buy the municipal.
If $t < t^*$, then buy the taxable.
If $t = t^*$, indifferent because after-tax yields are equal.

With R_m equal to 6 percent and R_t equal to 8 percent, any investor with a marginal tax rate over 25 percent prefers municipals, while any investor with a tax rate below 25 percent prefers taxables.

The analysis is complicated only slightly when state and local income taxes are taken into account. Let t_m equal the marginal state and local tax rate on municipal interest and taxable interest. Then the relevant yield comparison is

$$R_m(1 - t_m) \gtreqless R_t[1 - (t_m + t)] \tag{16.11}$$

Suppose that t_m equals 5 percent in the above case where the marginal federal income tax rate equals 36 percent. The after-tax yield comparison now becomes

$$\begin{gathered} 6\%(1 - 0.05) > 8\%(1 - 0.41) \\ 5.70\% > 4.72\% \end{gathered}$$

The municipal now yields 0.98 percent more.

Many analysts compare returns on municipals with taxables in terms of tax-equivalent yields. This involves nothing more than restating the relationships shown in Equations 16.9 and 16.11 when the equality of after-tax yields is enforced. Specifically, municipal yields are converted to their tax-equivalent values by solving Equation 16.12.

$$\text{Tax equivalent yield} = \frac{R_m(1 - t_m)}{[1 - (t_m + t)]} \tag{16.12}$$

In the above example, the tax-equivalent municipal yield equals 8.91 percent [0.06(1 − 0.05)/(1 − 0.36)]. This figure means that the investor would have to earn 8.91 percent on a comparable taxable security to produce the same 7.125 percent after-tax yield.[26]

The Yield Comparison for Commercial Banks

Suppose that a bank portfolio manager wants to compare potential returns between a taxable security and a municipal security that currently yield 10 percent and 8 percent, respectively. Both securities are new issues trading at $10,000 par with identical maturities, call treatment, and default risk. The primary difference is that the bank pays federal income taxes at a 34 percent marginal rate on the taxable security, while municipal interest is entirely tax-exempt. Section A of Exhibit 16.14 shows that the portfolio manager would earn $140 more in after-tax interest from buying the municipal.

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[26] In most published reports, taxes on municipal interest are ignored (t_m is set equal to zero) so that the reported tax-equivalent yield equals the municipal rate divided by 1 minus the federal income tax rate. In this example, such a tax-equivalent yield would equal 9.38% [6%/(1 − 0.36)]. This clearly understates the true tax-equivalent yield.

EXHIBIT 16.14 A Comparison of After-Tax Returns on Taxable and Tax-Exempt Securities for a Bank as Investor

A. After-Tax Interest Earned on Taxable versus Exempt Municipal Securities

	Taxable Security	Municipal Security
Par value	\$10,000	\$10,000
Coupon rate	10%	8%
Annual coupon interest	\$ 1,000	\$ 800
Federal income taxes at 34%	\$ 340	Exempt
After-tax interest income	\$ 660	\$ 800

B. Disallowing Deduction of Interest on Indebtedness to Finance Municipal Purchases for a Bank: Total Portfolio and Income Statement Effect

Factors affecting allowable deduction for 2014.

- Total interest expense paid in 2014: \$1,500,000
- Average amount of assets owned during 2014: \$20,000,000
- Average amount of tax-exempt securities owned that were acquired after the change in tax laws affecting interest deductibility: \$800,000
- Weighted-average cost of financing assets: $\frac{\$1{,}500{,}000}{\$20{,}000{,}0000} = 7.5\%$

Nondeductible interest expense:

- Pro rata share of interest expense to carry municipals:

$$\frac{\$800{,}000}{\$20{,}000{,}000} = 4\%$$

- Nondeductible interest expense at 20 percent : $\$1{,}500{,}000(0.04)(0.2) = \$12{,}000$

Deductible interest expense : $\$1{,}500{,}000 - \$12{,}000 = \$1{,}488{,}000$

C. After-Tax Interest Earned, Recognizing Partial Deductibility of Interest Expense: Individual Asset

	Taxable Security	Municipal Security
Par value	\$10,000	\$10,000
Coupon rate	10%	8%
Annual coupon interest	\$ 1,000	\$ 800
Federal income taxes at 34%	\$ 340	Exempt
Pooled interest expense (rate = 7.5%)	\$ 750	\$ 750
Lost interest deduction (20%)	\$ 0	\$ 150
Increased tax liability at 34%	\$ 0	\$ 51
Effective after-tax interest income	\$ 660	\$ 749

Applying Equation 16.11 using this data, the yield comparison is

$$8\%(1 - 0) = 8\% > 10\%(1 - 0.34) = 6.6\%$$

The after-tax yield differential multiplied by the principal invested produces the \$140 difference in after-tax income. The tax-equivalent yield, which essentially converts the municipal yield to a pretax yield that would produce an after-tax return equal to that on an otherwise identical taxable security, equals 12.12 percent (from Equation 16.12).

The Effective Tax on Incremental Municipal Interest Earned by Commercial Banks

Prior to 1983, commercial banks could invest in tax-exempt securities and deduct the full amount of interest paid on liabilities used to finance their purchases. Virtually all other investors, including individuals, were (and are still) denied a deduction for any indebtedness to carry or purchase tax-exempts. The deduction enabled many banks to do a tax arbitrage between the after-tax cost of borrowing and municipal yields at the margin to supplement earnings and reduce their effective income tax liability.

In 1983, Congress rewrote the tax law to deny banks a deduction for 15 percent of their interest expense allocated to indebtedness for the purpose of acquiring and holding new municipal issues. This nondeductible portion was increased to 20 percent in 1985. The Tax Reform Act of 1986 went one step further and eliminated the deduction for most municipal bonds.

The following calculations demonstrate the impact of a lost deduction on a bank's total after-tax income and on the effective yield on municipal securities. For income tax purposes, interest expense allocated to municipal investments is prorated against total interest expense. The applicable fraction equals the amount of tax-exempt securities purchased after the change in tax laws divided by total assets. Section B of Exhibit 16.14 provides an example that uses data on a bank's total portfolio and calculates the total amount of lost deductions for the year assuming 20 percent lost interest deductibility. The bank is relatively small with only $20 million in average assets. During 2014, the bank paid $1.5 million in total interest expense so that its weighted average cost of financing assets equaled 7.5 percent. The amount of interest expense that is nondeductible depends on how many bonds the bank owns that were purchased after the tax change ($800,000 in this example). Because the bank's post-tax-reform municipal holdings amount to 4 percent of average assets, a 4 percent pro rata share of total interest expense is allocated to municipal financing costs. This produces a disallowed deduction of $12,000. The remaining $1.488 million in interest was tax deductible. The $12,000 lost deduction has a tax value of $4,080 (0.34 × $12,000), which represents the increase in taxes owed by the bank.[27]

Section C of Exhibit 16.14 indicates the effect of this lost interest deductibility on the expected return from municipal investments. It replicates Section A except that the bank as an investor can deduct only 80 percent of its interest expense applicable to financing the municipal security. The analysis is identical through the federal income tax calculation. Beyond that, the bank pays a pooled interest cost of 7.5 percent (the same as in Section B; $1.5 million/$20 million). Thus, interest paid to finance the $10,000 in municipals equals $750, of which $150 is nondeductible. This lost deduction raises the bank's effective tax liability by $51 (34 percent of $150) and reduces the realized return on the municipal to $749, or 7.49 percent.

The lost interest deduction essentially represents a tax on incremental municipal interest. A good analogy is a homebuyer who obtains a mortgage to finance the purchase. Each month the homeowner makes a mortgage payment that includes interest on the debt. Suppose that Congress suddenly changed the tax laws and no longer allowed individuals to deduct home mortgage interest. The homeowner would still make the obligated mortgage payments, but could no longer itemize the interest deduction on his or her income tax statement. The lost deduction essentially represents an increase in taxes

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[27] Note that the bank must pay the entire $1.5 million in interest, which represents its actual cash outflow. However, it is allowed a deduction for just $1.488 million, so its reported income is $12,000 higher. This produces the $4,080 additional tax payment.

owed, because reported taxable income increases without any additional cash receipts. The cost of owning a home would increase, or alternatively, the after-tax return from owning a home would decrease.

In order to compare yields on municipal and taxable securities, the lost interest deduction is converted to a marginal tax on municipal interest. Let

c = the bank's pooled interest cost rate

n = the nondeductible portion of interest expense

t_c = the marginal corporate income tax rate

The tax value of the lost interest deduction equals the product of c, n, and t_c, divided by the pretax municipal rate (R_m). When state and local income taxes are added, the effective bank tax rate on municipal interest (t_b) can be expressed as

$$t_b = \frac{c(n)t_c}{R_m} + \text{state and local income tax rate}$$

Applying the data from Section C with no state and local income taxes,

$$t_b = \frac{[0.34(02)(0.075)]}{0.08} = 0.06375$$

and

$$8\%(1 - 0.06375) = 7.49\% > 10\%(1 - 0.34) = 6.6\%$$

The true tax-equivalent municipal yield for this bank paying no state and local income taxes is 11.35 percent.[28]

The Impact of the Tax Reform Act of 1986

The Tax Reform Act of 1986 dramatically altered commercial banks' investment strategies and the attractiveness of different types of securities. This section describes factors that lowered returns on most municipal securities. In general, the act reduced the pool of municipal securities that kept their tax exemption and eliminated banks' ability to deduct carrying costs on new municipal purchases, except for qualifying small issues that meet essential public-purpose requirements. The discussion focuses only on commercial banks because the distinction between qualified and nonqualified issues does not apply to other investors.

Qualified versus Nonqualified Municipals

All municipal interest is still tax-exempt for federal income tax purposes. There are, however, a variety of ways in which banks may be subject to tax when they buy municipals. The Tax Reform Act created different categories of municipal bonds. The more essential a given type of bond is for states and localities, the broader is its tax exemption. The first distinction is between municipals issued before and after August 7, 1986. Municipals issued before this date retain their tax exemption. They are essentially grandfathered in because banks can still deduct 80 percent of their associated financing costs regardless of the act. Securities issued after this date are categorized as bank qualified or nonqualified, depending on whether they meet certain criteria.

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[28] $[0.08\ (1 - 0.06375)/(1 - 0.34)] = 0.1135$.

Qualified Municipals. Banks can still deduct 80 percent of their carrying costs associated with the purchase of certain essential, public-purpose bonds. There are two important criteria that must be met in order for bonds to qualify. First, the proceeds must be used to finance essential government services including schools, highways, sewer systems, and so forth. In most cases, traditional general obligation bonds meet this standard. Second, the municipality cannot issue more than $10 million in municipal securities per year. Thus, only small-issue municipals qualify. Such instruments are labeled bank-qualified municipals. State government issues do not qualify regardless of total debt issuance. The purpose of this special treatment is to help small governmental units obtain financing. In many communities, banks are the only investors in local government securities, because they are the only ones with the resources and knowledge of the financial condition of the borrower. If this exception to the lost deduction had not been granted, it was feared that many governmental units would be forced to cut services drastically.

The effective bank tax rate against qualified municipals from Equation 16.10 uses a nondeductible portion of interest equal to 20 percent ($n = 0.20$). Thus, the after-tax yield calculation in Exhibit 16.14 and the above examples assumes that the municipal is bank qualified. The net impact is that even though banks lose a portion of their interest deductibility, with $n = 0.20$ the bank tax rate on municipal interest is so low that qualified municipals still yield more than fully taxed alternative investments. As such, qualified municipals are attractive investments for profitable banks. The problem is that transaction costs are high when banks search out qualified municipals. This occurs because only smaller, lesser-known municipalities can issue qualifying debt.

Nonqualified Municipals. All municipals that do not meet the criteria as bank-qualified bonds are labeled nonqualified municipals. If banks buy these securities, they can deduct none of their associated carrying costs. In terms of Exhibit 16.14 and the after-tax yield comparison, nondeductible interest on nonqualified municipals equals 100 percent. This sharply raises the effective tax rate on nonqualified municipals purchased by banks to such an extent that they are no longer viable investments. If the 8 percent municipal bond in Exhibit 16.14 (Section C) was nonqualified, the lost interest deduction would have totaled $750, and the tax liability would have increased to $255 ($t_b = 0.3188$). The effective after-tax income would have equaled only $545, or $115 less than that from the taxable security.

$$R_m(1 - t_b) = 8\%\left(1 - \frac{0.75(1.0)34}{0.08}\right) = 5.45\%$$

As demonstrated, the effective bank tax rate on nonqualified municipal interest is quite high. Because these securities are still attractive to nonbank investors looking for tax-sheltered income, they continue to carry yields below those on comparable taxable securities. The combination of tax-exempt yields and a high effective tax rate makes nonqualified municipals unattractive to banks. Banks no longer buy nonqualified municipals because they can get higher yields elsewhere.

A second important change under the act is the expanded alternative minimum tax (AMT). Banks must now compute their tax liability in two ways: according to regular income tax guidelines, and according to minimum tax rules, which add preference items back to normal taxable income and apply a 20 percent minimum tax rate. Banks pay the higher of the two taxes. The importance for the investment portfolio is that tax-exempt interest is a preference item and banks must include one-half of tax-exempt interest earned in the taxable base. Thus, the effective tax on qualified, essential public-purpose bond interest potentially rises by 10 percent.

The Tax Reform Act of 1986 has had several other structural effects on bank investments and relative security yields. First, pretax municipal yields have risen relative to taxable yields to reflect reduced demand by commercial banks. This is particularly true at short maturities. Second, banks have shifted their investment portfolios to taxable securities, such as mortgage-backed pass-through securities and CMOs, to earn higher risk-adjusted yields. Finally, large banks have found it difficult to locate enough bank-qualified municipals to fully meet the demand for tax-sheltered interest income. They now look to other tax-sheltered vehicles to take the place of municipal interest income.

Strategies Underlying Security Swaps

Active portfolio strategies also enable banks to sell securities prior to maturity whenever economic conditions dictate that additional returns can be earned without a significant increase in risk, or that risk can be lowered without reducing expected returns. In most cases, banks reinvest the sale proceeds in securities that differ in terms of maturity, credit quality, or even tax treatment.[29] Such portfolio restructuring improves long-term profitability beyond that available from buy-and-hold strategies.

Banks are generally willing to sell securities that have appreciated in price, yet they are unwilling to sell depreciated securities. Although gains are quite popular and enhance earnings, senior bank officers usually believe that stockholders will attribute security losses to poor management. They are thus extremely reluctant to take any losses. This philosophy, however, does not prevent the same banks from taking securities gains to supplement normal operating income and capital in low-profit periods.

This is perverse behavior. The reason that a security is priced at a discount is that the prevailing market rate exceeds the coupon rate on the security. The bank is earning below-market interest. A security is priced at a premium when its coupon rate exceeds the market rate so that the holder earns an above-average coupon. An investor who holds a security to maturity may suffer an opportunity loss by not selling the security at a loss, or may give up substantial value by selling at a premium to capture the gain. The appropriate financial decision can be viewed as a straightforward capital budgeting problem.

Analysis of a Classic Security Swap

In its classic form, a security swap involves the sale of a depreciated bond and the simultaneous purchase of a similar par bond to improve long-term earnings. The basic principle is to take advantage of the tax laws and the time value of money. Consider the two bonds identified in Section A of Exhibit 16.15. A bank currently owns the 10.5 percent Treasury with three years remaining to maturity and is considering buying a three-year FHLB bond yielding 12.2 percent. If the bank sells the Treasury, it gives up $105,000 in semiannual interest and realizes a capital loss of $73,760. This loss directly lowers taxable income, as banks do not distinguish between the tax treatment of short- and long-term capital gains or losses. A loss results because comparable instruments yield 12 percent annually, or 1.5 percent more than the Treasury coupon rate. The paper loss, in turn, produces a tax savings of $25,816, which can be reinvested with the direct proceeds from the sale in an FHLB security at par that pays $119,075 in semiannual interest. The cost to the bank includes transactions costs plus potential negative ramifications from the reported capital loss. The benefits include the $14,075 increase in semiannual interest.

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[29] The following discussion focuses on securities that banks hold as part of their investment portfolio classified as AFS, as opposed to trading account securities. Investment securities generate a return via coupon interest or price appreciation on discount instruments. Current accounting procedures record these securities at market value, with unrealized gains or losses as a component of capital.

EXHIBIT 16.15 **Evaluation of Security Swaps**

	Par Value	Market Value	Remaining Maturity	Semiannual Coupon Income	Yield to Maturity
A. Classic Swap Description					
Sell U.S. Treasury bonds at 10.5%	$2,000,000	$1,926,240	3 yrs.	$105,000	12.0%
Buy FHLB bonds at 12.2%*	1,952,056†	1,952,056	3 yrs.	119,075	12.2
Incremental coupon income				$14,075	
B. Swap with Minimal Tax Effects					
Sell U.S. Treasury bonds at 10.5%	$2,000,000	$1,926,240	3 yrs.	$105,000	12
Sell FHLB at 13.8%	3,000,000	3,073,060	4 yrs.	207,000	13
Total	$5,000,000	$4,999,300		$312,000	
Buy FHLB at 13%	$5,000,000	$5,000,000	1 yr.	$325,000	12
				$ 13,000	

C. Present Value Analysis

Time Line: Semiannual Periods

Period	0	1	2	3	4	5	6
Incremental Cash Flows							
Treasury:	$1,926,240	−$105,000	−$105,000	−$105,000	−$105,000	−$105,000	−$2,105,000
Tax saving:	25,816						
FHLB:	−$1,952,056	$119,075	$119,075	$119,075	$119,075	$119,075	$2,071,131
Difference:	0	$14,075	$14,075	$14,075	$14,075	$14,075	−$33,869

Present value calculation: discounted at 6.1% (12.2% annual)

$$\sum_{t=1}^{5} \frac{\$14,075}{(1.061)^t} - \frac{\$33,869}{(1.061)^6} = \$35,380$$

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*FHLB Indicates Federal Home Loan Bank.

†Reported security loss equals $73,760, which generates a tax savings of $25,816 at 35 percent. The loss recovery period equals $47,944/$14,075 at 3.4 periods, where the loss equals $73,760 – $25,816.

The simple net present value analysis in Section C of the exhibit demonstrates how much value the swap adds for the slightly greater default risk and adverse reporting consequences. The calculation essentially compares the cash flow from the Treasury if the bank held it to maturity with the cash from selling the Treasury and buying the FHLB bond. Note that this computation reduces to a comparison of the present value of the incremental coupon payments versus the lower principal received at the end of the three years. In this case, the net present value equals $35,380, using a discount rate equal to the yield on the FHLB bond.

The attractiveness of such a swap is often viewed in terms of a calculated loss-recovery period for the combined transaction. This is comparable to payback analysis in capital budgeting, which ignores the time value of money. Still, in this example, the after-tax security loss equals $47,944, which the bank can recover entirely in four semi-annual periods ($47,944/$14,075). Obviously, the net benefits would increase if the bank chose to reinvest the proceeds in a riskier asset, such as a loan that offered an even higher yield. A bank could also search out higher yields by lengthening maturities with an upward-sloping yield curve. Alternatively, a bank in need of tax-sheltered income could reinvest the proceeds in a municipal bond of similar maturity that offers a higher after-tax yield.

These alternatives point out the attractiveness of security swaps. In general, banks can effectively improve their portfolios by doing the following:

1. Upgrading bond credit quality by shifting into high-grade instruments when quality yield spreads are low
2. Lengthening maturities when yields are expected to level off or decline
3. Obtaining greater call protection when management expects rates to fall
4. Improving diversification when management expects economic conditions to deteriorate
5. Generally increasing current yields by taking advantage of the tax savings
6. Shifting into taxable securities from municipals when management expects losses

Any swap transaction requires a comprehensive assessment of a bank's overall risk position and explicit interest rate forecast. As a rule, banks normally lengthen maturities when they expect market rates to decline and shorten maturities when they expect market rates to rise. They shift into higher-quality securities when they expect economic conditions to deteriorate and lower-quality securities when conditions are expected to improve.

Consider, alternatively, a swap that involves the sale of a security at a gain and the simultaneous purchase of another security at par. A gain produces an increased tax liability, so that the seller receives more than cost but less than the market price after taxes. Because the government gets its cut up front, there are fewer funds to invest. The reason there was a gain is that prevailing interest rates are below the liquidated bond's coupon rate. Thus, periodic interest income from the reinvested proceeds will decline from that generated by the bond alone. The net present value comparison is again straightforward. Is the present value of the incremental principal cash flow at maturity greater than the present value of the negative interim cash flows? In most cases, the answer is no. It does not add value to sell securities at a gain and reinvest in a like instrument.

Swap with Minimal Tax Effects

Because most banks are reluctant to take capital losses regardless of the financial opportunities, swaps can occasionally be constructed that have no tax or reporting impacts. Section B of Exhibit 16.15 outlines a swap where the net tax impact is negligible. This possibility arises because the bank acquired securities at different times in the past. Over time, rates have changed, so some securities have appreciated in value relative to cost while others have depreciated. The simultaneous sale of two such instruments minimizes any tax effects and frees up funds for reinvestment. In the example, the bank sells a Treasury bond at a pretax loss of $73,760 and a FHLB bond at a pretax gain of $73,060. The net loss equals only $700, and the bank has almost $5 million to reinvest. Because management anticipates rising rates, it reinvests the proceeds in a one-year FHLB security yielding 13 percent, thereby shortening the maturity and duration of its assets. It is difficult to conduct a net present value analysis until management specifies what it will do with the proceeds after the first year. Of course, sensitivity analysis involving a variety of rate forecasts is extremely relevant here.

The essential point is that with swaps, active portfolio management allows a bank to adjust its interest rate risk, liquidity risk, and credit risk profile via buying and selling securities. Portfolio managers must also recognize that not selling securities because they are priced at a discount entails losses in the form of reduced periodic interest income. Similarly, securities sold for a gain typically involve a substitution of a larger current period cash inflow for reduced interest income in later periods.

Summary

Banks buy investment securities to generate income, but also to better manage their risk exposure. This chapter describes the investment portfolio objectives and summarizes important policy considerations. It explains the yield and risk features of alternative investment instruments. It also describes key changes in portfolio composition over time and provides a rationale for banks moving out of municipal bonds and into U.S. government agency securities and alternative investment instruments.

With the changing competitive environment, commercial banks are also looking to manage their investment portfolios more aggressively. The chapter introduces four questions that portfolio managers should get affirmative answers to before buying individual securities. It then discusses different strategies for managing the portfolio. Passive strategies, which view the portfolio as a simple supplement to loans, earn average returns over time relative to the interest rate cycle. Active strategies, if implemented carefully, can enhance returns by taking advantage of perceived changes in interest rates and required adjustments in portfolio composition. Still, taking large speculative positions based on interest rate forecasts is inappropriate. The higher risk will inevitably come back to haunt managers in the form of losses.

The credit crisis of 2006–2008 dramatically altered bank investment strategies. Because many borrowers defaulted on residential and commercial mortgages, many investors in residential MBSs and commercial MBSs generally shied away from these securities as investments. Thus, rates on these securities increased relative to Treasury rates and the LIBOR swap curve. Some banks took large losses on Trust Preferred securities. Banks often responded by changing the mix of their portfolios to emphasize highly liquid instruments rather than these riskier securities. The trend will likely reverse when the money and capital markets begin to function normally again.

Banks can generally improve the timing of their investments if they buy securities contracyclically, when loan demand is high. If successful, they will earn above-average coupon interest and be able to sell securities later at a gain. Most active investment strategies involve looking at a security's total return. This is especially difficult, however, when securities have embedded options, such as the call option in a callable agency bond and the prepayment option in MBSs. This chapter provides examples of how total return analysis can assist in evaluating these securities. It also describes the impact of these embedded options on a security's duration, convexity, and general price sensitivity. The chapter also demonstrates why banks should hold tax-exempt municipal securities to shelter as much income as possible, due to their higher after-tax yields relative to comparable taxable securities. Unfortunately, only bank-qualified municipals are attractive on a yield basis and they are in limited supply. Finally, portfolio managers should recognize that holding low-rate discount instruments produces opportunity losses in the form of reduced interest income in future years. If possible, they should take advantage of security swaps, which allow a bank to realign its overall risk and return position.

Questions

1. Describe how a bank makes a profit with its securities trading account. What are the risks?
2. Explain why bank managers often refuse to sell securities at a loss relative to book value. What is the cost of continuing to hold discount instruments? What are the costs of selling securities at a gain?
3. Explain how zero coupon securities differ from coupon securities. Which are more liquid, in general? Which are more price sensitive? What is the advantage of a zero coupon security in terms of total return?
4. What types of securities are banks prohibited from buying for investment purposes?
5. Explain how the composition of a small community bank's investment portfolio differs, in general, from the composition of a large bank's portfolio. Why might mutual funds be attractive to banks?
6. How did the provisions of Section 939A of the Dodd–Frank Act alter the behavior of banks in managing their investment portfolios?
7. What is the option in a callable agency bond? What impact does the call deferment period have on a callable bond's promised yield? What is the primary advantage of a discount callable bond versus one trading at par?
8. List the objectives that banks have for buying securities. Explain the motive for each.
9. What key attributes of a security make it a suitable investment for a bank?
10. FASB 115 requires certain classifications within a bank's securities portfolio. What is the accounting treatment of securities within each classification? Describe why full market-value accounting might adversely affect a bank's reported capital. How should management classify the bank's securities to *minimize* potential reporting problems?
11. Explain what impact accumulated other comprehensive income (from unrealized securities gains or losses) has on bank regulatory capital.
12. Discuss the impact of each of the following on prepayment risk for a mortgage-backed pass-through security (MBS):
    a. High-coupon interest MBS versus low-coupon interest MBS
    b. MBS issued six years prior versus MBS issued this year
    c. Demographic trends in different areas of the country
13. Explain how the design of a CMO supposedly helps to manage prepayment risk for investors. What is a tranche?
14. Suppose that you own a four-year maturity Treasury bond that pays $100,000 in principal at maturity and $3,000 every six months in coupon interest. Use the features of the bond to explain what Treasury IOs and POs are.
15. Consider a $100 million pool of conventional mortgages paying 8 percent interest. Suppose that you create one PO and one IO for this entire pool. Describe what a PO and IO would look like for this mortgage pool.
16. Large banks often borrow heavily in the federal funds market and maintain small investment portfolios relative to their asset size. Are these offsetting risk positions? Why do large banks organize themselves this way?
17. Describe the characteristics of the ladder investment strategy and compare them to the barbell investment strategy. Why should the barbell strategy outperform the

ladder strategy in a stable or declining interest rate environment? Why should the ladder strategy outperform the barbell strategy in a rising-rate environment?

18. The term-structure of U.S. Treasury interest rates generally exhibits certain shapes during different stages of the business cycle. Discuss this relationship and explain why it holds, on average. What shape does the yield curve take prior to a recession in the United States?
19. What rationale suggests that a contracyclical investment strategy should, on average, outperform the market? Is it possible to consistently earn above-average returns by timing security purchases?
20. Suppose that the U.S. Treasury yield curve is continuously downward-sloping. To maximize interest income over the next 10 years, should a bank portfolio manager buy securities with maturities of under 1 year or securities with maturities of 10 years? Explain what factors should be used to make a decision.
21. Provide one reason for using the bank's investment portfolio to speculate on interest rate movements. Provide one reason against such a strategy. What do you believe about efficient markets, and how does this influence your opinion of speculating? Can investors accurately forecast the direction of future interest rate movements?
22. Suppose that a bank's ALCO reports that the bank is too liability sensitive; that is, earnings will fall more than desired should rates rise. You have been asked to reduce the bank's earnings sensitivity. What specific strategies might the investment manager pursue? Identify the cost and benefit of each. Is each an active or passive strategy and is it speculative?
23. Describe the basic strategy in riding the yield curve. Can you ride the yield curve if the yield curve is downward-sloping with short-term rates above long-term rates?
24. In each of the following cases, identify the buyer and seller of the option, how the value of the option is indicated, and when (in what interest rate environment) the option will be exercised:
    a. A bank buys a five-year maturity GNMA bond that is callable at par after one year, yielding 6.88 percent. The matched-duration zero coupon Treasury rate is 6.11 percent.
    b. A bank buys an FHLB pass-through MBS at par yielding 7.47 percent. The matched-duration zero coupon Treasury rate is 6.48 percent.
25. Suppose that you own a callable U.S. agency bond like that in Exhibit 16.9. Explain why your total return will fall when interest rates rise. Identify changes in return associated with each component of total return. Why will total return rise when rates fall?
26. Suppose that a bank currently owns a $5 million par-value Treasury bond, purchased at par, with four years remaining to maturity that pays $200,000 in interest every six months. Its current market value is $5.23 million. If the bank sold the bond and reinvested the proceeds in a similar-maturity taxable security, it could earn 6.6 percent annually. Determine the incremental cash-flow effects for the bank if it sold the Treasury note and reinvested the full after-tax proceeds from the sale in a 6.6 percent three-year taxable security, assuming a 34 percent tax rate.
27. Suppose that the above bank also owns a $1 million par-value Treasury bond, purchased at par, with two years to maturity, paying $29,000 in semiannual interest, with a market value of $960,000. Determine the incremental cash-flow effects if the bank sold this note and bought a two-year taxable security yielding 6.2 percent with the proceeds.

28. You pay federal income taxes at a 28 percent marginal tax rate. You have the choice of buying either a taxable corporate bond paying 7.10 percent coupon interest or a similar-maturity-and-risk municipal bond paying 5.90 percent coupon interest.
    a. Which bond offers the higher after-tax yield?
    b. If you also pay a state income tax on taxable coupon interest at a 9 percent rate, but no tax on municipal interest, which bond offers the higher after-tax yield?

Problems

I. Learn More about Your Local Bank. Obtain a copy of a local community bank's annual report and the annual report of a large bank. Determine the extent to which each of the banks do the following:

1. Operates a trading account
2. Reports gains or losses on securities trades
3. Invests in municipal securities
4. Invests in mortgage-backed securities
5. Reports a change in capital due to its securities holdings
6. Classify securities as held-to-maturity (HTM) versus available-for-sale (AFS).

II. Riding the Yield Curve. Victory Bank plans to invest $1 million in Treasury bonds and has a four-year investment horizon. It is considering two choices: a four-year bond currently yielding 5.3 percent annually and an eight-year bond yielding 6.54 percent annually. Coupon interest is payable semiannually and can be reinvested at 5 percent (2.5 percent semiannually). If the bank buys the eight-year bond, it will sell it after four years. In four years a four-year bond is expected to yield 6 percent. Follow the example in Exhibit 16.7 and answer the following questions:

1. Calculate the total coupon interest, reinvestment income, and principal returned at maturity expected from investing $1 million in the four-year bond. What is the bank's expected total return?
2. Calculate the total coupon interest, reinvestment income, and sale value after four years expected from investing $1 million in the eight-year bond and selling it prior to maturity. What is the bank's expected total return?
3. Determine which investment promises the higher return. What risks are involved in this strategy?
4. Suppose that instead of yielding 6 percent after four years, the market rate on a four-year bond is 7.4 percent. What will the total return be for the strategy of buying an eight-year bond and selling it after four years?

III. Effective Duration and Convexity. You own a seven-year final maturity callable agency bond that is currently priced at $100.15 per $100 par value to yield 7.63 percent. If the prevailing market yield on this bond rises to 8.30 percent, the price will fall to $99.45. If the prevailing market yield on this bond falls to 6.93 percent, the price will fall to par value.

a. What is the effective duration of this bond?
b. What is the effective convexity of this bond?
c. Does this bond exhibit positive or negative convexity? Why?

IV. Security Swap. The ALCO members of Jackson County Bank have just reached a consensus that market interest rates are going to rise by 100 to 200 basis points during the upcoming year. Committee members decided to swap securities in the bank's investment portfolio to make the portfolio more rate sensitive. The table below lists selected security holdings and market values and coupon payments.

Security	Par Value	Market Value	Semiannual Coupon
2-year U.S. Treasury note	$2,000,000	$2,094,600	$ 60,000
10-year U.S. Treasury bond	$3,000,000	$3,277,525	$148,200
4-year Gov't. National Mortgage Assoc. bond	$2,000,000	$1,902,880	$ 52,000
4-year Federal Land Bank (FLB) bond	$2,000,000	$2,105,425	$ 76,000
*Current Market Rates**			
6-month Treasury bills: 3.88%			
52-week Treasury bills: 4.57%			
2-year Treasury note: 5.40%			
4-year FHLB: 6.05%			

*The bank's marginal income tax rate equals 35 percent.

1. What will the incremental cash-flow effects be over the next year if the bank sells both four-year bonds from its portfolio and invests the entire after-tax proceeds in a new 2-year Treasury note? Is this a positive or negative net present value project? What are the advantages and disadvantages of the bank doing this?
2. Suppose the bank sells the 2-year Treasury note, the 10-year Treasury bond, and the 4-year GNMA bond. Determine what dollar amount the bank will report under securities gains or losses. Analyze the incremental cash-flow effects if the bank uses the proceeds after taxes to (a) buy 6-month T-bills, (b) buy 52-week T-bills, and (c) buy 2-year Treasury notes. In each case, explain how the bank's risk profile will have changed.
3. Suppose that the bank also owns CMOs with an estimated life of 4.5 years that currently produce 8 percent coupon interest. At current interest rates, the prepayment speed is 25 percent faster than normal. Discuss the pros and cons of selling these CMOs in a rising-rate environment.

Activity

Obtain a copy of a large bank's most recent annual report. Analyze both the data for the securities portfolio and the notes to the balance sheet and income statement to determine the following:

1. How the bank accounts for its security holdings (review the amounts designated as trading securities, HTM, and AFS)
2. Whether the market value of securities held-to-maturity exceeds or falls below the book value
3. How much the impact of changing interest rates either increased or decreased reported bank capital

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17

Global Banking Activities

One clear trend in the evolution of financial institutions and markets is the expansion of activities across national boundaries. Technology has made it possible to conduct business around the world with relative ease and minimal cost. Producers recognize that export markets are as important as domestic markets, and that the range of competitors includes both domestic and foreign operatives. This trend is increasingly apparent in agriculture, textiles, steel, and microelectronics. Many financial institutions have similarly expanded their activities internationally while developing financial instruments to facilitate trade and funds flows.

Global banking activities involve both traditional commercial and investment banking products. U.S. commercial banks now accept deposits, make loans, provide letters of credit, trade bonds and foreign exchange, and underwrite debt and equity securities in dollars as well as other currencies. With the globalization of financial markets, all firms compete directly with other major commercial and investment banks throughout the world. Foreign banks offer the same products and services denominated in their domestic currencies and in U.S. dollars. Still, it was not always this way.

Restrictions on interstate branching and the types of financial products that U.S. depository institutions could offer produced smaller U.S. financial companies that offered fewer products than did global financial companies. Once interstate branching restrictions were removed and regulators authorized new combinations and lines of business, U.S. financial institutions took the shape and size of their more mature global counterparts.

One of the unfortunate consequences of the globalization of the market place, however, was clearly demonstrated with the financial crisis of 2008–2009. The interconnections of the world's banks meant that mortgage subprime problems produced a liquidity crisis that spread from the U.S. to Europe and beyond. As the world becomes more inter-connected, the need for coordination and cooperation between countries will be even more important.

U.S. Depository Institutions in the World Market

U.S. depository institutions, although dominant players in some world markets, were not considered "large" by international standards 20 years ago. Restrictive branching laws and restrictions on the types of products U.S. banks could offer meant that the U.S. banking system evolved into many smaller institutions, rather than a few larger

EXHIBIT 17.1 **Ranking of World Banking Companies Prior to Full Enactment of the Riegle–Neal Interstate Banking and Branching Efficiency Act, 1996 (millions of dollars)**

Rank	Company Name	Total Assets Year-End 1996
1	Bank of Tokyo-Mitsubishi Ltd., Tokyo	$648,161
2	Deutsche Bank AG, Frankfurt, Germany	575,072
3	Credit Agricole Mutual, Paris	479,963
4	Credit Suisse Group, Zurich	463,751
5	Dai-Ichi Kangyo Bank Ltd., Tokyo	434,115
6	Fuji Bank Ltd., Tokyo	432,992
7	Sanwa Bank Ltd., Osaka, Japan	427,689
8	Sumitomo Bank Ltd., Osaka, Japan	426,103
9	Sakura Bank Ltd., Tokyo	423,017
10	HSBC Holdings, plc London	404,979
…		
17	Chase Manhattan Corp., New York	333,777
26	Citicorp, New York (b)	278,941

Source: *American Banker*, "Ranking the Banks," www.americanbanker.com.

institutions, which is more common internationally. Exhibit 17.1 lists the world's largest banking companies by assets as of year-end 1996 prior to the relaxation of restrictive interstate branching laws and restrictions on the types of activities U.S. depository institutions could engage in. These restrictions and other regulatory factors generally meant that U.S. depository institutions were greater in number, but smaller in size.[1]

The Riegle–Neal Interstate Banking and Branching Efficiency Act of 1994 effectively eliminated interstate branching restrictions for commercial banks in the United States, but did not became fully effective until 1997. In early 1994, there were 10 U.S. commercial banks with 30 interstate branches. By June of 1997, there were 120 U.S. commercial banks with 8,876 interstate branches, and in June of 2007, there were 456 U.S. commercial banks with 32,739 interstate branches. U.S. depository institutions were also hampered in their ability to compete internationally by the Glass–Steagall Act of 1933, which effectively separated commercial banking from investment banking. U.S. depository institutions essentially provided two products: loans and FDIC-insured deposits. Glass–Steagall, however, left open the possibility of banks engaging in the investment banking business through the use of Section 20 affiliates so long as the bank was not "principally engaged" in these activities (For details on Glass–Steagall, see Chapter 2). Section 20 of the Glass–Steagall Act allowed commercial banks to engage in investment banking so long as the income generated was limited.

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[1] One problem with comparing U.S. banks with banks from around the world is that U.S. reporting requirements are much more stringent with respect to disclosure and timing. Publicly-owned U.S. companies must make an annual report within 90 days after the end of their fiscal year. U.S. banks must file their quarterly reports within 30 days, while companies based outside the United States do not have the same restrictions. Exhibits 17.1 and 17.2 convert foreign assets and equity into U.S. dollars. When the value of the dollar declines (rises) relative to a foreign currency, the dollar-valued magnitude of foreign assets and equity rises (declines). Thus, comparisons between countries incorporate fluctuations in the relative prices of currencies.

In 1987, commercial banks received permission from the Federal Reserve to underwrite and deal in securities. The Fed initially resolved the issue of "principally engaged" by allowing banks to earn up to 5 percent of their revenue in their securities affiliates. This fraction was raised to 10 percent in 1989 and to 25 percent in 1997. By the beginning of 1998, there were 45 Section 20 companies. In November 1999, the U.S. Congress passed the Gramm–Leach–Bliley Act which, for the first time, allowed U.S. depository institutions to fully compete with the largest global diversified financial companies by offering a similarly broad range of products. Gramm–Leach–Bliley (GLB) repealed restrictions on banks affiliating with securities firms contained in Sections 20 and 32 of Glass–Steagall and modified portions of the Bank Holding Company Act to allow affiliations between banks and insurance underwriters. While it preserved the authority of states to regulate insurance, the act prohibited state actions that prevent bank-affiliated firms from selling insurance on an equal basis with other insurance agents. The act further created a new *financial holding company* authorized to engage in underwriting, selling insurance and securities, conducting both commercial and merchant banking, investing in and developing real estate, and other "complementary activities."

As a direct result of Riegle–Neal and GLB, U.S. depository institutions quickly grew larger. By the end of 2000, U.S. banks held three of the largest world bank spots due to mergers of commercial banks as well as mergers across product lines, including securities and insurance firms (with Citicorp and Travelers being a notable example).[2] Citigroup formed a *financial holding company* under the provisions of GLB and became one of the first integrated financial services companies engaged in investment services, asset management, life insurance and property casualty insurance, and consumer lending. Its operating companies include Salomon Smith Barney, Salomon Smith Barney Asset Management, Travelers Life & Annuity, Primerica Financial Services, Travelers Property Casualty Corporation, and Commercial Credit.[3] Of course, Citigroup dramatically streamlined its different lines of business and reduced its global activities in response to its performance problems associated with the credit crisis of 2007–2008.

Exhibit 17.2 presents the largest financial companies in December 2013, ranked by assets and market capitalization (Cap.). The only U.S. bank making the top 10 largest by assets in the world was JP Morgan Chase & Co. Bank of America was ranked twelfth, Citigroup, Inc. was ranked fourteenth, and Wells Fargo was ranked twenty-first. Of the top 10 largest institutions in the world, four are from China and the twenty-third largest institution is also from China. The view is a bit different, however, if one ranks by total market capitalization. Although the Chinese banks are still heavily represented in the top of the list, the U.S. banks rank much higher by market capitalization. Wells Fargo is ranked first, JP Morgan Chase & Co. is ranked second, Bank of America is ranked fifth, and Citigroup Inc. is ranked seventh.

Today, the product offerings of the largest institutions are very similar regardless of where the institution is headquartered. Even prior to the elimination of Glass–Steagall, depository institutions in the U.S. were able to offer a diversified set of products by taking advantage of Section 20 of the Glass–Steagall Act, but also internationally by using an Edge Act corporation. **Edge Act corporations** are domestic subsidiaries of banking organizations chartered by the Federal Reserve. All "Edges" are located in the United States and may be established by U.S. or foreign banks and bank holding companies.

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[2] It is interesting to note that the merger between Citicorp and Travelers (which created Citigroup, a diversified financial services company), was not completely permissible under provisions of the Glass–Steagall Act at the time it was approved. The passage of GLB made the merger permissible allowing Citigroup to legally be the world's largest banking company. Had GLB not become law, Citigroup would have had between two to five years to divest itself of Travelers' insurance underwriting.

[3] In 2002, Citigroup sold Travelers Property Casualty—and in 2005, sold Travelers Life & Annuity (as well as almost all of its international insurance business)—to MetLife.

EXHIBIT 17.2 **World Rankings of Financial Companies (by Assets and Market Capitalization (Cap)), December 2013 (billions of U.S. dollars)**

Rank by Assets	Rank by Market Cap.	Bank	Country	Total Assets	Total Market Cap.
1	3	Industrial & Commercial Bank of China (ICBC)	China	3,181.88	196.21
2	4	HSBC Holdings	UK	2,758.45	191.43
3	6	China Construction Bank Corporation	China	2,602.54	160.83
4	14	BNP Paribas	France	2,589.19	96.03
5	6	Mitsubishi UFJ Financial Group	Japan	2,508.84	160.83
6	2	JPMorgan Chase & Co	US	2,476.99	229.90
7	8	Agricultural Bank of China	China	2,470.43	126.41
8	9	Bank of China	China	2,435.49	115.92
9	47	Credit Agricole Group	France	2,346.56	38.87
10	27	Barclays PLC	UK	2,266.82	63.24
11	41	Deutsche Bank	Germany	2,250.64	45.69
12	5	Bank of America	US	2,149.85	181.77
13	#N/A	Japan Post Bank	Japan	1,968.27	#N/A
14	7	Citigroup Inc	US	1,894.74	144.63
15	39	Societe Generale	France	1,740.75	47.62
16	38	Mizuho Financial Group	Japan	1,708.86	48.15
17	30	Royal Bank of Scotland Group	UK	1,703.96	58.68
18	11	Banco Santander	Spain	1,607.24	110.57
19	29	Sumitomo Mitsui Financial Group	Japan	1,569.99	59.14
20	#N/A	Groupe BPCE	France	1,567.88	#N/A
21	1	Wells Fargo	US	1,546.71	261.72
22	16	Lloyds Banking Group	UK	1,402.10	90.92
23	#N/A	China Development Bank	China	1,320.18	#N/A
24	33	UniCredit S.p.A.	Italy	1,157.41	52.81
25	21	UBS AG	Switzerland	1,107.95	78.06

Source: Relbanks.com, http://www.relbanks.com/worlds-top-banks/assets.

However, they are limited to activities involving foreign customers. They are able to establish overseas branches and international banking facilities (IBFs) and own foreign subsidiaries. Domestic and foreign banking organizations can subsequently conduct international business in the locales where their customers do business.

Many community banks located along the nation's borders also rely heavily on businesses and individuals based outside the United States, as such groups represent large depositors and borrowers. These banks, especially those near Mexico, typically conduct business in multiple currencies and face additional risks with the devaluation of foreign currencies when foreign business slows.[4] Banks generally find that it is advantageous to

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[4] The term *devaluation* refers to the situation in which a government administratively resets the value of its currency to a lower level relative to other currencies. As such, the same amount of the domestic currency buys less.

follow firms and individuals that the bank already feels comfortable with, so banks will often enter into contracts denominated in foreign currencies and hedge the foreign exchange risk with these customers.

Impact of the Credit Crisis of 2007–2008

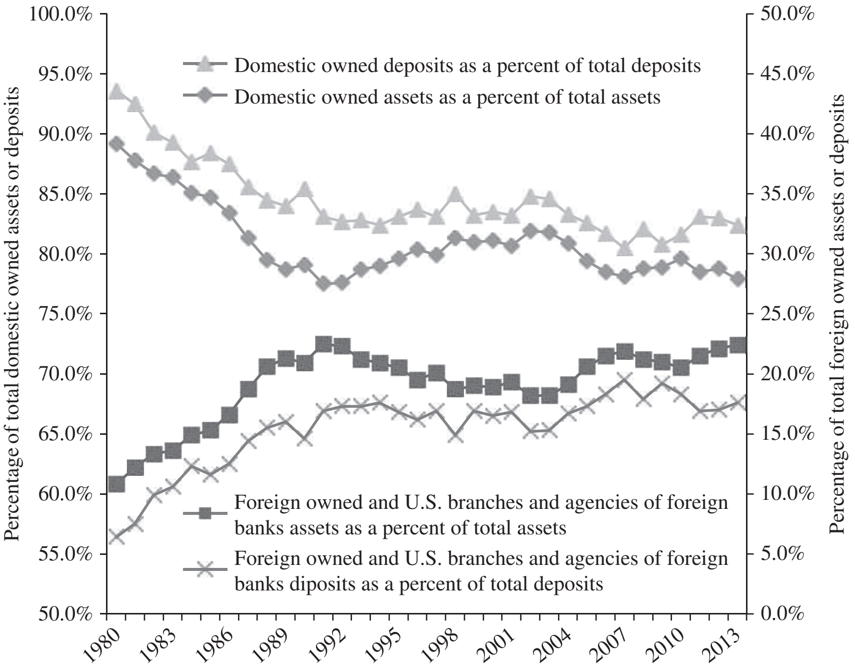
The credit crisis of 2007–2008 permanently altered the organizational structure and global activities of the world's largest financial institutions. Upon experiencing huge losses from asset write-downs associated with subprime mortgages, collateralized debt obligations, and leveraged loans, many institutions depleted their capital. While some institutions were initially able to obtain additional external capital from existing stockholders and sovereign wealth funds, these sources eventually dried up. Out of desperation and a real fear that large institution failures would freeze credit availability and lead to a global meltdown of the financial system, the governments of many countries injected capital directly into many financial institutions headquartered in their home countries—effectively nationalizing them. At a minimum, these governments acquired significant equity stakes. These actions were taken by governments throughout the world, both in the form of equity and debt guarantees, to support banking within their home countries.

The critical question during this period was, and to some degree continues today, is "How will governmental ownership, or past support, of these institutions influence the allocation of capital?" In one troublesome example in November 2008, a small firm in Chicago, Republic Window & Doors, could not meet its debt service requirements and closed operations, stating that Bank of America had cut off funding and the firm therefore could not pay for employees' vacation time and severance. Employees staged a sit-in, claiming that because Bank of America accepted federal funding under the Troubled Asset Relief Program, it should not be allowed to stop lending to the company. President-elect Barack Obama said that the employees were "absolutely right" in their actions. Bank of America subsequently caved in to the pressure and made a loan. The implication is that governmental ownership of the bank influenced its decision to make additional credit available to borrowers and their affiliated parties. Unfortunately, if governmental ownership means that decisions will be made without regard to business prudence, many of the companies who accept governmental funds could have significant problems going forward. Today, there continues to be a somewhat negative feeling about government support of large companies during the financial crisis. This, however, might be a bit shortsighted, as it is highly likely that without government support of these institutions, we would all have been worse off!

Market Share of Foreign Financial Institutions Operating in the United States

Foreign financial institutions operating through their American banking offices have also aggressively pursued U.S. business. Exhibit 17.3 indicates the dramatic change in market share data for U.S. offices of foreign banks. In 1973, U.S. offices of foreign banks controlled only 10.8 percent of total U.S. banking assets and 6.4 percent of total domestic deposits. This more than doubled over the next 10 years to a point where in 1991, U.S. offices of foreign banks controlled 22.5 percent of total domestic assets and 16.9 percent of total deposits. This percentage of foreign ownership of total assets and deposits did not change much over the following 13 years and has remained at similar levels at the end of 2013. The dramatic increase in foreign ownership of domestic assets and deposits

EXHIBIT 17.3 **Comparison of Market Share Data for U.S. Offices of Domestically and Foreign-Owned Commercial Banks in the United States: Total Assets and Deposits, 1980–2013**



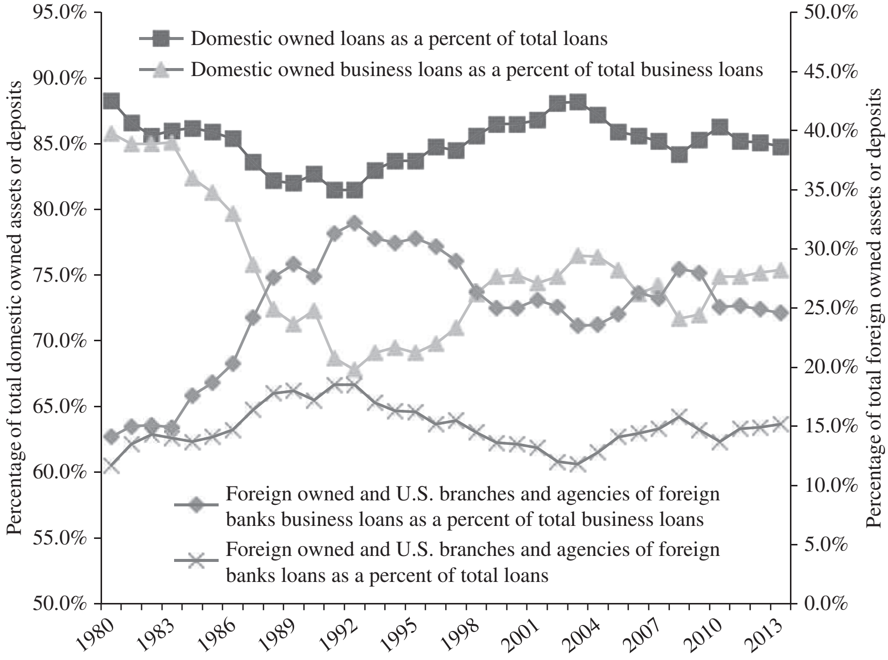
Source: Federal Reserve Board, Share Data for U.S. Offices of Foreign Banks, www.federalreserve.gov or www.federalreserve.gov/releases/iba.

through the early 1990s, as well as the leveling off and decline of this trend in the late 1990s and early 2000s, can be traced to changes in the U.S. banking system as branching and product restrictions were removed. Exhibit 17.3 shows that the loss in market share to foreign banks stopped during this time.

The most active foreign financial firms operating in the United States have been those headquartered in Western Europe and Hong Kong (with operations primarily in the Midwest and along the East Coast), and those headquartered in Japan (with extensive operations along the West Coast). Many foreign offices and branches are located in New York City, given its status as a financial center.

Global financial firms often follow different strategies. Some U.S. companies, such as Citigroup, have aggressively located offices outside the United States and attempted to establish their brand with extensive marketing efforts. Many foreign financial firms, by contrast, have been content to take silent participations in deals originated by U.S. banks with little fanfare. Domestic borrowers that might object to negotiating a credit agreement with a foreign financial company are often unaware that the originating U.S. commercial bank is part of a foreign banking organization or sells part of the loan. Foreign financial companies, in addition, are extremely aggressive in underwriting Eurobonds and engaging in off-balance sheet activities, including interest rate swaps, standby letters of credit, and municipal bond guarantees. This provides instant credibility and a foothold when negotiating loans later.

EXHIBIT 17.4 **Comparison of Market Share Data for U.S. Offices of Domestically and Foreign-Owned Commercial Banks in the United States: Total Loans and Total Business Loans, 1980–2013**



Source: Federal Reserve Board, Share Data for U.S. Offices of Foreign Banks, www.federalreserve.gov or www.federalreserve.gov/releases/iba.

Exhibit 17.4 shows the growth in market share of U.S. offices of foreign financial companies in total loans and business loans. In 1980, U.S. offices of foreign banks controlled 11.7 percent of total loans and 14.1 percent of business loans within the United States. Foreign ownership of total loans increased significantly over the next 12 years to 18.5 percent, while foreign control of business loans doubled to 32.2 percent market share of business loans in 1992. The market share of U.S. offices of foreign banks has fallen since 1992, as these offices controlled just 15.2 percent of total loans and 24.6 percent of business loans by 2013.

Some of the largest U.S. commercial banks allocate a significant portion of their assets internationally and generate considerable earnings through these activities. Exhibit 17.5 provides details on the largest U.S. commercial banks with significant international operations. At the time prior to the credit crisis of 2008, Citibank was the dominant player in foreign office banking with $326.5 billion in foreign office loans (or 47.4 percent of total loans), and $555.3 billion in deposits held in foreign offices, which is 71 percent of total deposits. It also had 281 foreign branches, but 1,026 branches in the United States. It is interesting to note that prior to the merger of Citibank with Bank One, Citibank had more foreign branches than domestic branches. JPMorgan Chase was second to Citibank in 2007 with $82.3 billion in foreign office loans (or 16.6 percent of total loans), and $304.8 billion in deposits held in foreign offices, which is 39 percent of total deposits. It also had 197 foreign branches, but 3,138 branches in the

EXHIBIT 17.5 **Largest U.S. Banks with Foreign Banking Activity, Ranked by Total Foreign Assets: 2013 (Millions of Dollars)**

Rank	Bank	Total assets	Total assets in foreign offices	Number of Domestic Offices	Number of Foreign Offices
1	JPMorgan Chase Bank, National Association (Columbus, OH)	1,945,467	756,551	5739	197
2	Citibank, National Association (Sioux Falls, SD)	1,346,747	601,778	1028	281
3	Bank of America, National Association (Charlotte, NC)	1,433,716	146,616	5320	228
4	The Bank of New York Mellon (New York, NY)	296,626	93,309	9	12
5	State Street Bank and Trust Company (Boston, MA)	239,051	51,918	1	1
6	Wells Fargo Bank, National Association (Sioux Falls, SD)	1,373,600	39,308	6345	37
7	The Northern Trust Company (Chicago, IL)	102,659	27,350	77	2
8	HSBC Bank USA, National Association (Mc Lean, VA)	179,772	16,442	248	19
9	FIA Card Services, National Association (Wilmington, DE)	158,290	15,853	1	1
10	Bank of China (New York, NY)	44,439	15,403	1	0
11	Capital One Bank (USA), National Association (Glen Allen, VA)	81,906	9,448	1	2
12	Deutsche Bank Trust Company Americas (New York, NY)	55,759	4,456	4	14
13	PNC Bank, National Association (Wilmington, DE)	310,000	3,115	2967	2
14	Banco Popular de Puerto Rico (Hato Rey, PR)	26,563	1,795	2	0
15	Israel Discount Bank of New York (New York, NY)	9,600	1,506	7	1
16	Union Bank, National Association (San Francisco, CA)	105,286	1,491	417	1
17	East West Bank (Pasadena, CA)	24,624	1,278	115	1
18	Safra National Bank of New York (New York, NY)	6,769	1,220	2	0
19	KeyBank National Association (Cleveland, OH)	90,440	1,121	1067	1
20	Comerica Bank (Dallas, TX)	65,202	1,078	487	1
21	U.S. Bank National Association (Cincinnati, OH)	360,478	780	3140	2
22	Mizuho Bank (USA) (New York, NY)	5,220	665	2	2
23	First Hawaiian Bank (Honolulu, HI)	17,104	658	57	2
24	Raymond James Bank, National Association (Saint Petersburg, FL)	11,262	552	1	0
25	Fifth Third Bank (Cincinnati, OH)	128	551	1373	1

EXHIBIT 17.5 (continued)

Rank	Bank	Deposits held in domestic offices	Deposits held in foreign offices	Net interest income: foreign offices
1	JPMorgan Chase Bank, NA (Columbus, OH)	1,004,101	321,935	1,163
2	Citibank, NA (Sioux Falls, SD)	451,105	529,736	10,342
3	Bank of America, NA (Charlotte, NC)	1,034,845	79,258	1,711
4	The Bank of New York Mellon (New York, NY)	130,876	121,987	82
5	State Street Bank and Trust Company (Boston, MA)	82,783	104,537	(89)
6	Wells Fargo Bank, NA (Sioux Falls, SD)	1,000,959	94,619	386
7	The Northern Trust Company (Chicago, IL)	35,410	50,307	(71)
8	HSBC Bank USA, NA (Mc Lean, VA)	103,036	19,998	13
9	FIA Card Services, NA (Wilmington, DE)	114,391	6,009	1,345
10	Bank of China (New York, NY)	14,031	15,358	-
11	Capital One Bank (USA), NA (Glen Allen, VA)	36,693	111	1,297
12	Deutsche Bank Trust Company Americas (New York, NY)	38,271	2,715	(13)
13	PNC Bank, NA (Wilmington, DE)	219,273	6,466	65
14	Banco Popular de Puerto Rico (Hato Rey, PR)	20,548	224	85
15	Israel Discount Bank of New York (New York, NY)	5,729	1,944	6
16	Union Bank, NA (San Francisco, CA)	79,622	786	62
17	East West Bank (Pasadena, CA)	19,674	839	16
18	Safra National Bank of New York (New York, NY)	4,904	1,172	4
19	KeyBank NA (Cleveland, OH)	71,292	560	10
20	Comerica Bank (Dallas, TX)	52,499	1,473	29
21	U.S. Bank NA (Cincinnati, OH)	246,124	25,027	(14)
22	Mizuho Bank (USA) (New York, NY)	2,317	1,099	1
23	First Hawaiian Bank (Honolulu, HI)	12,511	1,067	27
24	Raymond James Bank, NA (Saint Petersburg, FL)	10,012	-	27
25	Fifth Third Bank (Cincinnati, OH)	99,884	2,267	6

Source: FDIC SDI Data, http://www2.fdic.gov/SDI/download_large_list_outside.asp.

United States. Over the next six year, JPMorgan's foreign presence grew significantly, as Citibank went through financial problems and JPMorgan acquired Bear Stearns and Washington Mutual. JPMorgan controlled more total foreign assets, with $756.6 billion as compared to Citibank with $601.8 billion at year-end 2013.

Exhibit 17.6 lists the largest "foreign-owned" banks operating in the United States with a U.S. banking charter. T D Bank, owned by the Toronto-Dominion Bank holding company is the largest foreign commercial bank operating in the United States, and

EXHIBIT 17.6 **Largest Foreign-Owned, Domestically Chartered, Commercial Banks in the United States: Consolidated Domestic Assets and Percent Foreign Ownership, 2013 (Millions of Dollars)**

National Rank	Bank Name/Holding Co. Name	Bank Location	Consolidated Assets	Percent Domestic Assets
10	T D Bank NA/TD Us P & C Hold ULC	Wilmington, DE	217,626	100
11	HSBC Bank USA NA/HSBC North Amer Hold	Mclean, VA	179,772	91
19	Union Bank NA/Unionbancal Corp	San Francisco, CA	105,286	99
23	RBS Citizens NA/RBS Citizens Fncl Grp	Providence, RI	94,717	100
24	Bmo Harris Bank NA/Bmo Fncl Corp	Chicago, IL	91,286	100
29	Santander Bank NA/Santander Holds USA	Wilmington, DE	74,264	99
30	Compass Bank/BBVA Compass Bshrs	Birmingham, AL	71,737	100
31	Bank Of The West/Bancwest Corp	San Francisco, CA	66,468	100
34	Deutsche Bank TC Americas/Deutsche Bank TR Corp	New York, NY	55,759	95
53	Barclays Bank De/Barclays De Holds LLC	Wilmington, DE	19,056	100
59	First Hawaiian Bank/Bancwest Corp	Honolulu, HI	17,104	96
63	T D Bank USA NA/Td Us P & C Hold ULC	Wilmington, DE	16,074	100
67	Rabobank NA/Rabobank Intl Hold Bv	Roseville, CA	14,264	100
90	Great Western Bank/National Amer Hold LLC	Sioux Falls, SD	9,270	100
92	Banco Popular N Amer/Popular	New York, NY	8,755	100
108	Safra NB Of NY/SNBNY Hold	New York, NY	6,769	83
130	Mizuho Bank USA/	New York, NY	5,220	87
133	Bank Leumi USA/Bank Leumi Le-Israel Corp	New York, NY	5,191	100
136	City NB Of FL/Bankia Inversiones Financieras	Miami, FL	4,922	100
161	Sabadell United Bank NA/	Miami, FL	3,872	100
201	RBC Bank Ga NA/	Atlanta, GA	2,943	100
227	Totalbank/	Miami, FL	2,542	100
247	Manufacturers Bank/	Los Angeles, CA	2,303	100
292	CTBC Bank Corp USA/CTBC Cap Corp	Los Angeles, CA	1,897	100
296	Inter NB/Banorte USA Corp	Mcallen, TX	1,856	100

Source: Federal Reserve Statistical Release, Insured U.S.-Chartered Commercial Banks That Have Consolidated Assets of $300 Million or More, Ranked by Consolidated Assets as of December 31, 2013, http://www.federalreserve.gov/releases/lbr/current/default.htm.

HSBC, owned by HSBC Holdings located in London, England, is the second largest. With the exception of Puerto Rican banks, foreign-owned banks in the United States primarily operate U.S. branches. Foreign operations are generally handled through banks chartered in their respective domestic countries.

The European Community

In 1985, the countries of Western Europe started a process to design a plan for economic stability and growth in the region. The effort created the **European Community**, or **EC**, which is a confederation of countries that have negotiated the removal of trade barriers to enhance competition. The objective is to increase national output and employment by creating a unified economic engine that can better compete with Japan, the United States, and Eastern Europe. Today, these countries support a common currency—the **Euro (European Unified Currency)**. Euro banknotes and coins were introduced on January 1, 2002, and are used by Austria, Belgium, France, Finland, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain. Monaco, San Marino, and Vatican City have also adopted the Euro. The European Central Bank, based in Frankfurt, Germany, sets monetary policy for the single currency. The United Kingdom and Sweden have no plans at present to move toward adopting the Euro.

The 29 EC countries are Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom. EC country members have generally agreed on rules that allow the following:

- Free flow of capital across borders
- Elimination of customs formalities
- Establishment of a central bank, which creates the potential for a single currency

Although there have been short-term disruptions in the original plans, the expected long-term result is an environment where trade quotas will no longer exist, where the removal of tariffs and license restrictions will lower production costs and ultimately prices to consumers, and where national output will soar.

The implications for the banking industry are wide ranging. First, trade restrictions have generally protected European banks from outside competition. Banks in France, for example, reported efficiency ratios of 60 to 70 percent during the 1990s, while U.S. banks reported ratios closer to 55 to 60 percent. In order to improve their competitive opportunities, many financial companies have merged with banks in other countries. U.S. financial companies similarly view the EC as an opportunity to expand their market presence, and many are forming joint ventures with European banks. In addition, any benefits to consumers in the form of lower prices or enhanced output will benefit all lenders, regardless of where the home office is located.

The financial crisis of 2008–2009 severely tested the EC as well as the Euro. The financial problems of several EC members, such as Portugal, Italy, Iceland, Greece, and Spain meant that the stronger EC members, such as Germany, had to support the large government deficits of the weaker countries. To put this in perspective, it is difficult for the U.S. Federal government to support or bailout U.S. cities and states, image how unpopular it must be to bailout other countries! The Euro remains intact today, but these types of financial crises will test the currency going forward.

The remainder of this chapter examines the basic features of international banking. The analysis begins with a description of the different types of organizational units that engage in international activities. The following sections analyze the Eurocurrency and Eurobond markets, international lending activities, fee-based services, and foreign exchange operations. Improved communications systems and the development of innovative securities permit market participants to look globally before making investment or borrowing decisions. Participants benefit greatly from the increased liquidity and lower interest rates that would otherwise not exist. The final section describes foreign exchange risk and price risk associated with bank activities in multiple currencies.

Universal Banking Model

Universal banks have long dominated banking in most of continental Europe. As the label suggests, universal banks engage in everything from insurance to investment banking, commercial banking, and retail banking—similar to U.S. commercial banks prior to the enactment of the Banking Act of 1933 and Glass–Steagall provisions, and after the passage of GLB in 1999. Universal banks can also own shares (common stock) in industrial firms. Universal banking is the conducting of a variety of financial services, such as the trading of financial instruments, foreign exchange activities, the underwriting of new debt and equity issues, investment management, and insurance, as well as extension of credit and deposit gathering.

Three events changed the path and development of banking in the United States relative to the rest of the world. The first was the stock market crash of 1929 and the ensuing Great Depression. Many people blamed banks and universal banking activities for the problems, although there is no strong evidence to link the speculative activities of banks with the crash. The second was the enactment of the Banking Act of 1933 and the Glass–Steagall Act, which separated commercial banking from investment banking activities. The third was the increasing importance of the federal government in financial markets. Prior to these events, the U.S. banking system operated more or less under a universal banking system.

Universal banks, like Deutsche Bank in Germany and Credit Lyonnais in France, grew to prominence in the nineteenth century and were an integral part of the industrialization that began to sweep over Europe in the 1830s and 1840s. European governments have, in many circumstances, actively promoted the growth of big banks, believing they would better serve national economic interests. As part of this trend, European banks are now actively merging or striking alliances with large insurance companies.

One reason universal banking has worked well in continental Europe is because European banks are able to induce corporate customers into using them for a broad range of business. Banks have thus developed expertise in traditional banking, investment banking, and insurance activities. However, while banks in Europe have tied investment banking and lending activities with the same customer, this has not generally been permissible in the United States until the passage of GLB, and even now, there are restrictions. There are other drawbacks to universal banking as well. First, it has slowed consolidation in most European countries, with the exception of Spain and France, such that many European markets have highly fragmented banking systems. Second, banks with the capability of handling all types of financial transactions have failed to excel or become innovative in any one field. Thus, Europe has few investment banks that dominate any product market, even though they compete in a wide range of markets around the world. For example, many European investment banks have not grown as fast in their own countries as U.S. institutions—such as JPMorgan Chase, Goldman Sachs, Wells Fargo, and Bank of America—have.

Proponents, however, promote the advantages of a more flexible banking model, particularly risk diversification and expanded business opportunities. A universal bank can spread its costs over a broader base of activities and generate more revenues by offering a bundle of products. Diversification, in turn, reduces risk. In November 1999, with the repeal of Glass–Steagall, the United States made a dramatic change in its banking system and implemented a type of universal banking that is similar to, but distinct from, the

European model. Although there are many restrictions, particularly in terms of how depository institutions will be functionally regulated, U.S. depository institutions are now allowed to compete with foreign banks on a somewhat equal footing.

GLB allowed other financial companies—such as insurance companies, investment banks, and other suppliers of financial services—to become financial holding companies (FHCs) and offer banking products and accept FDIC-insured deposits. Unfortunately, however, there was a significant flaw in GLB in that it “allowed” but did not “require” nonbanks to become FHCs and be regulated by the Federal Reserve. Many of these companies could use Industrial Loan Companies (ILCs) to offer FDIC-insured deposits, use these deposits to make proprietary investments, and not be regulated by the Federal Reserve. Many experts suggest this was a major contributor to the financial crisis of 2008–2009. Today, as we know, the large investment companies, such as Goldman Sachs and Morgan Stanley have converted their ILC charters to national bank charters and have become FHCs.

Still, there are opponents to a universal banking system. The fundamental arguments against universal banking were at least some of the reasons the United States moved away from that type of system in the 1930s. The potential problems involve the separation of commerce from finance, in which there is an inherent conflict of interest. A universal bank might use pressure tactics to coerce a corporation into using its underwriting services or buy insurance from its subsidiary by threatening to cut off credit facilities. It could force a borrower in financial difficulty to issue risky securities in order to pay off loans. A universal bank could also abuse confidential information supplied by a company issuing securities. Some of the most complicated aspects of GLB are functional regulation, privacy provisions, and what banks are allowed to do versus what the bank’s “financial holding company” is allowed to do. Under GLB, the Federal Reserve is the primary regulator of the financial holding company. The act further streamlines bank holding company supervision by establishing the Federal Reserve as the umbrella holding company supervisor, while state and other federal regulators “functionally” regulate the various affiliates of the holding company. The new authorities permitted within the scope of the legislation allow banks to engage in securities, insurance, and commerce businesses; provide for a rule-making and resolution process between the SEC and the Federal Reserve; and allow multistate insurance agency licensing.

Under the U.S. system, FHCs are distinct entities from bank holding companies (BHCs). A company can form a BHC, an FHC, or both. The primary advantage to forming an FHC is that the organizer can engage in a wide range of financial activities not permitted in the bank or within a BHC. Some of these activities include insurance and securities underwriting and agency activities, merchant banking, and insurance company portfolio investment activities. Activities that are “complementary” to financial activities also are authorized. The primary disadvantage to forming an FHC, or converting a BHC to an FHC, is that the Federal Reserve may not permit a company to form a financial holding company if any of its insured depository institution subsidiaries are not well capitalized and well managed, or if it did not receive at least a satisfactory rating in its most recent Community Reinvestment Act (CRA) exam. More importantly, if any of the insured depository institutions or affiliates of an FHC received less than a satisfactory rating in its most recent CRA exam, the appropriate Federal banking agency may not approve any additional new activities or acquisitions under the authorities granted under the act. This is considered a severe penalty, which has made many banks cautious about converting their BHC to an FHC.

The Dodd–Frank Act introduced the Volcker Rule, which prohibits proprietary trading, trading on the company’s behalf rather than the client’s, and using FDIC-insured funds. The Federal Reserve Board regulates allowable nonbank activities that are “closely related to banking," in which BHCs may acquire subsidiaries. Restrictions came about for three reasons. First, it was feared that large financial conglomerates would control the financial system because they would have a competitive advantage. Second, there was concern that banks would require customers to buy nonbank services in order to obtain loans. Third, some critics simply did not believe that BHCs should engage in businesses that were not allowed for banks, because these businesses were less regulated and considered more risky.

Special ties between large banks, commercial firms, and regulators have often characterized the Japanese financial system. Most of these firms owned stock in their related parties and were engaged in joint business activities. While the system worked well in the past, Japanese banks and other members of *keiretsus* (conglomerations of closely tied firms) are currently experiencing severe problems that the system makes more difficult to resolve. If one firm fails, several firms in the same keiretsu may fail.

Every year, the U.S. Congress considers legislation that proposes an expansion of the powers of U.S. banks. If passed, such legislation would generally allow banks, securities firms, and insurance companies to offer new products and services in areas in which they were not previously permitted, and to enter into currently unauthorized business combinations.

Organizational Structure of U.S. Banks with Foreign Operations

U.S. commercial banks conduct their international activities through a variety of units. Small- and medium-sized banks typically do business strictly through the bank's head office. Large banks and multibank holding companies typically operate a variety of representative offices, foreign branches, foreign subsidiaries, Edge Act and Agreement corporations, and export trading companies. These units differ in terms of where they are located, what products they can offer, with whom they can conduct business, and how they are regulated.

Head Office. U.S. banks involved in international activities normally have an international division or department as part of the home office's organizational structure. Division managers supervise all international activities, with the possible exception of funding responsibilities if a bank has a funds management division. These activities include direct commercial and retail lending, lease financing, and securities operations. Other international units report to senior management through this division.

Representative Office. A representative office is usually the first type of international office that a bank forms outside the country. The term representative indicates that the office does not conduct normal banking business but simply represents the corporation. Employees cannot accept deposits or make loans. The purpose is to promote the corporation's name and, therefore, develop business that can be funneled to the home office. Banks that establish these offices are trying to assess whether it is feasible to pursue normal banking activities in that location. Because they are exploratory in nature, representative offices have few employees until their transition to full-service banking units.

Foreign Branch. U.S. banks conduct an estimated 60 percent of their international business through foreign branches. Branch offices are legally part of the home bank but are subject to the laws and regulations of the host nation. Foreign branches are either shell offices or full-service banks. Shell branches normally do not solicit business from local individuals, companies, or governments. Instead, they serve as conduits for Eurodollar activities that originate in the head office. Since December 1981, banks have been allowed to engage in the same activities as shell branches via IBFs. IBFs provide cheaper access to the Eurodollar market, reducing the value of pure shell branches. Full-service branches operate much like domestic banks. They accept deposits, make loans, trade securities, and provide fee-based services. Most large U.S. banks have a branch located in London, the center of Eurodollar activity.

Foreign Subsidiary. Domestic commercial banks can acquire an ownership interest in foreign banks. A bank holding company or Edge Act corporation can acquire both foreign banks and qualifying nonbank subsidiaries. Unlike branches, subsidiaries are distinct organizations from the parent bank with their own sets of books.

Most nonbank subsidiaries serve the same functions as their domestic counterparts: commercial and consumer financing, data processing, and leasing. The largest U.S. BHCs have also formed investment banking subsidiaries (merchant banks) that underwrite a broad range of stocks and bonds in full competition with foreign investment banks. Foreign bank subsidiaries operate much like foreign branches, concentrating on loans and deposits.[5]

Edge Act and Agreement Corporations. Edge Act corporations are domestic subsidiaries of banking organizations chartered by the Federal Reserve. All "Edges" are located in the United States but may be established by U.S. or foreign banks and BHCs. Agreement corporations are the state-chartered equivalents of an Edge. Both types of firms are limited to activities involving foreign customers. These include accepting demand and time deposits, extending credit, and other activities incidental to international business.[6] The primary advantage of Edge Act corporations is that they can locate anywhere in the United States, independently of branching restrictions. They can establish overseas branches and IBFs and own foreign subsidiaries. Domestic and foreign banking organizations can subsequently conduct international business near their sources.

Edge Act corporations account for a very small share of total claims on foreign entities. Most of this activity involves firms in New York and Miami, where many international businesses set up offices. Approximately 70 percent of total Edge assets originated at either Miami or New York firms. Still, Edge Act corporations primarily represent deposit gatherers, as they do not keep many commercial loans on their books.

International Banking Facilities. Many international banking units were formed expressly to circumvent U.S. regulations. Shell branches are a prime example. By channeling Eurodollar transactions through shell branches, domestic banks could avoid legal reserve requirements, Regulation Q interest ceilings where applicable, and FDIC insurance payments. IBFs were created to make it easier for U.S. banks to conduct international business without the cost and effort of avoiding regulatory requirements through shell units. Thus, IBFs are not required to have legal reserves or pay FDIC insurance.[7]

Much like Edge Act corporations, IBFs accept deposits from, and extend credit to, foreign entities. They also engage in numerous transactions with Edge Act corporations, foreign banks, and other IBFs. IBFs, in fact, are part of other banking organizations

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[5] U.S. banks are also involved in joint ventures with foreign organizations, including consortium banks that are jointly owned by several foreign banks. The primary purpose is to share credit expertise in loan syndications.

[6] In October 1985, the Federal Reserve allowed Edge corporations to provide full banking services to international businesses. Previously, Edges needed to verify that all deposits from a foreign firm and credit granted were for the sole purpose of carrying out international transactions.

[7] A parent company of an IBF must hold reserves against any borrowings from the IBF.

because they exist simply as a set of accounting entries. The organizing unit—a domestic commercial bank or savings and loan, U.S. branch or agency of a foreign bank, or an Edge corporation—makes all the financial decisions, as it does with a shell branch.

Four basic restrictions on IBF activities are intended to distinguish IBF transactions from domestic money market operations.[8] First, IBFs cannot offer transactions accounts to nonbank customers. Deposit maturities must thus be a minimum of two business days. Second, IBFs cannot issue large, negotiable CDs that would be competitive with CDs offered by domestic depository institutions. Third, $100,000 is the minimum acceptable transaction amount. This limits IBF customers to major wholesale participants, including corporations and governments. Finally, loans and deposits must be directly tied to a customer's foreign activity such that direct competitors are those involved in international trade.

Export Trading Companies. Under federal legislation, an export trading company is "exclusively engaged in activities related to international trade and is organized and operated principally for purposes of exporting goods and services produced in the United States by unaffiliated persons."[9] BHCs can acquire export trading companies as part of their international business efforts and extend them credit within limits. These subsidiaries enable banks to expand the range of services offered companies, including the handling of transportation and shipping documentation, field warehousing, and insurance coverage. Export trading companies can also take title to trade items, which a bank is not permitted to do directly.

Agencies of Foreign Banks. Foreign banks compete in the United States through their head offices, U.S. branches, subsidiaries, Edge Act and Agreement corporations, agencies, and investment companies. The first four types of facilities are structured and operate much like U.S. facilities. Agencies and investment companies, by contrast, can offer only a limited range of banking services.[10] They cannot accept transactions deposits from U.S. residents or issue CDs, but must deal exclusively with commercial customers. Their primary purpose is to finance trade originating from firms in their own countries. Agencies also actively participate in interbank credit markets and in lending to U.S. corporations. Agencies and investment companies can accept credit deposit balances, much like correspondent balances from commercial customers, if the account is tied directly to the commercial services provided.

International Financial Markets

International banking activities have grown along with the growth in international trade. The development of international financial instruments and markets has necessarily followed. Firms that export or import goods and services and banks that finance these activities transact business in many different currencies under different sets of regulations. International financial markets have evolved to facilitate the flow of funds and reduce the risk of doing business outside the home country.

International banks are active in soliciting deposits and lending funds outside their domestic borders. The market in which banks and their international facilities obtain

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[8] See Chrystal (1984), "International Banking Facilities."

[9] Edge Act and Agreement subsidiaries of bank holding companies, as well as bankers' banks, can similarly purchase export trading companies. Park and Zwick (1985) describe the legislation that authorized this investment.

[10] New York State charters foreign agencies as investment companies. These companies are granted powers similar to those of federally chartered agencies of foreign banks.

international deposits is labeled the Eurocurrency market. The market for long-term international securities is the Eurobond market. Term lending activities tied to Eurocurrency operations occur in the Eurocredit market.

The Eurocurrency Market

A Eurocurrency is a deposit liability denominated in any currency except that of the country in which the bank is located. Two features identify qualifying Eurocurrencies. First, a bank or one of its international facilities must accept the deposit. Second, the accepting bank must be located outside the country that issues the currency. Thus, a BankAmerica branch located in London that accepts U.S. dollar deposits is dealing in Eurodollars, one type of Eurocurrency. The same bank that accepts a sterling deposit is not operating in the Eurocurrency market. Banks that issue Eurocurrency claims are called Eurobanks.

Eurodollar deposits are the dominant type of Eurocurrency. Eurodollars are dollar-denominated deposits at banks located outside the United States. Functionally, deposits at IBFs are equivalent and are often included as Eurodollars. Chapter 10 introduces Eurodollars, and Exhibit 10.7 describes how Eurodollars originate. Briefly, they arise when the owner of a dollar deposit at a U.S. bank moves the deposit outside the United States. The Eurobank accepting the deposit receives a dollar claim on the U.S. bank from which the funds were transferred. The Eurodollar and Eurocurrency markets consist of a series of transactions leading to the eventual extension of a loan.

From the depositor's perspective, Eurodollar deposits are equivalent to domestic CDs. They are issued in large denominations (typically some multiple of $1 million), have fixed maturities, and pay interest at rates slightly above rates on comparable-maturity CDs issued by U.S. banks. The deposits take the form of both nonnegotiable time deposits and negotiable CDs.[11] Issuing banks do not hold reserves against Eurodollar liabilities and do not pay deposit insurance, which justifies the higher interest rates.

Because Eurobanks that issue Eurodollars pay interest but receive a nonearning U.S. demand deposit, they are eager to reinvest the funds. Eurobanks without immediate credit demand for U.S. dollars simply redeposit the Eurodollar proceeds in another Eurobank. Normally, this deposit is made at a small spread over the initial Eurodollar rate paid. The second Eurobank that accepts the deposit either lends dollars to a commercial or government unit or also redeposits the proceeds. Such pyramiding of deposits continues until a loan is granted. The initial or base rate at which a Eurodollar deposit is accepted is called the London Interbank Offer Rate (LIBOR). Each redeposit is priced at a markup over LIBOR, as is the final loan. Many U.S. banks also price loans to domestic firms at a premium over LIBOR, in recognition of the fact that dollars obtained outside the country are identical to dollars obtained domestically. **LIBOR** is the London market-based rate for dollar-denominated deposits and equals an average of the quotations at 16 major London banks for short-term borrowings between major international banks. Unfortunately, many of these banks were determined to have 'rigged' their LIBOR quotes. In 2012, a globally-sponsored investigation concluded that banks such as Barclays, UBS, Rabobank and the Royal Bank of Scotland, manipulated LIBOR quotes in order to help traders profit (or reduce losses) from trades based on LIBOR prices. Regulators have subsequently extracted fines exceeded $6 billion for such rate rigging.

The markets for other types of Eurocurrencies are similarly structured. Eurosterling represents claims on deposits denominated in pounds sterling at banks located outside the United Kingdom. A nonfinancial firm or bank that needs sterling can borrow in

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[11] A small amount of Eurodollars is callable on demand by the depositor. Because the funds have an effective 24-hour maturity, they earn much lower rates than time deposits or CDs do.

either the Eurosterling market or from Great Britain's domestic banks at a markup over LIBOR. The size of each Eurocurrency market reflects the underlying demand for that currency. The Eurodollar market dominates because U.S. dollars are accepted as a means of payment throughout the world.

The Eurobond Market

Many international banks are active in the Eurobond market. Traditional corporate bonds are long-term instruments, underwritten by well-known investment banks that are subject to the securities laws of the country in which they are issued. The U.S. Securities and Exchange Commission, for example, requires extensive disclosure regarding the terms of the offering before it will approve a bond issue. Eurobonds are similar in form but subject to virtually no regulation. They can be denominated in any currency or international currency units. As Park and Zwick state, "Eurobonds are issued in the international Euromarket, underwritten by an international banking syndicate not subject to any one country's securities laws, and denominated in any major national currency or even in an artificial currency unit such as the Special Drawing Right, Eurco, the European Unit of Account, and the European Currency Unit."[12]

The primary issuers of Eurobonds are nonfinancial corporations that view them as alternatives to traditional corporate bonds and direct international loans from banks. International banks with investment banking subsidiaries underwrite the bond offerings and often engage in secondary market trading activities. Some international banks issue a hybrid form of Eurobonds structured as a floating-rate note. Floating-rate notes are issued in denominations as low as $5,000, with maturities ranging from two to five years, and carry interest rates that vary with LIBOR. Typically, the interest rate floats every six months at a fixed spread over six-month LIBOR. Through floating-rate notes, an issuing bank can obtain long-term financing by paying short-term rates. These markets should continue to grow with the move toward syndications among financial institutions and the gradual removal of regulatory restrictions. Borrowers benefit because interest rates are generally lower than they would be without Euromarket opportunities.

Consumers and borrowers benefit from the increased competition. More services are available, and interest rates are lower because spreads are smaller. Some critics claim, however, that foreign institutions compete in the United States without the same opportunities available to U.S. firms when they operate abroad. U.S. banking rules are somewhat more restrictive than those of many other countries, although this has changed in the past decade. Discrepancies in different nations' regulations create inequities, which are slowly disappearing.

Eurocredits

Banks that accept Eurocurrency deposits face the same asset and liability management decisions that derive from other funding sources. The fundamental difficulty is in managing interest rate risk. This problem disappears when a bank redeposits Eurodollars, because it matches the asset maturity with that of the initial deposit. When a bank makes a commercial loan, however, it often mismatches the loan maturity with the deposit maturity.

This risk was especially evident during the credit crunches of the 1960s. U.S. banks that could not issue domestic CDs were forced to go to the Eurodollar market for funding. With the competition for funds and the credit-tightening efforts of the Federal Reserve, during these periods Eurodollar rates rose above ceiling rates on

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[12] See Park and Zwick (1985).

new-issue domestic CDs. Eurobanks subsequently faced a dilemma. Although dollar borrowers generally required term loan financing, Eurobanks did not want to make fixed-rate term loans funded by short-term deposits representing hot money. Borrowing costs could potentially rise above the fixed loan rate if depositors moved their funds.

One solution was the development of **Eurocredits**, term loans priced at a premium over LIBOR. In most cases, the loan rate floats every three or six months, thereby reducing the mismatch between asset and liability maturities. For large loans, banks form a syndicate of international banks in which each member takes a share of the loan and participates in the negotiation of terms. Because both credit and interest rate risks are lower, Eurocredits are generally priced at relatively low spreads over LIBOR.

International Lending

International loans exhibit many of the same characteristics as domestic loans. Individuals, multinational businesses with offices in the United States and overseas, domestic export/import companies, foreign businesses, and foreign governments constitute the basic borrowing groups. The use of proceeds ranges from working capital lines to production loans that facilitate a country's long-term economic development. The difference with international loans is that they entail unique risks. Historically, many large banks have found these risks attractive. Still few U.S. money center banks generate more than 50 percent of their earnings from international operations. Citibank, a part of Citigroup, earns more than 50 percent of its earnings in global activities.

In 1987, and again in 1989, most of the largest U.S. banks charged off significant portions (up to 25 percent) of their loans to Latin American and other foreign borrowers, and subsequently reported net losses. In 1998, the economic meltdown in Asia and Russia's default on its outstanding debts caused many U.S. and foreign banks to suffer losses. In 2001, problems in Argentina produced substantial losses at FleetBoston, Citicorp, and JPMorgan Chase. After the fact, some of these banking organizations concluded that foreign loans effectively produced few profits, because the losses offset earlier earnings. In response, many U.S. banks no longer aggressively pursue international loans. Banks that continue to be aggressive are those that follow U.S. customers as they expand outside the United States or those that have strategically decided to become truly global universal banking organizations.

Foreign banks have experienced the same volatility in performance, because loans outside their home countries initially produce profits, only to lead to later losses. Japanese and European banks were exposed to the Asian and Russian problems, while Spain's largest banks suffered losses from their exposures in Brazil and other parts of South America.

During the financial crisis of 2008–2009, several U.S. banks had exposure to Ireland, Italy, Greece, Spain, and Portugal some of the most economically stressed nations in the Eurocurrency zone. JPMorgan Chase and Goldman Sachs had more than $80 billion at risk in 2012. Many of the largest institutions began aggressively cutting their exposures by using credit default swaps, selling assets, and reducing lending. The use of credit default swaps, however, does not come without its own negative issues. In early 2012, for example, it cost more than $400,000 a year to insure $10 million in Italian government debt for five years. Swap premiums for Greece debt were significantly higher.

Lending across national boundaries introduces country risk and foreign exchange risk. **Country risk** refers to default risk associated with loans to borrowers outside the home country. It exists because lenders and borrowers face different regulations and because of differing political considerations in each country. Country risk increases with government controls over business and individuals, internal politics that potentially disrupt payments, the elimination or reduction of subsidies, and general market disruptions. **Foreign exchange risk** refers to the current and potential volatility in earnings and stockholders' equity due to changes in foreign exchange rates. This risk is discussed in the last section.

The previous section introduced Eurocredits. U.S. banks are also heavily involved in financing foreign trade and making direct loans to major commercial customers. The characteristics of these loans are described below.

Short-Term Foreign Trade Financing

International trade and international trade financing are considerably more complex than simply dealing with trading partners within the same country. Not only is the importer located apart from the exporter, but the two parties usually operate under different rules and regulations and may be totally unfamiliar with each other's financial stability and credit rating. Frequently, they transact business in different currencies. To facilitate trade, someone must enter the transaction and assume the risk that the importer may not pay. Commercial banks fulfill this role through bankers acceptance financing.[13] Trading partners must also have the opportunity to convert one currency into another, which creates a demand for foreign exchange services as well.

A **bankers acceptance** is a time draft that represents an order to pay a specified amount of money at a designated future date. A bank accepts the draft when it stamps the word "accepted" across the document. This approval represents a guarantee under which the accepting bank agrees to remit the face value of the draft at maturity. Acceptances are attractive because a bank substitutes its credit rating for that of the importer. The maturity date is far enough forward to allow the goods being financed to be shipped and inspected before the draft matures. Bankers acceptances are negotiable instruments, with maturities ranging from one to six months. Most bankers acceptance transactions are associated with letters of credit, documents that stipulate the contract terms and duties of all parties and authorize an exporter to draw a time draft on a participating bank. The draft is then converted to a negotiable instrument when it is accepted.

Exhibit 17.7 illustrates the mechanics of how a bankers acceptance is created and used to finance trade.[14] Drafts accepted by U.S. banks are used almost exclusively to finance either U.S. imports or U.S. exports. A small portion finances the warehousing of goods in transit. The trade activity outlined in the exhibit involves a U.S. importer, but the sequence of events is similar for all types of transactions. After agreeing to terms with the exporter (Stage 1), the U.S. importer applies for a letter of credit (LOC) from a U.S. bank (Stage 2). Upon approving the request, the U.S. bank issues an LOC, which authorizes the exporter to draw a time draft against the U.S. bank and delivers it to the exporter's bank (Stage 3). The foreign bank then notifies the exporter, who ships the goods and submits the LOC, time draft, and shipping documents, which it forwards to the U.S. bank. When the U.S. bank accepts the draft, it creates a bankers acceptance (Stage 8).

The bankers acceptance has a face value and fixed maturity. The exporter discounts the draft with the issuing bank and receives immediate payment (Stage 9). If, for example, the bankers acceptance carried a face value of $1 million and a 90-day maturity, the discounted price would equal $980,000 at an 8 percent discount rate.[15] This covers the

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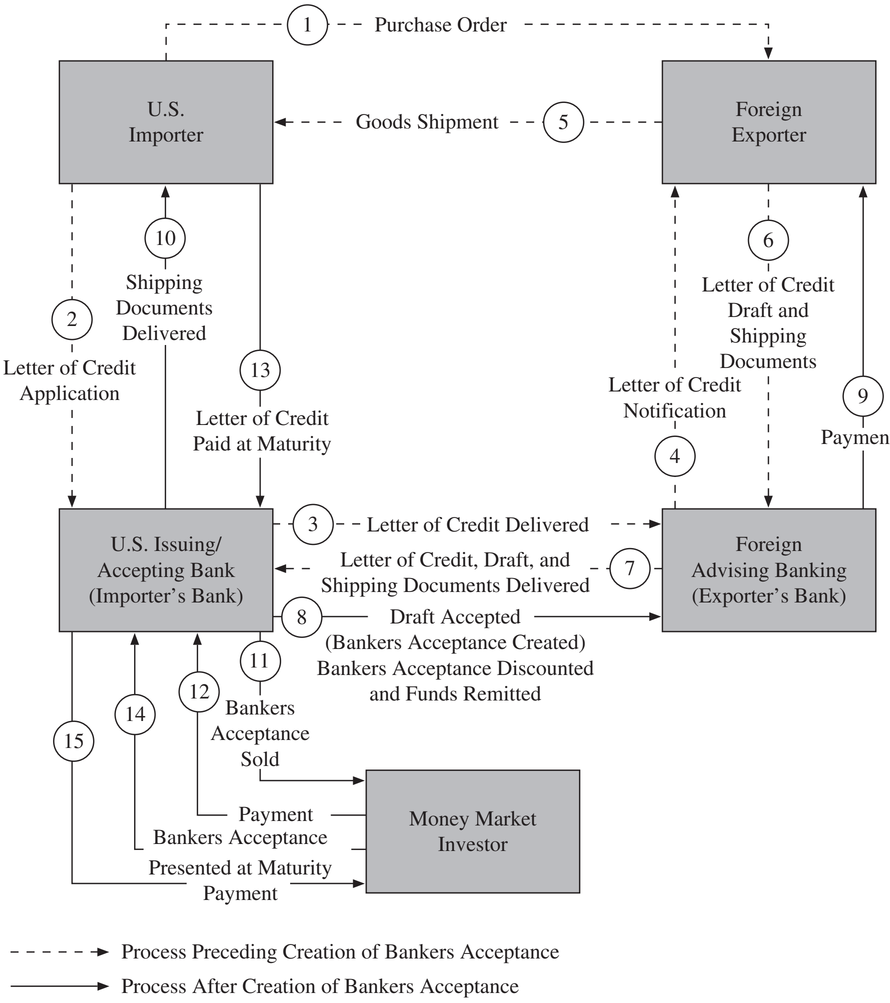
[13] Exporters who are familiar with an importer often extend credit on open account and receive payment after the goods have been delivered. In other cases, an exporter may demand payment from the importer directly before shipping the goods.

[14] Exhibit 17.8 is taken from Duffield and Summers (1981). The following discussion is based on their explanation of the transactions underlying the exhibit.

[15] Price $= 1 - (90/360)(0.08)(\$1\text{ million}) = \$980{,}000$.

EXHIBIT 17.7 **Bankers Acceptance Financing of U.S. Imports: A Bankers Acceptance Is Created, Discounted, Sold, and Paid at Maturity**



① Purchase Order
U.S. Importer
⑤ Goods Shipment
Foreign Exporter
⑩ Shipping Documents Delivered
② Letter of Credit Application
⑬ Letter of Credit Paid at Maturity
⑥ Letter of Credit Draft and Shipping Documents
Letter of Credit Notification ④
⑨ Payment
U.S. Issuing/ Accepting Bank (Importer's Bank)
③ Letter of Credit Delivered
Letter of Credit, Draft, and Shipping Documents Delivered ⑦
Foreign Advising Banking (Exporter's Bank)
⑧ Draft Accepted (Bankers Acceptance Created) Bankers Acceptance Discounted and Funds Remitted
⑪ Bankers Acceptance Sold
⑫ Payment
⑭ Bankers Acceptance Presented at Maturity
⑮ Payment
Money Market Investor
Process Preceding Creation of Bankers Acceptance
Process After Creation of Bankers Acceptance

Source: J. Duffield and B. Summers, "Bankers Acceptances," in *Instruments of the Money Market*, edited by T. Cook and B. Summers. Richmond, VA: Federal Reserve Bank of Richmond, 1981.

purchase price of the goods, although the importer will remit the full face value at maturity. The accepting bank delivers the shipping documents to the importer (Stage 10), who can then legally obtain the goods.

Use of the acceptance enables the exporter to be paid before the importer receives the goods, and the importer to effectively borrow the purchase price. If the issuing bank keeps possession of the bankers acceptance, it essentially finances the importer's purchase, much like a direct loan. In most cases, the issuing bank will sell the acceptance to a third-party investor in the money market (Stage 11). If the bank receives the same discount value, $980,000 in this example, it has no funds committed to the financing. It must, however, pay off the acceptance at maturity (Stages 13 to 15), when it presumably receives payment from the importer.

The issuing bank makes a profit in several ways. First, it levies a fee on the importer for accepting the draft and providing its guarantee. Second, it earns the discounted value of the draft, $20,000 in this example, if it simply keeps the acceptance in its portfolio. Finally, it can earn additional profits if it sells the acceptance prior to maturity at a price below the original discounted value ($980,000). Of course, the sale eliminates any interest income.

Historically, exporters and importers originated most of the time drafts that evolved into bankers acceptances. Since the early 1970s, however, many bankers acceptances have refinanced credits of foreign banks that wanted to liquidate their direct financing of foreign trade. These bank-drawn drafts are known as *refinancing acceptances* or *accommodations*.

Direct International Loans

International loans originate from international departments of domestic banks, Edge Act corporations, and the credit offices of foreign branches and subsidiaries. Eurodollar loans to foreign governments and well-established multinational corporations are generally low risk. Defaults are extremely rare, so that the loans are priced at a small markup over LIBOR. Some loans are extended to private corporations but carry an explicit guarantee from the source country's government. These loans carry higher risk, because some governments have reneged on their guarantees. Loans that have received the greatest attention recently are made within less-developed countries (LDCs). LDC credit extended to both private borrowers and governmental units has generally shown a poor repayment history over the long term. With increasing frequency, regulators and bank shareholders express concern about U.S. banks' exposure to potential foreign loan losses. International loans to LDCs, in fact, clearly contributed to regulators' demand that U.S. money center banks increase their capital-to-asset ratios.

Unfortunately, nonperforming loans do not completely reflect potential losses. Many loans are not classified as nonperforming, because U.S. banks have loaned the borrowers funds to make interest and principal payments on existing loans to keep the loans current. Several Latin American governments, including those of Brazil, Peru, and Mexico, have called for a moratorium on debt service to U.S. and foreign banks when they are short of funds. The risk is that these countries may, and often do, unilaterally determine that borrowers, including governments, should suspend interest and principal payments until their revenues increase sufficiently.

To assess risk, the analyst must understand the relationship between large financial institutions and the U.S. government. International loans are part of the price banks pay for the U.S. government's implied guarantee that they will not be allowed to fail. If the banks were to demand payment on defaulted foreign loans or charge off loans as uncollectible and refuse to extend additional credit, economic conditions in LDCs would clearly worsen. Not wanting to bring about a collapse of world trade and financial markets, governments encouraged the largest banks to renegotiate existing agreements and continue lending.

Through 1986, U.S. banks generally acceded to the government's request and continued lending to LDCs. In May 1987, however, Citicorp reversed the trend by allocating $3 billion to its loan loss reserve for possible loan charge-offs with Latin American borrowers. The transfer produced a quarterly loss near $2.5 billion. Other money center banks quickly increased their associated loss reserves. The reserve allocations enabled the banks to recognize discounts on the loans so that they could sell the loans in the secondary market and engage in debt-for-equity swaps with foreign borrowers. In essence, U.S. banks acknowledged that the financial markets realized LDC debts would not be paid in a timely fashion. Banks prefer foreign exposure in the form of equity investments rather than long-term, constantly renegotiated loans to foreign central banks.

Credit Analysis. It is difficult to evaluate international loans from a traditional credit analysis viewpoint. In addition to analyzing the borrower's financial condition, a lender must assess country risk. Many foreign governments rely heavily on single industries or products as a source of reserves to pay off their debt. Mexico, with its reliance on oil revenues, is a prime example. When oil prices were rising in the late 1970s and early 1980s, Mexico increased its foreign borrowing to finance internal economic development. The subsequent steep drop in oil prices eliminated its source of foreign currency and forced a total restructuring of the country's international debt obligations. The passage of the North American Free Trade Agreement (NAFTA) made Mexico an attractive place to invest, such that new ventures and funding have moved into the country in anticipation of expanded trade and the growth that typically coincides.

Credit analysis for international loans generally follows the same systematic procedures outlined previously for domestic loans. Analysts evaluate the required loan amount, use of the proceeds, source and timing of expected repayment, and availability of secondary collateral sources. What makes international lending different is a series of additional risks associated with debt repayment prospects and constraints. If, for example, a bank accepts payment in a currency other than its own country's monetary unit and does not hedge, it assumes *foreign exchange risk*. If the value of the foreign currency declines relative to the domestic currency, the value of the debt service declines, even though all payments might be received on a timely basis. Other potential problems are also created with *country risk*, which includes the economic and political risks introduced earlier. **Economic risks** are readily quantifiable, reflecting the considerations discussed above. **Political risks** are much more difficult to assess. Bankers frequently analyze **sovereign risk**, which refers to the likelihood that foreign governments will unilaterally alter their debt service payments, regardless of the formal repayment schedule. In 1985, for example, governments in Nigeria and Peru both capped the amount of interest their countries would pay toward international debt obligations. In general, banks have little recourse in the event that a foreign government restricts debt service payments in dollars, because the legal systems of different countries do not allow a resolution of the default.

Many banks have developed credit-scoring systems for assessing country risk. One bank's system measures country risk by using discriminant analysis to quantify economic risks and subjective checklists to quantify political risks.[16] The evaluation produces an index that ranks different countries according to their riskiness in rescheduling debt payments. In this application, economic risk is measured by debt management factors and economic indexes. The best indicators of risk are a country's current debt service ratio, defined as the sum of debt service and short-term debt outstanding divided by total exports; total debt divided by exports; and basic economic measures such as per capita income, real growth in a gross domestic product, and the inflation rate. Political risk is measured according to a subjective political rating model and structural factors. The political model assesses both political stability and general government characteristics (see Exhibit 17.8). Each country receives a weighted score representing its cumulative risk profile. The bank determines appropriate loan limits or concentrations in different countries according to these rankings.

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[16] Morgan (1985) describes the inputs and evaluation procedures in detail.

EXHIBIT 17.8 Political Rating Models

Government characteristics, country ABC

What classification best describes the current government?

Government type (0 to 10) **6**

0 Despot, dictator
2 Military dictator
4 Monarchy, family rule
6 One-party democracy or nonviable multiparty democracy
8 Multiparty (coalition) democracy
10 Viable two-party democracy

Latest change in government (0 to 10) **8**

0 Bloody and violent coup d'etat
2 Bloodless coup d'etat
4 Peaceful dictator change
6 Monarch change, change in colonial status
8 Elections, one candidate only
10 Peaceful elections, two or more candidates

Relations with United States (0 to 10) **4**

0 Considered a threat to U.S. security
2 Anti-American policies
4 Nonaligned, but leaning to the East
5 Nonaligned
6 Nonaligned, but leaning to the West
8 Supports most U.S. foreign policies
10 Strongly pro-American, supports all U.S. policies

Government's role in economy (0 to 10) **6**

0 Government controls all aspects of economy (communism)
2 Government influences all aspects of economy
4 Socialist type of economy
6 General agreement between capitalists and government
8 Capitalism with minor government intervention
10 STRONGLY CAPITALISTIC, FREE ENTERPRISE

Stability of present government (0 to 10)

0 Violent coup d'etat imminent
2 Overthrow of government likely
4 Unexpected change in government possible (i.e., death of leader)
6 Government could lose in next election
8 Likely change in government, political power remains intact
10 Government unlikely to lose in next elections

Political stability, country ABC

What are the chances of the following events in the short term and medium term?*

	Short Term	Medium Term
Destabilizing riots, civil unrest	3	2
Increased terrorist activities	3	2
Guerilla activity, armed rebels	3	2
Civil war	4	4
Government overthrow, coup d'etat	4	3
Foreign war, border skirmishes	4	4
Political moratorium of debt	4	4
Nationalization of major industries	3	3
Socialistic party comes to power	3	3
Communist party comes to power	4	4
Total	35	31

Probabilities

5 Extremely unlikely	2 Likely
4 Unlikely	1 Extremely likely
3 Neutral	0 Present situation

Government characteristics	**30**
Political stability (short term/medium term)	**35/31**
TOTAL POLITICAL RATING	**65/61**

*Short term is within one year; long term is between one and five years.

Source: John Morgan, "Assessing Country Risk at Texas Commerce," *Bankers Magazine*, Volume 168, Number 3, May/June 1985. Reprinted with permission from *Bankers Magazine,* copyright © 1985, Warren, Gorham & Lamont, Inc., 210 South Street, Boston, MA 02111. All Rights Reserved.

Foreign Exchange Activities

Because different countries use different monetary units, traders must be able to convert one unit into another. Foreign exchange markets are where these monetary units are traded. Foreign exchange refers to currency other than the monetary unit of the home country, and an exchange rate is the price of one currency in terms of another currency. For example, Japanese yen represent foreign exchange in the United States, such that one U.S. dollar may be worth 128 yen if exchanged today. Banks participate in foreign exchange markets by buying and selling currencies from participants who use different currencies in their business or travels. They also coordinate foreign exchange hedges for bank customers, enter arbitrage transactions, and speculate on currency price movements for their own account by taking unhedged positions.

Foreign Exchange Risk

Foreign exchange risk is the current and potential risk to earnings and stockholders' equity arising from changes in foreign exchange rates. It is found in assets and liabilities denominated in different currencies that are held on a bank's balance sheet, and in certain off-balance sheet activities where the commitments or guarantees are denominated in different currencies. It is evidenced when changing exchange rates affect a bank's cash inflows differently than cash outflows associated with these positions denominated in different currencies.

Banks also make markets in foreign currencies and take positions buying and selling currencies for their own account. The change in values of these positions due to changing foreign exchange rates is labeled price risk. It is a component of the sensitivity to market risk (S in a bank's CAMELS rating, see Chapter 3) evaluated by bank regulators.

Foreign exchange risk can be high if a bank holds assets and issues liabilities denominated in different currencies where the amounts are substantially different. In this case, changes in exchange rates will produce changes in earnings and the market value of stockholders' equity. Consider the situation faced by Commerce Bank (CB), whose home country is Poland and home currency is the *zloty*. The current (spot) exchange rate is $1 equals 150 zlotys. CB's balance sheet position in U.S. dollars is such that the bank has $1,000 in loans and $250 in liabilities. Assume that all loans and liabilities have the same maturity and there are no embedded options. In terms of zlotys, CB's assets are worth 150,000 zlotys, and its liabilities are worth 37,500 zlotys at the prevailing exchange rate.

- If the exchange rate moved to $1 equals 160 zlotys, the assets would increase in value by 10,000 zlotys, while the liabilities would increase in value by 2,500 zlotys. The bank would gain 7,500 in zlotys, holding everything else constant, such that stockholders' equity would increase by 7,500 zlotys.
- If the exchange rate moved to $1 equals 140 zlotys, the assets would decrease in value by 10,000 zlotys, while the liabilities would decrease by 2,500 zlotys. In this case, the bank would see stockholders' equity decrease by 7,500 zlotys.

These same exposures exist for off-balance sheet commitments and guarantees when counterparties effect the at-risk transactions or activities.

A bank's risk managers analyze aggregate foreign exchange risk by currency. The basic approach is to calculate a bank's net balance sheet exposure by currency and relate this to the potential change in value given changes in the associated exchange rate.

Let:

A_j = amount of assets denominated in currency j
L_j = amount of liabilities denominated in currency j

A bank's net balance sheet exposure in currency j ($NEXP_j$) is the amount of assets minus the amount of liabilities denominated in currency j:

$$NEXP_j = A_j - L_j \tag{17.1}$$

If $NEXP_j > 0$, the bank is long on currency j on its balance sheet. If $NEXP_j < 0$, the bank is short on currency j on its balance sheet. The bank will lose if it is long on a currency and the currency depreciates in value (the currency buys less of another currency). The bank will lose if it is short on a currency and the currency appreciates in value (the currency buys more of another currency). CB, which was long on U.S. dollars, would thus lose if the dollar depreciates as indicated by the movement in the exchange rate to $1 equals 140 zlotys. CB would gain if the dollar appreciates as indicated by the exchange-rate change to $1 equals 160 zlotys. The gain or loss in a position with a currency is indicated by:

$$\text{Gain/loss in a position with currency j} = NEXP_j \times \Delta\text{spot exchange rate} \tag{17.2}$$

where the spot exchange rate is measured as the number of units of the home currency for one unit of the foreign currency. In the case of CB, the bank's loss from a move to $1 equals 140 zlotys is:

$$\begin{aligned}\text{Loss} &= (1{,}000 - 250) \times (140 - 150)\\ &= -7{,}500 \text{ zlotys}\end{aligned}$$

Risk managers must assess their foreign exchange risk for each currency in which the bank has significant balance sheet and off-balance sheet exposures. They should also assess interest rate risk and liquidity risks in each currency. They can choose to speculate or hedge this risk. Many banks use currency forward, futures, and swap contracts to manage this risk.

Currency Exchange

A fundamental responsibility of international banks is to facilitate funds transfers between trading partners who deal in different currencies. Most transactions are settled by exchanging deposits, so banks must maintain either correspondent bank relationships or operate their own foreign bank offices to have access to Eurocurrencies. Each funds transfer may require a conversion of deposits to another currency and thus may affect exchange rates if banks choose to realign their inventories.

Suppose, for example, that a U.S. retail outlet negotiates the purchase of video recording equipment for $500,000 from a Japanese manufacturer. If the purchase is invoiced in yen, the buyer will convert U.S. dollars to yen at $1 to 105 yen and exchange 52.5 million yen for the goods. The hypothetical transaction is summarized in Exhibit 17.9, assuming that the traders deal with Western Bank and Fuji Bank Ltd. After the purchase, Western Bank's inventory of currencies has changed, because it holds 64 million fewer yen than previously. The bank will have to buy yen to bring its foreign exchange holdings back to the initial position. If the transaction was denominated in dollars, Fuji Bank would hold $500,000 more and would need to sell dollars to reach its initial foreign exchange position. Both the purchase of yen by Western Bank and sale of dollars by Fuji Bank would put pressure on the dollar to decrease in value (increased supply of dollars) and the yen to increase in value (increased demand for yen). Current exchange rates will thus be affected when transactions force a realignment of foreign exchange holdings.

In actuality, there is a spot market, a forward market, futures markets, and markets for options on futures for foreign exchange. The **spot market** is the exchange of currencies for immediate delivery. The **forward market** comprises transactions that represent a

EXHIBIT 17.9 **Facilitating Funds Transfers of Different Currency-Denominated Deposits**

U.S. retailer imports $500,000 in video equipment from Japanese manufacturer. Spot exchange rate is $1 = 105 yen.

Western Bank		**Fuji Bank Ltd.**	
ΔASSETS	**ΔLIABILITIES**	**ΔASSETS**	**ΔLIABILITIES**
1. Deposit at Fuji Bank −52.5 million yen	Deposit of U.S. retailer −$500,000	1.	1. Deposit of U.S. retailer +52.5 million yen Deposit of Western Bank −52.5 million yen
			2. Deposit of U.S. retailer −52.5 million yen Deposit of Japanese manufacturer +52.5 million yen

1. U.S. RETAILER BUYS YEN FROM WESTERN BANK AND DEPOSITS BALANCE AT FUJI BANK IN TOKYO.
2. U.S. RETAILER PAYS JAPANESE MANUFACTURER FOR GOODS.

commitment to exchange currencies at a specified time in the future, at an exchange rate determined at the time the contract is signed. For example, a bank might commit to buy 1 million yen 90 days forward for $8,000. After 90 days, the bank pays $8,000 and receives 1 million yen, regardless of movements in exchange rates during the 90-day period. The 90-day forward rate in this case is different from the spot rate quoted earlier, because $1 equals 125 yen. Foreign exchange trading also occurs in organized markets for futures and options on futures, which enables traders to hedge spot transactions or speculate on future exchange-rate changes.[17] A **financial futures contract** represents a commitment between two parties—a buyer and a seller—on the price and quantity of a standardized financial asset or index. An **option contract** is an agreement between two parties in which one party gives the other the right, but not the obligation, to buy or sell a specific asset at a set price for a specified period of time. An **option on futures contract** is an option contract in which the underlying asset is a futures contract.

Banks that buy or sell currencies for customers normally charge a commission. Alternatively, they may enter into forward contracts with customers and speculatively trade for their own account. For example, suppose that the current dollar-to-yen spot rate is $1 equals 128 yen, and the 90-day forward rate is $1 equals 125 yen. If a bank buys 100 million yen with dollars 90 days forward, it agrees to pay $800,000 for the yen when the forward contract comes due, even though the current exchange rate sets the value at $781,250. If the position is unhedged, the bank assumes the risk that dollars will increase in value relative to yen or stay above the forward rate during the 90-day interval. The bank will gain if dollars fall more in value than that suggested by the forward-to-spot rate differential (below 125 yen).

A spot rate of $1 to 129 yen at the time of delivery of the forward contract would indicate that the dollar rose in value, and the bank could have purchased 100 million yen for only $775,194. A spot rate of $1 to 124 yen at delivery would require a price of $806,452, which exceeds the contracted price by more than $6,000. When the forward price of a foreign currency is higher than its spot price, the foreign currency is priced at a forward premium. When the forward price is lower, the foreign currency is priced at a forward discount. In the above case, the yen is priced at a forward premium against the dollar.

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[17] Chrystal (1984) describes the rudiments of foreign exchange futures and options in "A Guide to Foreign Exchange Markets."

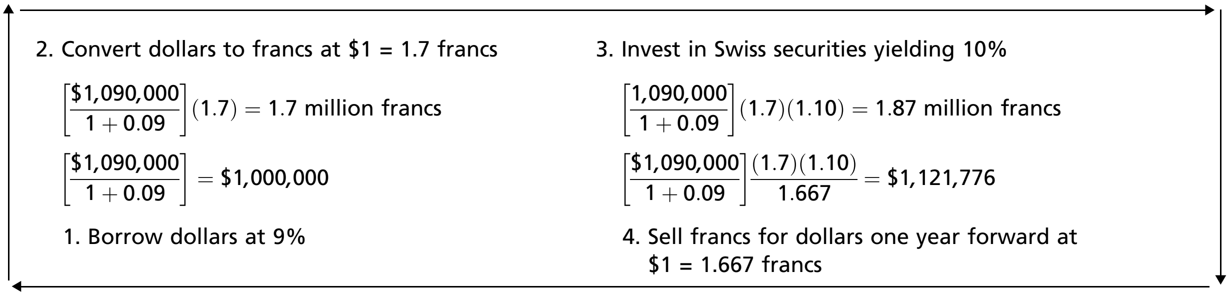
The Relationship between Foreign Exchange Rates and Interest Rates

The relationship between spot rates and forward rates is determined by the same factors that influence relative interest rates between countries. Arbitrage transactions essentially guarantee that interest rate changes produce changes in foreign exchange rates, and vice versa. The pure definition of **arbitrage** is the simultaneous purchase of a security in one market and the sale of it or a derivative product in another market in which no money is put at risk. The object of an arbitrage is to profit from price differentials between the two markets. Suppose that a trader can borrow U.S. dollars for one year at 9 percent at the same time that one-year maturity, risk-free, Swiss franc–denominated securities yield 10 percent. The trader can convert dollars to francs at the spot rate of $1 for 1.7 francs and sell francs for dollars one year forward at $1 = 1.667 francs.

The series of transactions is demonstrated in Exhibit 17.10. A trader borrows $1 million and agrees to repay $1.09 million one year later. Simultaneously, the trader sells the dollars for francs, buys a Swiss security, and sells the expected amount of francs at maturity for dollars one year forward. As indicated, the trader can earn a riskless profit of $31,776 for each $1 million borrowed. The profit is riskless because the trader has borrowed in one currency, yet covered the transaction by selling the expected foreign exchange after investment for the original currency in the forward market. A profit is available because the interest rate differential between securities in the two countries is out of line with the spot-to-forward exchange rate differential. This series of trades is called **covered interest arbitrage.**[18]

If the exchange rates and interest rates were this far out of line and the large profit was available, arbitrageurs would quickly negotiate the same series of transactions until prices moved back in line to eliminate (net of transactions costs) the riskless return.

EXHIBIT 17.10 **Covered Interest Arbitrage**



2. Convert dollars to francs at $1 = 1.7 francs

$$\left[\frac{\$1{,}090{,}000}{1+0.09}\right](1.7) = 1.7 \text{ million francs}$$

$$\left[\frac{\$1{,}090{,}000}{1+0.09}\right] = \$1{,}000{,}000$$

1. Borrow dollars at 9%

3. Invest in Swiss securities yielding 10%

$$\left[\frac{1{,}090{,}000}{1+0.09}\right](1.7)(1.10) = 1.87 \text{ million francs}$$

$$\left[\frac{\$1{,}090{,}000}{1+0.09}\right]\frac{(1.7)(1.10)}{1.667} = \$1{,}121{,}776$$

4. Sell francs for dollars one year forward at $1 = 1.667 francs

Sample Transaction: Borrow $1,000,000.

1. Borrow $1,000,000 at 9 percent; agree to repay $1,090,000 in one year.
2. Convert $1,000,000 to 1.7 million francs in spot market at $1 = 1.7 francs.
3. Invest 1.7 million francs in one-year security yielding 10 percent; will receive 1.87 million francs after 1 year.
4. Sell 1.87 million francs one year forward for $1,121,776 at $1 = 1.667 francs.

Net profit = $1,121,776 – $1,090,000 = $31,776

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[18] If the calculation showed a loss, reversing the direction of transactions by borrowing in the opposite currency and converting it in a similar fashion could make a profit.

Interest rate parity exists when covered interest arbitrage profit potential is eliminated. Letting:

i_1 = annual interest rate in Country 1
i_2 = annual interest rate in Country 2
$s_{1,2}$ = spot exchange rate equal to the number of units of Country 2's currency for one unit of Country 1's currency
$f_{1,2}$ = one-year forward exchange rate equal to the number of units of Country 2's currency for one unit of Country 1's currency

$$\text{Interest rate parity implies}: \frac{1+i_2}{1+i_1}\left(\frac{s_{1,2}}{f_{1,2}}\right) = 1, \text{ or} \tag{17.3}$$

$$\frac{i_2 - i_1}{1+i_1} = \left(\frac{f_{1,2} - s_{1,2}}{s_{1,2}}\right) \tag{17.4}$$

The equilibrium condition, expressed in Equation 17.4, suggests that the forward exchange rate differential as a fraction of the spot rate should equal the interest rate differential relative to 1 plus an interest factor to eliminate arbitrage profits. If i_1 is 9 percent, i_2 is 10 percent, and $s_{1,2}$ is 1.7 in the previous example, then $f_{1,2}$ should equal 1.7156:

$$\frac{0.10 - 0.09}{1 + 0.09} = \left(\frac{f_{1,2} - 1.7}{1.7}\right)$$

$$f_{1,2} = 1.7156$$

Conceptually, if interest rates are relatively low in one country, that country's currency should sell at a forward premium. Any gain from borrowing at low rates and investing at higher rates (0.01/1.09) is exactly offset (0.0156/1.7) when the borrower attempts to sell the investment proceeds forward at a premium price.

Price Risk with Foreign Currencies

International banks actively trade most foreign currencies. They buy and sell foreign exchange for customers by request—to hedge transactions for customers and themselves, to earn arbitrage profits by taking advantage of temporary price discrepancies, and to trade speculatively for their own account. Foreign exchange gains often supplement normal operating earnings for many banks. Risk managers continually assess a bank's exposure to the risk of loss from these trading positions associated with adverse changes in foreign exchange rates. Regulators refer to this as *price risk* and require large banks to formally measure their exposure or sensitivity to market risk from all potential price moves. In terms of measuring this risk, a bank can identify its net exposure in each currency much like the format given in Equation 17.1, except that the amounts used in the equation represent the value of a bank's long and short positions in each currency from these speculative positions or customer positions in each of the currencies. The gain or loss can be similarly measured by Equation 17.2. Regulators, however, require that the largest banks perform a value-at-risk (VaR) analysis of their entire trading positions that they then require capital to support.

Summary

Large international financial companies effectively operate as universal commercial banks. They accept foreign deposits and make loans to foreign borrowers. They act as brokers, dealers, and underwriters in negotiating Eurobond issues, floating-rate note issues, interest rate and currency swaps, and foreign equity issues. Many commercial banks located outside the United States aggressively pursue business outside as well as within the United States. Bank of America, Citigroup and JPMorgan Chase, for example, also have well-defined strategies for actively pursuing banking business in Western Europe, Asia, emerging markets, and elsewhere, and they generate a considerable portion of their overall profits from activities outside the United States.

Because of large losses on international loans and the difficulty of assessing country risk, many large financial institutions have substantially reduced their international commercial loan exposure. This is true for both U.S. and non-U.S. banks. Many U.S. banks that pursue business outside the United States prefer to do mergers, acquisitions, and security underwriting rather than straight commercial lending.

International financial companies operate a wide range of offices to conduct foreign banking business. These offices generally provide access to the Eurocurrency markets and Eurocredits. Loans to foreign governments and businesses entail two additional risks as compared with loans to domestic borrowers. Country risk involves both economic risk (the borrower's ability to repay may deteriorate) and political risk (the underlying government may simply renege on contracted debt service payments). International loans may also involve foreign exchange risk when lenders receive payment in a currency other than their own. Financial companies also assume foreign exchange and price risk if they hold unequal amounts of assets and liabilities denominated in different currencies or have trading positions where long and short positions are not equal. As such, changes in exchange rates can sharply increase or lower bank profits and the market value of stockholders' equity.

The financial credit crisis of 2008–2009 forced governments in many countries, particularly the United Kingdom, United States, Iceland, and Germany, to provide direct equity investments in large banking organizations within their home countries. These institutions depleted their capital after investing in problem mortgages and loans and being forced to mark these assets to market. In many cases, the governments guaranteed certain types of debt issued by the institutions. In the case of the European Community, the financial credit crisis also required large loans from the financially stronger governments to those with significant financial and debt problems.

Questions

1. Discuss the differences between Eurocurrency, Eurobonds, and Eurocredits.
2. Why were IBFs created? How do they differ from Edge Act and Agreement corporations?
3. Explain how you would measure country risk in international lending. Can you get a precise statistical measure?
4. The U.S. system of banking historically led to many more banks that were smaller in size and operated with few branches. Why did the U.S. banking system develop so differently from that of other countries? What factors have brought about a change in the U.S. system that makes it look more like other countries?
5. Identify several large foreign institutions that are major lenders in the United States. Do any have a basic competitive advantage over U.S. commercial banks? Explain.
6. Which of the following types of foreign banking operations would best suit the circumstance described?
    a. A major customer of a U.S. commercial bank requests a loan to finance growing export activity in Mexico.
    b. Management notices that an increasing number of its business customers have located offices in Moscow.

   c. Although the bank cannot justify a permanent office in Moscow, it wants to provide loans to these international activities.
   d. Indonesia has just announced the privatization of many small banks. Your bank is going to buy one of the banks to establish a local lending and deposit base.

7. What is a bankers acceptance? Explain by setting up an example of how one is created.
8. Explain how the forward market for foreign exchange differs from the spot market. When will forward exchange rates be at a premium or discount to spot exchange rates?
9. Suppose that the following exchange rates and interest rates prevail:

   Spot exchange rate: \$1 = 121 yen

   One-year forward rate: \$1 = 130 yen

   One-year interest rates: United States = 5.54%, Japan = 6.98%

   Can a trader earn covered interest arbitrage profits? If not, explain why not. If possible, determine what the likely directional impact on each rate would be if arbitrageurs took advantage of the profit potential.
10. Assume that the forward exchange rate is for 90 days forward and the interest rates are annualized 90-day rates in Question 9. Can a trader earn covered interest arbitrage profits?
11. Suppose that Commerce Bank in Poland holds \$400 in assets and \$1,000 in liabilities denominated in dollars. The home currency is the zloty, and the current spot exchange rate is \$1 = 145 zlotys.
    a. What is the bank's net exposure in dollars?
    b. Will the bank gain or lose if the spot exchange rate changes to \$1 = 150 zlotys? Calculate the gain or loss.
    c. Will the bank gain or lose if the spot exchange rate changes to \$1 = 140 zlotys? Calculate the gain or loss.

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Glossary

1–4 Family Residential Mortgage Loans Mortgage loans secured by 1–4 family residential properties.

A

Accelerated Depreciation A method of computing depreciation deductions for income taxes that permits deductions in early years greater than those under straight line depreciation.

Acceptances, see Bankers Acceptance.

Account Activity Transactions associated with a deposit account, including home debits, transit checks, deposits, and account maintenance.

Account Analysis An analytical procedure for determining whether a customer's deposit account or entire credit-deposit relationship with a bank is profitable. The procedure compares revenues from the account with the cost of providing services.

Account Executive A representative of a brokerage firm who processes orders to buy and sell stocks, options, etc., for a customer's account.

Account Maintenance The overhead cost associated with collecting information and mailing periodic statements to depositors.

Accounts Payable Funds owed to a firm's suppliers.

Accounts Receivable Funds owed a firm by customers to whom the firm sells goods and services.

Accounts Receivable Aging Schedule A list of accounts receivable segregated according to the month in which the invoice is dated (invoice aging) or in which the invoice is payable (due date aging).

Accounts Receivable Turnover Credit sales divided by average accounts receivable outstanding.

Accrual The accumulation of income earned or expense incurred, regardless of when the underlying cash flow is actually received or paid.

Accrual Bond A bond that accrues interest but does not pay interest to the investor until maturity when accrued interest is paid with the principal outstanding.

Accrued Interest Interest income that is earned but not yet received.

Acid-Test Ratio A measure of liquidity from reported balance sheet figures with a targeted minimum value of 1. Calculated as the sum of cash and marketable securities divided by current liabilities.

Active Portfolio Management An investment policy whereby managers buy and sell securities prior to final maturity to speculate on future interest rate movements.

Activity Charge A service charge based on the number of checks written by a depositor.

Activity Ratios Financial relationships that measure how efficiently a firm uses assets to generate sales.

Add-on Rate A method of calculating interest charges by applying the quoted rate to the entire amount advanced to a borrower times the number of financing periods. An 8 percent add-on rate indicates $80 interest per $1,000 for 1 year, $160 for 2 years, and so forth. The effective interest rate is higher than the add-on rate because the borrower makes installment payments and cannot use the entire loan proceeds for the full maturity.

Adequately Capitalized Bank FDIC definition of a bank with capital levels that meet or exceed all applicable Federal regulatory capital standards--but one that is restricted from obtaining brokered deposits without FDIC approval.

Adjustable-Rate Mortgage (ARM) A mortgage with an interest rate that can be adjusted with changes in a base rate or reference index. The index generally varies with market interest rates.

ADR American Depository Receipt: A certificate issued by a U.S. bank that evidences ownership in foreign shares of stock held by the bank.

Advance A payment to a borrower under a loan agreement.

Advance Commitment An agreement to sell an asset prior to the seller holding a commitment to purchase the asset.

Affiliate Any organization owned or controlled by a bank or bank holding company, the stockholders, or executive officers.

Affinity Card A credit card that is offered to all individuals who are part of a common group or who share a common bond.

After-Tax Real Return The after-tax rate of return on an asset minus the rate of inflation.

Agency A trust account in which title to property remains in the owner's name.

Agency Securities Fixed-income securities issued by agencies owned or sponsored by the federal government. The most common securities are issued by the Federal Home Loan Bank, Federal National Mortgage Association, Government National Mortgage Association, and Farm Credit System.

Aging Accounts Receivable A procedure for analyzing a firm's accounts receivable by dividing them into groups according to whether they are current or 30, 60, or over 90 days past due.

ALCO Acronym for asset and liability management committee.

All-in-Cost The weighted average cost of funds for a bank calculated by making adjustments for required reserves and deposit insurance costs. The sum of explicit and implicit costs.

Allowance for Loan Losses A balance sheet account representing a contra-asset, or reduction in gross loans. It is established in recognition that some loans will not be repaid. Also called a loan loss reserve.

Alternative Minimum Tax (AMT) A federal tax against income intended to ensure that taxpayers pay some tax even when they use tax shelters to shield income.

Amortize To reduce a debt gradually by making equal periodic payments that cover interest and principal owed.

Amortizing Swap An interest rate swap in which the outstanding notional principal amount declines over time.

Annual Percentage Rate The effective annual cost of credit expressed as a percentage inclusive of the amount financed, the loan maturity, and the finance charge.

Annuity A constant payment made for multiple periods of time.

Anticipated Income Theory A theory that the timing of loan payments should be tied to the timing of a borrower's expected income.

Applicable Income Taxes Estimated taxes to be paid over time, not actual tax payments.

Appreciation An increase in the market value of an asset.

Arbitrage The simultaneous trading (purchase and sale) of assets to take advantage of price differentials.

Arbitrageur or Spreader Speculators who take relatively low-risk positions.

ARM, see Adjustable-Rate Mortgage. Arrears An overdue outstanding debt.

Ask Price The price at which an asset is offered for sale.

Asset and Liability Management (ALM) The management of a bank's entire balance sheet to achieve desired risk-return objectives and to maximize the market value of stockholders' equity.

Asset Liquidity The ease of converting an asset to cash with a minimum of loss.

Asset Sensitive A bank is classified as asset sensitive if its GAP is positive.

Asset Utilization (AU) Ratio of total operating income to total assets; a measure of the gross yield earned on assets.

Asset-Backed Security A security with promised principal and interest payments backed or collateralized by cash flows originating from a portfolio of assets that generate the cash flows.

Asset-Based Financing Financing in which the lender relies primarily on cash flows generated by the asset financed to repay the loan.

Assignment The transfer of the legal right or interest on an asset to another party.

At the Money An option where the price of the underlying instrument or contract is approximately equal to the option's exercise price.

ATS Account A checking account that pays interest, similar to a NOW account, but the customer has both a DDA and savings account. The bank forces a zero balance in the DDA at the close of each day after transferring just enough funds from savings to cover checks presented for payment.

Auction-Rate Securities Usually long-term bonds with interest rates that reset periodically, often once a month through an auction process. Since the auction resets their rates often, they act similarly to short-term bonds.

Automated Clearinghouse (ACH) A facility that processes interbank debits and credits electronically.

Automated Loan Machine A machine that serves as a computer terminal and allows a customer to apply for a loan and, if approved, automatically deposits proceeds into an account designated by the customer.

Automated Teller Machine (ATM) A machine that serves as a computer terminal and allows a customer to access account balances and information at a bank.

Automatic Transfers from Savings (ATS) Transactions accounts that pay interest set by each bank without federal restrictions.

Available-for-Sale Securities reported at market value.

Average Historical Cost of Funds Measure of average unit borrowing costs for existing funds.

B

Backwardization The situation in which futures prices on futures contracts that expire farther in the future are below prices of nearby futures contracts.

Bad Debts Loans that are due but are uncollectible.

Balance Inquiry A request by a depositor or borrower to obtain the current balance on his or her account.

Balance Sheet A financial statement that indicates the type and amount of assets, liabilities, and net worth of a firm or individual at a point in time.

Balance Sheet GAP The effective amount of assets that reprice by the full assumed rate change minus the effective amount of liabilities that reprice by the full assumed rate change.

Balloon Loan A loan that requires small payments that are insufficient to pay off the entire loan so that a large final payment is necessary at termination.

Bank Holding Company (BHC) Any firm that owns or controls at least one commercial bank.

Bank Holding Company Act of 1956 The act placed the Federal Reserve in charge of determining what activities holding companies could engage in and prohibited bank holding companies from acquiring a bank in another state. Banks were generally restricted to operating within very narrow geographic markets.

Bank Liquidity A bank's capacity to acquire immediately available funds at a reasonable price.

Bankers Acceptance A draft drawn on a bank and accepted, which makes it a negotiable instrument.

Bankers' Bank A firm that provides correspondent banking services to commercial banks and not to commercial or retail deposit and loan customers.

Bankrupt The situation in which a borrower is unable to pay obligated debts.

Barbell Strategy An investment portfolio in which a large fraction of securities mature near term and another large fraction of securities mature longer term.

Base Computation Period The 14-day period during which a bank's outstanding liabilities determine the amount of required reserves to be held during the reserve maintenance period.

Base Rate An interest rate used as an index to price loans; typically associated with a bank's weighted marginal cost of funds.

Basic Swap A plain vanilla interest rate swap in which one party pays a fixed interest rate and receives a floating rate, while the other party pays a floating rate and receives a fixed rate, with all rates applied to the same, constant notional principal amount.

Basis With financial futures contracts, the futures rate minus the cash rate.

Basis Point 1/100th of 1 percent, or 0.0001; 100 basis points equal 1 percent.

Basis Risk The uncertainty that the futures rate minus the cash rate will vary from that expected.

Bearer Bonds Bonds held by the investor (owner) in physical form. The investor receives interest payments by submitting coupons from the bond to the paying agent.

Benchmark Rate The key driver rate used in sensitivity analysis or simulation models to assess interest rate risk. Other model rates are linked to the benchmark rate in terms of how they change when the benchmark rate changes.

Beneficiary The recipient of the balance in a trust account upon termination of the trust.

Best Efforts Underwriting The underwriter of securities commits to selling as many securities as possible and returns all unsold shares or units to the issuer.

Beta An estimate of the systematic or market risk of an asset within the capital asset pricing model (CAPM) framework.

Beta GAP The adjusted GAP figure in a basic earnings sensitivity analysis derived from multiplying the amount of rate sensitive assets by the associated beta factors and summing across all rate sensitive assets, and subtracting the amount of rate sensitive liabilities multiplied by the associated beta factors summed across all rate sensitive liabilities.

Bid Price The price at which someone has offered to buy an asset.

BIF Bank Insurance Fund that insures deposits at commercial banks.

Blank Check A signed check with no amount indicated.

Board of Directors Individuals elected by stockholders to manage and oversee a firm's operations.

Board of Governors of the Federal Reserve System The policy-setting representatives of the Federal Reserve System in charge of setting the discount rate, required reserves, and general policies designed to affect growth in the banking system's reserves and U.S. money supply.

Bond An interest-bearing security representing a debt obligation of the issuer.

Bond Anticipation Notes These provide interim financing for capital projects that will ultimately be financed with long-term bonds.

Bond Broker A broker who trades bonds on an exchange.

Bond Equivalent Rate Also known as the coupon-equivalent rate, it is the annual percentage yield quoted for most Treasury and corporate bonds. It does not equal the effective annual compounded rate of interest.

Bond Fund A mutual fund that invests in debt instruments.

Bond Rating The subjective assessment of the likelihood that a borrower will make timely interest and principal payments as scheduled. Letters are assigned to a security by rating agencies to reflect estimated creditworthiness.

Book Value Accounting value typically measured as historical cost minus depreciation.

Book Value of Equity Total assets minus total liabilities reported on the balance sheet.

Borrowed Funding Federal funds purchased, repurchase agreements, Federal Home Loan Bank (FHLB) borrowings, and other borrowings.

Borrowing Base An estimate of the available collateral on a company's current assets.

Bounce a Check A depositor writes a check that is returned to the bank and by the bank to the depositor because of insufficient funds.

Branch Bank A retail outlet in which customers can conduct their banking business either face to face with bank representatives, such as tellers and customer service representatives, or electronically via ATMs. The two most common types of branches are standalone brick-and-mortar buildings and in-store branches.

Branch Banking An organizational structure in which a bank maintains facilities that are part of the bank in offices different from its home office. Some states allow banks to set up branches through the state, county, or city. Others prohibit branches.

Bridge Loan A loan issued to fund a temporary need from the time a security is redeemed to the time another security is issued.

Broker An individual who executes orders for customers for which he/she receives a commission.

Brokered Deposits Deposits acquired through a money broker (typically an investment bank) in the national markets.

Bulge Bracket Firms Firms in an underwriting syndicate that have the highest commitment to assist in placing the underlying securities.

Bullet Loan A loan that requires payment of the entire principal at maturity.

Bump-up CD, see Jump-Rate CD.

Burden Noninterest expense minus noninterest income.

Burden Ratio Measures the amount of noninterest expense covered by fees, service charges, securities gains, and other income as a fraction of average total assets.

Business Risk Expense Represents both actual cash expense (losses) as well as noncash expense, or allocations for potential losses.

C

Call Feature A bond characteristic, or feature, that gives the issuer the right, but not the obligation, to redeem the bond at a date prior to the original maturity data. The bonds usually have a deferral period, as well as a call premium to the face value.

Call Loan A loan that is callable on 24 hours' notice.

Call Option An agreement in which the buyer has the right to buy a fixed amount of the underlying asset at a set price for a specified period of time.

Call Protection The feature that does not allow a bond to be called for some (deferment) period.

Call Provision A provision in a bond that allows the issuer to redeem the bond, typically at a premium over par, prior to maturity.

Callable Bond A bond in which the issuer has the option to call the bond from the investor; that is, to prepay the outstanding principal prior to maturity.

Callable CD Certificate of deposit that typically carries a two-year deferment period, meaning it cannot be called for two years after issue. Afterward, the bank can call the CD, meaning that it could repay the depositor's principal, at its discretion.

CAMELS An acronym that refers to the regulatory rating system for bank performance: C—capital adequacy; A—asset quality; M—management quality; E—earnings quality; L—liquidity; and S—sensitivity to market risk.

Cap Use of options to place a ceiling on a firm's borrowing costs.

Capital Funds subscribed and paid by stockholders representing ownership in a bank. Regulatory capital also includes debt components and loss reserves.

Capital Gain (Loss) Profit (loss) resulting from the sale of an asset for more (less) than its purchase price.

Capital Market Market for securities with maturities beyond one year.

Capital Reserves for Contingencies The value of cumulative reserves established for deferred taxes or contingencies.

Capital Risk Potential decrease in the market value of assets below the market value of liabilities, indicating economic net worth is zero or less.

Captive Finance Company A finance company owned by a manufacturer that provides financing to buyers of the firm's products.

Card Bank Bank that administers its own credit card plan or serves as a primary regional agent of a national credit card operation.

CARs (Collateralized Automobile Receivables) A form of asset-backed security in which the collateral is automobile receivables.

Cash Assets Assets held to satisfy customer withdrawal needs, meet legal reserve requirements, or purchase services from other financial institutions--but that do not pay interest.

Cash Basis The accounting procedure that recognizes revenues when cash is actually received and expenses when cash is actually paid.

Cash Budget A comparison of cash receipts and cash expenditures over a period of time.

Cash Flow from Operations A firm's net cash flow from normal business operating activities; used to assess the firm's ability to service existing and new debt and other fixed-payment obligations.

Cash Letter Transit letter on tape that lists items submitted between banks for collection.

Cash Market The spot market for the immediate exchange of goods and services for immediate payment.

Cash Settlement The form for settling futures contracts where the parties exchange cash rather than have one party deliver the underlying asset.

Cash-Based Income Statement A modified form of a direct statement of cash flows. It is essentially a statement of changes reconciled to cash, which combines elements of the income statement and balance sheet.

Cashier's Check A bank check that is drawn on the bank issuing the check and signed by a bank officer.

Cash-to-Cash Asset Cycle The time it takes to accumulate cash, purchase inventory, produce a finished good, sell it, and collect on the sale.

Cash-to-Cash Liability Cycle The length of time it takes to obtain interest-free financing from suppliers in the form of accounts payable and accrued expenses.

Cash-to-Cash Working Capital Cycle The timing difference between the cash-to-cash asset cycle and the cash-to-cash liability cycle.

CD Specials CDs with higher rates offered to attract new customers. CD specials are typically offered with nonstandard maturity dates such as 7 or 13 months rather than 6 months or one year; intent is to attract new funds and not cannibalize deposits from current customers in traditional CDs.

Cease and Desist Order (C&D) A legal document that orders a firm to stop an unfair practice under full penalty of law. Only the cease and desist order has legal standing, but other types of recommendations serve the purpose of notifying a bank as to whether its house is in order.

Central Bank The main bank in a country responsible for issuing currency and setting and managing monetary policy.

Centralized Underwriting An organizational feature of many larger banks; a centralized underwriting department uses a relationship manager (RM) who sources new business and manages existing relationships within the portfolio.

Certificate of Deposit (CD) A large-denomination time deposit representing the receipt of funds for deposit at a bank.

Certified Check A check guaranteed by a bank where funds are immediately withdrawn.

Certified Financial Planner (CFP) A designation earned by individuals who have passed the examination sponsored by the Certified Financial Planner Board. Such individuals have studied banking, investment, insurance, estate planning, and tax planning to assist in managing client financial needs.

Changes in Reserve Requirements Changes that directly affect the amount of legal required reserves that banks are required to hold as an asset and thus change the amount of funds a bank can lend out.

Changes in the Discount Rate Changes that directly affect the cost of reserve borrowing. When the Fed raises the discount rate, it discourages borrowing by making it more expensive. Fed decreases in the discount rate make borrowing less expensive.

Charge-off The act of writing off a loan to its present value in recognition that the asset has decreased in value.

Charter A document that authorizes a bank to conduct business.

Chartered Financial Analyst (CFA) A designation earned by individuals who have passed a three-part examination sponsored by the Institute of Chartered Financial Analysts. Topics include economics, finance, security analysis, and financial accounting to assist in security analysis and portfolio management.

Check Clearing for the 21st century act (Check 21) The act created a framework for the elimination of paper checks by allowing any institution to "truncate" the paper check at any point in the process. Check truncation involves creating a new negotiable instrument called a substitute check, which permits banks to truncate original checks, process check information electronically, and deliver substitute checks to banks that want to continue receiving paper checks.

Check Kiting The process of writing checks against uncollected deposits while checks are in the process of collection, thereby using funds (float) not actually available.

Check Truncation The conversion of a paper check into an electronic debit or image of the check by a third party in the payment system other than the paying bank.

Chinese Wall The imaginary barrier that ensures a trust department will manage trust assets for the benefit of the trust beneficiaries, not for other departments in the bank.

Classified Loan A loan for which regulators have forced management to set aside reserves for clearly recognized losses.

Clean Up the Line of Credit To bring the outstanding credit line balance to zero at least once during the year.

Clearinghouse Association A voluntary association of banks formed to assist the daily exchange of checks among member institutions.

Collar Use of options to place a cap and floor on a firm's borrowing costs.

Collateral Property a borrower pledges as security against a loan for repayment if the borrower defaults.

Collateralized Bond Obligation (CBO) A security backed by a pool of noninvestment grade (junk) bonds.

Collateralized Mortgage Obligation (CMO) A security backed by a pool of mortgages that is structured to fall within an estimated maturity range (tranche), based on the timing of allocated interest and principal payments on the underlying mortgages.

Collected Balances Ledger balances minus float.

Commercial Bank A bank that mostly specializes in short-term business credit, but also makes consumer loans and mortgages, and has a broad range of financial powers. Commercial banks are stock corporations whose primary purpose is to maximize shareholder wealth.

Commercial Loan Theory A theory suggesting that banks make only short-term, self-liquidating loans that match the maturity of bank deposits.

Commercial Paper A short-term unsecured promissory note of a prime corporation.

Commercial Real Estate Loans These are generally short-term loans consisting of construction and real estate development loans, land development loans, and commercial properties loans, such as shopping centers and office buildings.

Commission Broker A trader operating on the floor of an exchange who executes trades for other parties.

Commitment Fee Fee charged for making a line of credit available to a borrower.

Common Stock Securities (equities) that evidence ownership in a company for which the holder received discretionary dividends and realizes price appreciation/depreciation.

Community Bank A bank that operates primarily in, or has ties to, one community.

Community Reinvestment Act (CRA) Passed in 1977, the act prevents a depository institution from acquiring another institution if the parent receives a poor CRA evaluation; that is, the depository institution is not doing enough to ensure that its credit and services are available to all members of the defined community.

Compensating Balance A deposit balance required as compensation for services provided by a lender or correspondent bank.

Competitive Equality Banking Act of 1987 The act recapitalized the Federal Savings and Loan Insurance Corporation (FSLIC) and expanded the FDIC's authority for open bank assistance transactions.

Composition (Mix) Effects Rise or fall in a bank's net interest income resulting from changes in the composition, or mix, of assets and/or liabilities.

Compound Interest Interest paid on outstanding principal plus any interest that has been earned but not paid out.

Compounding Earning interest on interest.

Computation Period Consists of two 1-week reporting periods and, therefore, consists of 14 consecutive days beginning on a Tuesday and ending on the second Monday thereafter.

Concentration Risk Risk of making investments (loans) into a particular geographic area or certain industry; such risk is not measured by the total dollar amount of assets.

Conservator An individual or trust department appointed by a court to manage the property of an incapacitated individual.

Consolidated Balance Sheet A balance sheet showing the aggregate financial condition of a firm and its subsidiaries, netting out all intracompany transactions.

Construction Loans Temporary financing on commercial, industrial, and multifamily residential property. Construction loans are *interim loans*.

Consumer Bank A bank that does not make commercial loans.

Consumer Financial Protection Bureau An agency created by the Dodd–Frank Act that is charged with providing consumers with information about mortgages and other financial products in plain English.

Contemporaneous Reserve Accounting (CRA) During the period from 1984 until 1998, open market operations affected both the current deposit levels and required reserves coincidentally.

Contingent Liabilities Items, such as guarantees or related contracts, that may become liabilities if certain developments arise.

Contractual Repricing A variable-rate loan or deposit for which the applicable interest changes at a predetermined time for a predetermined amount on the basis of movements in a base rate or the simple passage of time

Conventional Mortgage A mortgage, deed, or trust that is not obtained under a government-insured program.

Conversion Fee Fee charged for converting a loan commitment to a term loan.

Convertible Debt A bond that may be exchanged for common stock in the same firm.

Convexity Characterizes the rate of change in duration when yields change. It attempts to improve upon duration as an approximation of price volatility.

Core Capital Tier 1 capital consisting primarily of stockholder's equity.

Core Deposits A base level of deposits a bank expects to remain on deposit, regardless of the economic environment.

Correspondent Bank A bank that provides services, typically check clearing, to other banks.

Correspondent Banking System of interbank relationships in which one bank sells services to other financial institutions.

Cost of Funds Interest expense divided by the dollar volume of interest-bearing liabilities.

Cost of Funds Estimate May be a bank's weighted marginal cost of pooled debt or its weighted marginal cost of capital at the time the loan was made.

Country Risk The credit risk that government or private borrowers in a specific country will refuse to repay their debts as obligated for other than purely economic reasons.

Coupon Rate The ratio of the dollar-valued coupon payment to a security's par value.

Covenant An element of a loan agreement whereby the borrower agrees to meet specific performance requirements or refrain from certain behavior.

Covered Interest Arbitrage A trader borrows in one currency yet covers the transaction by selling the expected foreign exchange after investment for the original currency in the forward market. A profit is available because the interest rate differential between securities in the two countries is out of line with the spot-to-forward exchange rate differential.

Credit Bureau An association that collects and provides information on the credit (payment) histories of borrowers.

Credit Check Efforts by a lender to verify the accuracy of information provided by potential borrowers.

Credit Culture Refers to the fundamental principles that drive lending activity and how management analyzes risk.

Credit Department The bank department where credit information is collected and analyzed to make credit decisions.

Credit Enhancement A guarantee or letter of credit backing for a loan, which improves the creditworthiness of the contract.

Credit File Information related to a borrower's loan request, including application, record of past performance, loan documentation, and analyst opinions.

Credit Limit The maximum amount that a borrower is allowed to borrow against a loan commitment or credit line.

Credit Philosophy Determines how much risk the bank will take and in what form.

Credit Risk Potential variation in net income and market value of equity resulting from the nonpayment of interest and principal.

Credit Scoring The use of a statistical model based on applicant attributes to assess whether a loan automatically meets minimum credit standards. The model assigns values to potential borrowers' attributes, with the sum of the values compared to a threshold.

Credit Services The types of products offered by financial institutions related to lending activities.

Credit Union A nonprofit organization that offers financial services to qualifying members. Credit unions do not pay state and federal income taxes and thus operate at a competitive advantage to other depository institutions.

Critically Undercapitalized Bank An institution that does not meet minimum threshold levels for the three capital ratios.

Cross Hedge Use of a futures contract for a specific asset that differs from the cash asset being hedged.

Cumulative GAP A measure of interest rate risk that is the sum of the periodic GAPs through the longest time frame considered. A measure of the bank's aggregate interest rate risk exposure.

Currency Swap An agreement to exchange payments denominated in one currency for payments denominated in a different currency.

Current Ratio Current assets divided by current liabilities; measures a firm's ability to pay current debts when they come due.

Current Tax Equivalent Adjustment Reverses the current part of the tax benefit included in interest income on loan and lease financing, as well as the estimated tax benefit from municipal securities.

Current Yield The coupon rate on a bond divided by the current market price of the bond.

Customer Information File A record of the services used by each customer.

Customer Profitability Analysis A procedure that compares revenues with expenses and the bank's target profit from a customer's total account relationship.

Cyclical Liquidity Needs An estimate of liquid funds needed to cover deposit outflows or loan demand in excess of trend or seasonal factors.

D

Day Trader A trader who tries to profit from short-term price movements during trading hours in any day, but offsets the initial position before market closing so that no position remains outstanding overnight.

Daylight Overdrafts Bank payments from deposits held at a Federal Reserve bank or correspondent bank in excess of actual collected balances during a day.

Days Accounts Payable Outstanding Accounts payable divided by average daily purchases; measures the firm's efficiency in using trade credit to finance its working capital needs.

Days Accounts Receivable Collection period Accounts receivable divided by average daily credit sales; indicates the average number of days required to convert accounts receivable into cash.

Days Inventory on Hand Inventory divided by average daily cost of goods sold; measures the efficiency of the firm in managing its inventory.

De Novo Branch A newly opened bank branch.

Dealer A trader who sets bid and ask prices for every security traded.

Dealer Reserve An account established by a bank and dealer used to assign the interest that accrues to dealers as they sell loans to a bank.

Debenture A long-term bond that is secured by the general performance of the issuer.

Debit Card A plastic card that, when used, immediately reduces the balance in a customer's transactions deposit.

Debt Service The amount needed to pay principal and interest on a loan.

Debtor-in-Possession Financing A loan made to a firm that has filed for Chapter 11 bankruptcy protection.

Debt-to-Total-Assets Ratio Total liabilities divided by total assets.

Defalcation The misappropriation of funds or property by an individual.

Default The failure to make obligated interest and principal payments on a loan.

Default Risk With respect to credit services, the largest single risk.

Deferred Availability Credit Items Checks received for collection for which a bank has not provided credit to the depositor.

Delinquent Account An account that is past due because the account holder has not made the obligated payment on time.

Delivery Date Specific day that a futures contract expires.

Delta The change in an option's price divided by the change in the price of the underlying instrument or contract.

Demand Deposit Transactions account, payable on demand, that pays no interest to the depositor.

Deposit Insurance Reform Act of 2005 The act merges the old Bank Insurance Fund (BIF) and the old Savings Association Insurance Fund (SAIF) into one new fund, the Deposit Insurance Fund (DIF) and increases deposit insurance on retirement accounts to $250,000.

Deposit Service Charges Income from checking account fees, which generally constitute the bulk of noninterest income.

Depository Institutions Act of 1982 The act, also known as Garn–St. Germain, expanded FDIC powers to assist troubled banks and established the Net Worth Certificate program for savings and loans to assist these institutions in acquiring needed capital. The act authorized money market deposit accounts to allow banks and thrifts to compete with products offered by brokerage firms. It also expanded the powers of thrift institutions in a misguided attempt at allowing these institutions to "earn" their way out of their financial problems.

Depository Institutions Deregulation and Monetary Control Act (DIDMCA) of 1980 The act removed interest rate ceilings and authorized banks and savings institutions to pay interest on checking accounts through the use of negotiable orders of withdrawal (NOW) accounts.

Deposits Held in Foreign Offices Dollar-denominated demand and time deposits, but balances are issued by a bank subsidiary (owned by the bank holding company) located outside the United States.

Depreciation Writing down the value of a capital asset, reported as an expense. Also, a decrease in the market value of a financial asset.

Deregulation The process of eliminating existing regulations.

Derivative A financial instrument whose value is determined by the specific features of the underlying asset or instrument.

Direct Loan A loan with terms negotiated directly between the lender and actual user of the funds.

Discount Broker A brokerage firm that offers a limited range of retail services and charges lower fees than full-service brokers.

Discount Rate Interest rate charged by Federal Reserve banks for borrowing from the discount window.

Discount Window The process of Federal Reserve banks lending to member institutions.

Dividend A payment made to holders of a firm's common stock and/or preferred stock. Cash dividends are paid in cash, while stock dividends are paid in stock.

Dividend Payout Ratio Cash dividends divided by net income; measures the fraction of earnings a firm pays out in cash to stockholders and thus is not retained.

Dodd–Frank Wall Street Reform and Consumer Protection Act (Dodd–Frank) Passed in 2010, the act is a sweeping piece of legislation intended to prohibit many of the financial and housing market abuses that led to the financial crisis of 2008–2009.

Draft A written order requesting one party to make payment to another party at a specified point in time.

Dual Banking System System in the U.S. in which a group trying to obtain a charter to open a bank can apply to the state banking department or the Office of the Comptroller of the Currency—the national banking agency.

Duration The weighted average of time until cash flows generated by an asset are expected to be received (paid). The weights are the present value of each cash flow as a fraction of the asset's current price.

Duration Gap The weighted duration of assets minus the product of the weighted duration of liabilities and the ratio of total liabilities to total assets.

Duration Gap Analysis Compares the price sensitivity of a bank's total assets with the price sensitivity of its total liabilities to assess whether the market value of assets or liabilities changes more when rates change.

E

Early Withdrawal Penalty An interest penalty a depositor pays for withdrawing funds from a deposit account prior to maturity.

Earning Asset Ratio The dollar volume of a bank's earning assets divided by the dollar volume of total assets.

Earning Assets Income-earning assets held by a bank; typically include interest-bearing balances, investment securities, and loans.

Earnings Base (EB) Compares the proportionate investment in average earning assets to average total assets and, thus, indicates whether one bank has more or fewer assets earning interest versus peers.

Earnings Change Ratio (ECR) A ratio calculated for each asset or liability that estimates how the yield on assets or rate paid on liabilities is assumed to change relative to a 1 percent change in the base rate.

Earnings Coverage of Net Losses A measure of net operating income before taxes, securities gains (losses), extraordinary items, and the provision for loan losses divided by net loan and lease losses.

Earnings Credit Interest rate applied to investable balances.

Earnings Dilution A decrease in earnings per share after one bank acquires another.

Earnings Per Share Net income divided by the number of outstanding shares of common stock.

Earnings sensitivity Analysis Takes into account shifts in asset and liability composition and embedded options in a bank's assets and liabilities and off-balance sheet activities. It provides a better understanding of potential changes in earnings than do simple static models.

Earnings-at-Risk (or Net Interest Margin) Simulation Summary results of a bank's earnings sensitivity.

EBIT Earnings before interest and taxes.

EBITDA Earnings before interest, taxes, depreciation, and amortization.

Economic Risk The risk to a company's earnings or processes derived from economic events.

Economic Value Added (EVA) A measure of financial performance trademarked by Stern, Stewart & Co. that is equal to a firm's net operating profit after tax (NOPAT) minus a capital charge representing the required return to shareholders.

Economic Value of Equity (EVE) Sensitivity Analysis Sensitivity analysis framework that extends the static duration gap analysis by making it dynamic using a simulation procedure incorporating a "what if" analysis of all the factors that affect EVE across a wide range of interest rate environments.

Economies of Scale Cost efficiencies evidenced by low operating costs per unit of output.

Economies of Scope Focus on how the joint costs of providing several products change as new products are added or existing product output is enhanced.

ECU European Currency Unit.

Edge Act Corporation A bank subsidiary that engages in international banking activities.

Effective Annual Compounded Rate of Interest The compounded rate of interest assuming the investor reinvests all periodic cash flows received at the same rate of interest.

Effective Convexity The value for convexity that reflects the price impact of embedded options in different interest rate environments.

Effective Duration The value for duration reflecting the price impact of embedded options when interest rates rise versus fall.

Effective GAP The "true" measure of GAP that takes into account a specific interest rate forecast and when embedded options will either be exercised or will affect the actual repricing of an asset or liability.

Efficiency Ratio Noninterest expense divided by the sum of net interest income and noninterest income.

Elasticity A measure of the relative quantity response to a change in price, income, interest rate, or other variable.

Electronic Funds Transfer (EFT) Electronic movement of financial data, designed to eliminate the paper instruments normally associated with such funds movement.

Electronic Transactions Transactions that occur through automatic deposits, Internet and telephone bill payment, ATMs, and ACH transactions.

Embedded Option A specific feature of a bank's asset, liability, or off-balance sheet contract that potentially changes the cash flows of the item when interest rates vary. Examples include early prepayment of principal on loans, issuers calling outstanding bonds, and depositors withdrawing funds prior to maturity.

Emergency Credit May be authorized in unusual and exigent circumstances by the Board of Governors to individuals, partnerships, and corporations that are not depository institutions.

Emergency Economic Stabilization Act of 2008 The act authorized the U.S. Treasury to supply banks with cash by purchasing up to $700 billion in distressed assets, particularly mortgage-backed securities.

EMU European Monetary Union.

Enterprise Value The value of a firm equal to the market capitalization (number of shares of stock times the current stock price) plus the market value of outstanding debt.

Equity Ownership interest in a firm represented by common and preferred stockholders.

Equity and Security Price Risk Potential risk of loss associated with a bank's trading account portfolios.

Equity Multiplier (EM) Ratio of total assets to equity; a measure of financial leverage.

Equity-Related Funding Source of funds consisting largely of subordinated debt, common and preferred stock, and retained earnings.

Estimated Tax Benefit Estimated dollar tax benefit from not paying taxes on loan and lease financing and tax-exempt securities income.

Euro (European Unified Currency) The European currency unit introduced in January 1999.

Eurocredits Term loans priced at a premium over LIBOR.

Eurocurrency A financial claim denominated in a currency other than the one where the issuing institution is located.

Eurodollar A dollar-denominated financial claim at a bank outside the United States.

Eurodollar Deposits Dollar-denominated deposits at banks located outside the United States.

European Community (EC) A confederation of countries that have negotiated the removal of trade barriers to enhance competition.

Exchange Rate Price of one currency in terms of another.

Executor An individual or trust department responsible for handling a settlement.

Expedited Funds Availability Act The act stipulated maximum time limits under Regulation CC for banks to make funds available on deposited checks; effective September 1990.

Expense Ratio (ER) The sum of all expense components (interest, noninterest, and provisions for loan losses) divided by average total assets.

Extension Risk The risk that the holder of a mortgage-backed security will receive outstanding principal payments later than originally anticipated. Later principal payments result from interest rates rising and prepayments occurring slower than expected.

Extraordinary Items An unusual nonrecurring event, a cost or expense such as expenses related to acquisitions or plant shutdowns, results of legal proceedings, or unanticipated tax benefits

F

Facility Fee Fee imposed for making a line of credit available.

Factoring An advance of credit whereby one party purchases the accounts receivable of another party at a discount, without recourse.1

Fair and Accurate Credit Transactions Act (FACT) of 2003 Enhances consumer rights in situations involving identity theft, credit scoring, and claims of inaccurate credit information.

Fannie Mae Name referring to the Federal National Mortgage Association.

FASB 115 Issued by the Financial Accounting Standards Board in 1993 to address the market value accounting for all investments in equity securities that have readily determinable fair values and all investments in debt securities.

FASB 157, see Level 1, Level 2, and Level 3 Assets.

Federal Deposit Insurance Corporation Improvement Act of 1991 The act greatly increased the powers and authority of the FDIC, recapitalized the Bank Insurance Fund, and allowed the FDIC to borrow from the Treasury. The act mandated a least-cost method and prompt corrective action for dealing with failing banks, and established new capital requirements for banks.

Federal Financing Bank A federal agency that borrows from the U.S. Treasury and lends funds to various federal agencies.

Federal Funds Unsecured short-term loans that are settled in immediately available funds.

Federal Home Loan Bank (FHLB) Borrowings Direct loans from the Federal Home Loan Bank with original maturities ranging from one week to over 20 years. FHLB borrowings have see extraordinary growth since the passage of the Gramm-Leach-Bliley Act of 1999.

Federal Housing Finance Agency (FHFA) The new regulator for Fannie Mae, Freddie Mac, and the 12 FHLBs, created by the Housing and Economic Recovery Act (HERA) of 2008. The act merged the Office of Federal Housing Enterprise Oversight (OFHEO), the Federal Housing Finance Board (FHFB), and the U.S. Department of Housing and Urban Development (HUD).

Federal Housing Finance Regulatory Reform Act of 2008 The act was designed to address problems related to certain government-sponsored enterprises (GSEs).

Federal Reserve Bank One of the 12 district Federal Reserve banks that make up the Federal Reserve System.

Fee Income Noninterest income.

Fee-Only Noninterest checking Account Incurs a monthly fee (regardless of the account balance) as well as a possible per-check charge.

FHA (Federal Housing Administration) A federal agency that insures mortgages.

FHA Modernization Act of 2008 Created by HERA in conjunction with the Foreclosure Prevention Act of 2008. It expanded the benefits of the FHA loan limit, established minimum down payments for FHA loans (3.5 percent), made changes to FHA insurance for manufactured housing, and increased consumer protections.

FHLMC (Federal Home Loan Mortgage Corporation, or Freddie Mac) A private corporation operating with an implicit federal guarantee; buys mortgages financed largely by mortgage-backed securities.

FHLMC Collateralized Mortgage Obligations Are debt issues originated by FHLMC that are secured by a pool of mortgages in which payments are grouped into classes, or tranches, according to their estimated maturities.

FHLMC Guaranteed Mortgage Certificates Mortgage-backed securities issued by FHLMC that are similar to bonds. Interest and principal payments on the certificates are backed by a pool of mortgages, but interest is paid just semiannually and principal is repaid annually

FHLMC Participation Certificates Pass-through securities issued by FHLMC that are secured by conventional residential mortgages.

Fidelity Bond A contract that covers losses associated with employee dishonesty, typically embezzlement and forgery at banks.

Fiduciary An individual or trust department responsible for acting in the best interests of a designated third party.

Fiduciary activities Income from the institution's trust department.

Finance Charge Under Regulation Z, the sum of "all charges payable directly or indirectly by the borrower and imposed directly or indirectly by the lender as an incident to or as an extension of credit."

Finance Company A firm that borrows from the money and capital markets to make loans to individuals and commercial enterprises.

Financial Futures Contract A commitment between two parties to exchange a standardized financial asset through an organized exchange at a specified price for future delivery. The price of futures contracts changes prior to delivery, and participants must settle daily changes in contract value.

Financial Holding Company (FHC) A specific type of bank holding company created by the Gramm-Leach-Bliley Act of 1999 that allows banks, securities firms, and insurance companies to affiliate within the FHC structure.

Financial Innovation The continuous development of new products, services, and technology to deliver products and services.

Financial Institutions Reform, Recovery and Enforcement Act of 1989 The act abolished the FSLIC and placed the FDIC in charge of insurance of the industry and created two insurance funds, the Bank Insurance Fund (BIF) and the Savings Association Insurance Fund (SAIF). The act also abolished the Federal Home Loan Bank Board and created the Office of Thrift Supervision (OTS) and the Resolution Trust Corporation (RTC), which was to manage and dispose of the assets of failed institutions. The act further established severe penalties for bank boards and management for their actions or failure of action.

Financial Leverage Relationship between the amount of debt versus equity financing.

Financial Market Utilities (FMUs) Systems "that provide the essential infrastructure for transferring, clearing, and settling payments, securities, and other financial transactions among financial institutions or between financial institutions and the system." Examples of FMUs are the Options Clearing Corporation and the Chicago Mercantile Exchange.

Financial Risk Potential variation in income before interest and taxes associated with fixed interest payments on debt and lease payments.

Financial Services Holding company A parent company that owns a bank holding company plus other subsidiaries, such as a thrift holding company and insurance subsidiary.

Financial Stability Oversight Council The Council is charged with identifying and responding to risks that threaten financial stability in the U.S. and overseeing nonbank financial institutions, such as hedge funds. The Council is chaired by the Treasury Secretary and is made up of 10 federal financial regulators, an independent member, and 5 nonvoting members.

Fixed Charge Coverage Ratio Earnings before interest and taxes (EBIT) plus lease payments divided by interest expense plus lease payments; measures the number of times the firm can pay interest and other fixed charges (such as lease payments) with current earnings.

Fixed Rate An interest rate that does not change during a specified period of time.

Fixed-Rate CD Fixed-rate contract renegotiated at various maturities.

Flipper Repo Type of repurchase agreement in which the rate paid by the borrower changes, or "flips," from a floating rate to a fixed rate after a prespecified lockout period. The parties agree to terms when the RP is originated.

Float Dollar amount of checks in process of collection, net of deferred availability amounts, to depositors.

Floating Rate An interest rate tied to a base rate that changes over time as market conditions dictate.

Floating-Rate Note (FRN) A short-term note whose interest payment varies with a short-term interest rate.

Floor Use of options to establish a minimum borrowing cost.

FNMA (Federal National Mortgage Association, or Fannie Mae) A private corporation operating with an implicit federal guarantee; buys mortgages financed by mortgage-backed securities.

Foreclosure Selling property in order to apply the proceeds in payment of a debt.

Foreclosure Prevention Act of 2008 Created by HERA and in conjunction with the FHA Modernization Act of 2008; expands the benefits of the FHA loan limit, establishes minimum down payments for FHA loans (3.5 percent), makes changes to FHA insurance for manufactured housing, and increases consumer protections.

Foreign Exchange Currency of a foreign country acceptable as a medium of exchange.

Foreign Exchange Risk The risk that the value of a position denominated in a foreign currency may decline due to a change in exchange rates.

Foreign Tax Credit Income taxes paid to a foreign country that can be claimed as a tax credit against a domestic tax liability.

Forward Contract A commitment between two parties to exchange a nonstandardized asset at a fixed price for future delivery. The price of the contract does not change prior to delivery, and no interim payments are required.

Forward Market Comprises transactions that represent a commitment to exchange currencies at a specified time in the future, at an exchange rate determined at the time the contract is signed.

Forward Rate Yield on a forward contract. Also, break-even yield calculated under pure expectations theory according to prevailing interest rates.

Forward Rate Agreement A forward contract in which the two parties establish an interest rate to be paid by one party to the other at a set date in the future. If the actual rate on that date differs from the predetermined rate, one party makes a cash payment to the other party.

Free Cash Flow Typically cash flow from operations less required capital expenditures (those capital expenditures required to maintain the company's ability to produce cash flow from operations).

Free Noninterest Checking Account Imposes no fees of any kind.

Full-Service Broker A brokerage that provides a full range of services to customers including advice on which securities to buy and/or sell.

Funding GAP, see GAP.

Funding Liquidity Risk Inability to liquidate assets or obtain adequate funding from new borrowing.

Futures Markets Organized exchanges in which all contracts are subject to a daily settlement procedure.

Futures Spreader Speculator who may simultaneously buy a futures contract and sell a related futures contract; tries to profit on anticipated movements in the price difference between the contracts.

G

GAAP Generally Accepted Accounting Principles representing the standard rules and procedures that accountants follow when reporting financial information.

GAP Dollar value of rate-sensitive assets minus the dollar value of rate-sensitive liabilities.

GAP Ratio The dollar volume of rate-sensitive assets divided by the dollar volume of rate-sensitive liabilities.

Garnishment A court directive authorizing a bank to withhold funds from a borrower.

General Market Risk Refers to changes in the market value of on-balance sheet assets and off-balance sheet items resulting from broad market movements. Includes risk common to all securities, such as changes in the general level of interest rates, exchange rates, commodity prices, or stock prices.

General Obligation Bonds Municipal bonds secured by the full faith, credit, and taxing power of the issuing state or local government.

Ginnie Mae Name referring to the Government National Mortgage Association.

Glass–Steagall Act The 1933 act that separated lending activities from investment banking activities at commercial banks by prohibiting commercial banks from underwriting corporate securities.

GNMA (Government National Mortgage Association, or Ginnie Mae) A government entity that buys mortgages for low-income housing and guarantees mortgage-backed securities issued by private lenders.

Gold Standard A monetary system where the value of a country's currency is determined by the value of the gold content in the currency.

Goodwill An intangible asset representing the difference between the book value of an asset or a firm and the actual sales price.

Goodwill Impairment Impairment losses expense for goodwill. If the value of the previously acquired asset that created goodwill is impaired or loses significant value, that value must be written off as an expense.

Government-Sponsored Enterprise (GSE) A quasi-public federal agency that is federally sponsored, but privately owned. Examples include the Farm Credit Bank, Federal Home Loan Banks (FHLBs), the Federal Home Loan Mortgage Corporation (Freddie Mac), and the Federal National Mortgage Association (Fannie Mae).

Grace Period The time period for a credit card statement representing the time from when the statement is generated to the last day full payment can be made and still avoid a finance charge.

Gradual Rate Shock An assumed change in interest rates that occurs over time; a 1 percent annual increase in rates may translate into a monthly increase of 8.3 basis points.

Gramm–Leach–Bliley Act of 1999 The act repeals the Glass–Steagall Act and modifies the Bank Holding Company Act to create a new financial holding company authorized to engage in underwriting and selling insurance and securities, conducting both commercial and merchant banking, investing in and developing real estate, and participating in other activities "complementary" to banking. The act also restricts the disclosure of nonpublic customer information, requires disclosure of a privacy policy, and provides a new funding source for some banks by easing membership and the collateral requirements that must be met to access funds from the Federal Home Loan Bank (FHLB).

Grandfather Clause A legislative provision that exempts parties previously engaged in activities prohibited by new legislation.

Gross Domestic Product The market value of goods and services produced over a period of time including the sum of consumer expenditures, investment expenditures, government expenditures, and net exports (exports minus imports).

Gross Loan Losses (Charge-offs) Dollar value of loans actually written off as uncollectible during a period.

Guarantee Make oneself liable for the debts of another.

Guaranteed Investment Contract (GIC) A financial contract in which the writer of a policy agrees to pay a fixed amount at maturity after receiving a fixed, single premium up front.

Guardian An individual or a trust department appointed by a court to manage a minor's property or personal affairs.

H

Hedge To take a position in the forward futures, or swaps, market to offset risk associated with cash market activity.

Hedger A trader who has an existing or anticipated position in the cash market and trades futures contracts (or some other contract) to reduce the risk associated with uncertain changes in value of the cash position.

Held-to-Maturity Securities recorded at amortized cost on the balance sheet, with changes in value having no impact on the income statement.

Helping Families Save Their Homes Act of 2009 The act included provisions that were intended to prevent mortgage foreclosures, enhance the availability of mortgage credit, and protect renters living in foreclosed homes. The act also amended the Truth in Lending Act by establishing a new requirement for notifying consumers regarding the sale of their mortgage loan. In addition, the act increased the borrowing authority for the FDIC and NCUA, lengthened the Deposit Insurance Fund restoration plan period from 5 years to 8 years, and extended the $250,000 deposit insurance coverage through the end of 2013.

Highly Leveraged Transaction (HLT) Transaction in which the borrower's debt increases sharply after the asset exchange, such as a leveraged buyout (LBO).

High-Performance Bank One that makes an exceptional return to shareholders while maintaining an acceptable level of risk.

Historical Cost The value for certain balance sheet items reflecting the original cost or amortized cost.

Hold on the Check When a bank holds a check until it verifies that the check writer has enough funds on deposit to cover the draft.

Holding Period Return The annualized rate of return expected or realized from holding a security over a specific period of time.

Home Banking Actions involving the conduct of banking business taking place in customers' homes, including telephone and computer transactions.

Home Debit A check drawn on a bank that is presented to the same bank for deposit or payment.

Home Equity Lines of Credit (HELOC) Open credit lines with a credit limit, similar to installment loans or credit card loans, that are secured by the value of the borrower's home equity.

Home Equity Loan Loan secured by an individual's equity in a home.

HOPE for Homeowners Act of 2008 Created a new discount program at the Federal Housing Administration (FHA) to back FHA-insured mortgages and to allow lenders to provide mortgage loans to distressed borrowers at a deep discount to prevent foreclosures.

Hot Money Funds that move between institutions quickly in search of higher yields or greater safety.

Housing and Economic Recovery Act (HERA) of 2008 A package of several pieces of legislation designed to address the economic and financial crisis of 2008–2009.

Hypothecation In a contract, committing property to secure a loan.

I

Illiquid An asset that is not easily or readily converted into cash.

Immediately Available Funds Collected deposits held at Federal Reserve banks, or certain collected liabilities or private financial institutions.

Immunize To fully hedge against interest rate risk.

Implied Volatility The expected volatility in return on an underlying asset or contract derived from an option pricing model.

In the Money An option that has a positive intrinsic value. A call option in which the actual price is above the exercise price; a put option in which the actual price is below the exercise price.

Income Statement GAP An interest rate risk model which modifies the standard GAP model to incorporate the different speeds and amounts of repricing of specific assets and liabilities given an interest rate change.

Independent Bank A bank operating in one locality that is not part of a large multibank holding company or group of banks.

Index Rate The rate that serves as a base rate when pricing certain mortgages and variable-rate loans.

Indirect Loan A loan in which a retailer takes the credit application and negotiates terms with the actual borrower. The lender then purchases the loan from the retailer under prearranged terms.

Individual Retirement Account (IRA) A retirement account available to individuals to defer income taxes.

Industrial Development Bond (IDB) A municipal bond issued by a state or local government political subdivision in which the proceeds are used to finance expenditures of private corporations.

Industrial Revenue Bond (IRB) A bond issued by a state government, local government, or political subdivision for the express benefit of a business that will effectively use the proceeds.

Initial Margin At initiation of a futures position, traders must post a cash deposit or U.S. government securities.

Initial Public Offering (IPO) The initial offering of stock of a private company.

Insolvent The financial position of a firm whose market value of stockholders' equity is less than or equal to zero. A firm is technically insolvent when the book value of stockholders' equity is less than or equal to zero.

Installment Loan A loan that is payable in periodic, partial installments.

Instantaneous Rate Shock An immediate increase or decrease in all interest rates by the same amount; a parallel shift in the yield curve.

Insurance Commission Fees and Income Income from insurance underwriting and from the sale of insurance or from reinsurance; this category includes fees, commissions, and service charges.

Intangible Amortizations Amortization expense for intangible assets.

Intelligent Card Contains a microchip with the ability to store and secure information, and makes different responses depending on the requirements of the card issuer's specific application needs.

Inter Vivos Phrase referring to "between living persons."

Interbank Loan Credit extended from one bank to another.

Interest Expense (IE) Sum of interest paid on all interest-bearing liabilities, including transactions accounts, time and savings deposits, volatile liabilities and other borrowings, and long-term debt.

Interest Income (II) Sum of interest and fees earned on all of a bank's assets, including loans, deposits held at other institutions, municipal and taxable securities, and trading account securities.

Interest Rate Cap A contract in which payments are made by the seller (who receives an up-front premium) to the buyer when a reference index rate exceeds a strike rate.

Interest Rate Collar The simultaneous purchase of an interest rate cap and sale of an interest rate floor on the same index for the same maturity and notional principal amount.

Interest Rate Floor A contract in which payments are made by the seller (who receives an up-front premium) to the buyer when a reference index rate is less than a strike rate.

Interest Rate Futures When the underlying asset of a futures contract is an interest-bearing security.

Interest Rate Risk Potential variability in a bank's net interest income and market value of equity caused by changes in the level of interest rates.

Interest Rate Swap A contract in which two parties (counterparties) agree to exchange fixed-rate interest payments for floating-rate interest payments over a specific period of time based on some notional principal amount.

Interest-Bearing Debt Includes all liabilities that explicitly pay interest; these would generally include all liabilities (less demand deposits), as well as acceptances and other liabilities.

Interest-on-Interest Interest earned on interest, or reinvestment interest income.

Interim Loans Provide financing only for a limited time until permanent financing is arranged.

Internal Audit Routine examination of a bank's accounting records.

Intrinsic Value The net value obtained from exercising an option.

Inventory Turnover Cost of goods sold divided by inventory; measures the efficiency of the firm in managing its inventory.

Inverted Yield Curve Yield curve with long-term rates below short-term rates.

Investable Balances Ledger balances minus float minus required reserves against associated deposit balances.

Investment Banking, Advisory, Brokerage, and Underwriting Fees and Commissions Fees and commissions from underwriting securities, private placements of securities, investment advisory and management services, and merger and acquisition services.

Investment Income from Deposit Balances Generated by every deposit customer's hold investment securities.

IO Interest-only security representing the interest portion of a stripped Treasury or stripped mortgage-backed security.

J

Judgment Legal ruling regarding the final payment of a court-determined transfer of assets.

Judgmental Credit Analysis Subjective assessment of a borrower's ability and willingness to repay debts.

Jumbo CDs CDs of $100,000 or more.

Jump-Rate CD (Bump-Up CD) A CD that allows the rate to be changed, at the discretion of the customer, to the current rate offered by the institution at least once during the life of the CD.

Junk Bond A bond with a credit rating below investment grade (below Baa for Moody's, and below BBB for S&P), or a bond that is not rated.

K

Keogh Plan A pension plan for the self-employed that allows them to make contributions and defer taxes until the funds are withdrawn.

Kite Writing checks against uncollected deposits in the process of clearing through the banking system.

L

Lack of Diversification Banks that lend in a narrow geographic area or concentrate their loans to a certain industry.

Ladder Strategy When investing bonds, allocating roughly equivalent amounts (portions) to different maturities.

Lagged Reserve Accounting (LRA) System of reserve requirements based on deposits outstanding prior to the reserve maintenance period.

Land Development Loans Finance the construction of roads and public utilities in areas where developers plan to build houses.

Large Time Deposits Generally referred to as large CDs or jumbo CDs, these accounts consist of large, negotiable certificates of $100,000 or more. They are issued primarily by the largest banks and purchased by businesses and governmental units.

LBO Leveraged buyout.

Lead Bank In loan participations, this is generally the bank that makes the original loan and sells participations. Often, the lead bank retains the largest share of the loan that is participated.

Lease A contract in which the owner of a property allows another party to use the property if certain terms are met and lease payments (rent) are made.

Ledger Balances Dollar value of deposit balances appearing on a bank's books.

Legal Lending Limit The maximum amount that can be loaned to any one borrower or any group of related borrowers.

Legal Risk Risk that unenforceable contracts, lawsuits, or adverse judgments could disrupt or negatively affect the operations, profitability, condition, or solvency of the institution.

Lender Liability Circumstances in which the courts have found lenders liable to their borrowers for fraud, deception, breached fiduciary activities, broken promises, and good faith negotiations.

Lessee The party that rents or leases an asset from another party.

Lessor The party that owns an asset and leases or rents it to another party.

Letter of Credit A bank's guarantee of payment, indicated by a document that describes the handling of a specific transaction.

Level 1, Level 2, and Level 3 Assets Asset classifications required by FASB 157 for valuing securities. ***Level 1*** assets have the most precise values, because valuations are based on actual price quotes in active markets for the same or virtually identical assets. The values are less precise for ***Level 2*** assets, because they are based on matrix pricing. In this context, values are based on the prices of similar assets typically obtained from dealer-pricing services that use survey data. Assets in the final category, ***Level 3***, are extremely difficult to value, because in this category, there are no comparable assets being traded—and market quotes are thus not available.

Leverage Capital Ratio Tier 1 capital divided by total assets net of goodwill, other disallowed intangible assets, and disallowed deferred tax assets.

Leverage Ratios Indicate the mix of the firm's financing between debt and equity and potential earnings volatility.

Leveraged Buyout (LBO) An acquisition where the firm buying another firm contributes a small amount of equity and finances the bulk of the purchase price with debt.

Liability Liquidity The ease with which a bank can issue new debt to acquire clearing balances at reasonable costs.

Liability Management Theory A theory that focuses on banks issuing liabilities to meet liquidity needs.

Liability Sensitive A bank is classified as liability sensitive if its GAP is negative.

LIBOR London Interbank Offer Rate, which represents a money market rate offered by banks for the placement of Eurodollars.

Lien Legal right granted by the court to attach property until a legal claim is paid.

Limited Branching Provisions that restrict branching to a geographic area smaller than an entire state.

Line of Credit A lending agreement between a bank and borrower in which the bank makes a fixed amount of funds available to the borrower for a specified period of time. The customer determines the timing of actual borrowing.

Liquid Assets Unpledged, marketable short-term securities that are classified as available-for-sale, plus federal funds sold and securities purchased under agreement to resell. A liquid asset can be easily and quickly converted into cash with minimum loss.

Liquidity Premium The premium included in longer-term interest rates to compensate investors for price risk associated with volatile interest rates.

Liquidity Ratios Indicate a firm's ability to meet its short-term obligations and continue operations.

Liquidity Risk The variation in net income and market value of bank equity caused by a bank's difficulty in obtaining immediately available funds, either by borrowing or selling assets.

Loan Administration Expense Cost of a loan's credit analysis and execution. It includes personnel and overhead costs as well as direct costs for sending interest bills, processing payments, and maintaining collateral.

Loan Agreement Formalizes the purpose of the loan, the terms, repayment schedule, collateral required, any loan covenants, and finally, what conditions bring about default by the borrower.

Loan and Lease Loss Allowance Contra-asset (negative asset) reserve account that exists in recognition that some loans will not be repaid. The reserve's maximum size is determined by tax law but increases with the growth in problem loans and decreases with net loan charge-offs.

Loan Commitment Formal agreement between a bank and borrower to provide a fixed amount of credit for a specified period.

Loan Committee A committee, consisting of the bank's senior loan officers and sometimes a board member, which formally reviews larger loans. This committee reviews each step of the credit analysis as presented by the loan officer and supporting analysts and makes a collective decision.

Loan Concentration Defined by regulators as credit exposure to any single borrower, industry, or geographic locale that exceeds 25 percent of capital.

Loan Interest Interest income on loans.

Loan Participation Credit extended to a borrower in which members of a group of lenders each provide a fraction of the total financing; typically arises because individual banks are limited in the amount of credit they can extend to a single customer.

Loan Policy Formalizes lending guidelines that employees follow to conduct bank business. It identifies preferred loan qualities and establishes procedures for granting, documenting, and reviewing loans.

Loan Production Offices (LPOs) Institutions that make commercial loans but do not accept deposits.

Loan Syndication An arrangement where several lenders make a loan jointly to a borrower.

Loan-to-Value Ratio The loan amount divided by the appraised value of the underlying collateral.

Local A trader operating on the floor of an exchange who trades for his or her own account.

Lockbox A post office box number controlled by the bank.

London Interbank Offer Rate (LIBOR) Interest rate at which banks deposit Eurodollars with other banks outside the United States.

Long Hedge The purchase of a futures contract to reduce the risk of an increase in the price of a cash asset.

Long Position Market position in which an investor actually owns an asset.

Long-Term Investment Securities Securities with maturities in excess of one year.

M

Macaulay's Duration Computed as a weighted average of the time until cash flows are received.

Macrohedge A hedge strategy designed to reduce risk associated with a bank's entire balance sheet position.

Maintenance Margin The minimum amount of funds in a margin account that must be maintained at all times. When the customer's balance falls below this amount, the broker will require an additional deposit or may close the account.

Maintenance Period With respect to required reserve calculation, consists of 14 consecutive days beginning on a Thursday and ending on the second Wednesday thereafter.

Make a Market Stand ready to buy or sell particular assets.

Make-Whole Clause A provision that requires that the borrower make a payment to a lender after a loan is called or prepaid. The amount of the payment equals the net present value of the lost interest and principal payments.

Managed Liabilities Deposits or other liabilities at banks that pay market interest rates; banks can attract additional funds by increasing rates above current quoted rates in the trade area.

Margin Deposit with a broker that protects the broker from losses arising from customer transactions.

Marginal Cost of Debt A measure of the borrowing cost paid to acquire one additional unit of investable funds.

Marginal Cost of Equity Capital A measure of the minimum acceptable rate of return required by shareholders.

Marginal Cost of Funds The incremental cost of additional funds to finance firm operations.

Marginal Tax Rate Tax rate applied to the last increment of taxable income.

Market Liquidity Risk Inability of the bank to easily unwind or offset specific exposures without significant losses from inadequate market depth or market disturbances.

Market Risk Current and potential risk to earnings and stockholders' equity resulting from adverse movements in market rates or prices.

Market Value The actual value indicating what an asset can be currently sold for.

Mark-to-Market The daily reconciliation of a future trader's margin account in which gains and losses on the position are added and subtracted, respectively.

Maturity The date at which the principal of a note, draft, or bond becomes due and payable.

Memorandum of Understanding (MOU) A formal regulatory document that identifies specific violations and prescribes corrective action by the problem institution.

Memory Cards Cards that store information. Similar to the stored information on the back of a credit card, a memory card can contain value that the user can spend in a pay phone, retail store, or vending machine.

Merger A combination of two firms, generally where the assets and liabilities of the seller are combined with the assets and liabilities of the buyer.

Microhedge A hedge strategy designed to reduce risk associated with a specific transaction.

Modified Duration Macaulay's duration divided by 1 plus the prevailing interest rate on the underlying instrument.

Money Market Deposit Account (MMDA) Small time deposit whose holder is limited to three written checks per month.

Money Market Mutual Fund Mutual fund that accepts customer funds and purchases short-term marketable securities.

Money Supply The federal government's designation of certain liquid assets as money; M1A equals currency outside banks plus demand deposits; M1B equals M1A plus other checkable deposits; M2 equals M1B plus overnight RPs, savings and small time deposits, and money market funds; M3 equals M2 plus large time deposits and term RPs; L equals M3 plus other liquid assets.

Moral Hazard A lack of incentives that would encourage individuals or a business to protect or mitigate against risk. In some cases of moral hazard, incentives are created that would actually increase risk-taking behavior.

Mortgage A contract whereby a borrower provides a lender with a lien on real property as security against a loan.

Mortgage Banking The business of packaging mortgage loans for sale to investors and retaining the servicing rights to the mortgages.

Mortgage Servicing The process of collecting monthly payments on mortgages, keeping records, paying the associated insurance and taxes, and making monthly payments to holders of the underlying mortgages or mortgage-backed securities.

Mortgage-Backed Security (MBS) A security that evidences an undivided interest in the ownership of a pool of mortgages.

Multibank Holding Company A bank holding company that owns controlling interest in at least two commercial banks.

Municipal Notes Municipal securities with a maturity of one year or less; proceeds are used to fund operating expenses for states, local governments, and their political subdivisions.

Municipal Securities (Municipals) Securities issued by states, local governments, and their political subdivisions.

Mutual Fund A pool of funds that is managed by an investment company. Investors in a mutual fund own shares in the fund, and the fund uses the proceeds to buy different assets.

Mutual Savings Banks Firms without capital stock that accept deposits and make loans.

N

Negotiable Order of Withdrawal (NOW) Account Interest-bearing transactions account offered by banks.

Net Charge-offs (Net Losses) Difference between gross loan losses and recoveries. Net losses directly reduce loan loss reserves that a bank sets aside for potential losses.

Net Fixed Assets to Tangible Net Worth An indicator of the proportion of the firm's less liquid assets financed by net worth.

Net Gains (Losses) on Sales of Loans Net gains (or losses) on the sales or other disposal of loans and leases.

Net Gains (Losses), Other Income from net gains (losses) on the sales or other disposal of other real estate owned, and on sales of other assets (excluding securities) such as premises and fixed assets and personal property acquired for debts previously contracted (such as automobiles, boats, equipment, and appliances).

Net Income (NI) Operating profit less all federal, state, and local income taxes, plus or minus any accounting adjustments and extraordinary items.

Net Indirect Costs Costs not directly related to the product, such as salaries for managing the bank or general overhead.

Net Interest Income (NII) Interest income minus interest expense.

Net Interest Margin (NIM) Ratio of net interest income to total earning assets.

Net Interest Margin Simulation Simulated estimates of changes in net interest margin.

Net Losses (Net Charge-offs) Difference between gross loan losses and recoveries. Net losses directly reduce loan loss reserves that a bank sets aside for potential losses.

Net Overhead Noninterest income minus noninterest expense.

Net Overhead Burden Difference between noninterest expense and noninterest income as a fraction of total bank assets.

Net Servicing Fees Income from servicing real estate mortgages, credit cards, and other financial assets held by others.

Net Transactions Accounts Base liabilities in which the holder is permitted to make withdrawals by negotiable or transferable instruments, payment orders, and telephone and preauthorized transfers in excess of three per month.

Net Worth Owners' (stockholders') equity in a firm.

Netting The practice of offsetting promised interest payments with promised interest receipts and transferring the difference with an interest rate swap.

No Load Fund A mutual fund that does not charge a regular sales commission. It may charge a 12b-1 fee.

No-Fee NOW Accounts Interest-bearing checking accounts that charge no fees.

Nominal Interest Rate Market interest rate stated in current, not real, dollars.

Nonaccrual Loan Loan not currently accruing interest. The loan is currently—or has been habitually—past due, or has other problems, which has placed it in nonaccrual status.

Nonbank Bank A firm that either makes commercial loans or accepts deposits but does not do both. Thus, it avoids regulation as a commercial bank.

Nonbank Subsidiary A subsidiary of a bank holding company that is engaged in activities closely related to banking, such as leasing, data processing, factoring, and insurance underwriting.

Noncredit Services Non-lending-related services provided by a financial institution, for example, cash management, checking services, and ATM services.

Noncurrent Loan Typically a loan that is 90 days past due.

Nonelectronic Transactions Transactions conducted in person or by mail.

Noninterest Expense (OE) Composed primarily of personnel expense, which includes salaries and fringe benefits paid to bank employees; occupancy expense from rent and depreciation on equipment and premises; and other operating expenses, including technology expenditures, utilities, and deposit insurance premiums. Other noninterest expenses include goodwill impairment amortization and other intangible amortizations.

Noninterest Income (OI) Income from products and services offered by a financial institution that is not earnings from lending activities.

Nonperforming Loan Loan for which an obligated interest payment is past due.

Nonrate GAP Non-interest-bearing liabilities plus equity minus nonearning assets as a fraction of earning assets.

Nonrated Bond A bond that is not rated by Moody's, S&P, or other rating agency.

Nonrecourse Stipulates that the holder of an obligation has no legal right to force payment on a claim.

Nontransactional Accounts Accounts that offer limited check-writing capabilities and pay higher rates.

Note Issuance Facility An arrangement in which borrowers can issue short-term securities in their own names.

Notional Principal Serves as a reference figure in determining cash flows.

Notional Value The face value of interest rate swap contracts; a mere reference value for computing obligated interest payments.

NOW Account Checking account that pays interest.

NSF Not sufficient funds.

O

Off-Balance Sheet Activities Commitments, such as loan guarantees, that do not appear on a bank's balance sheet but represent actual contractual obligations.

Off-Balance Sheet Risk Volatility in income and market value of bank equity that may arise from unanticipated losses due to these off-balance sheet liabilities.

Offer Price The price at which a broker is willing to sell the underlying security or asset.

Office of credit Rating Agencies Created by Dodd–Frank with a mandate to standardize credit ratings terminology and require disclosure of the credit rating agencies' methodologies.

Office of National Insurance Created by Dodd–Frank, the office is charged with promoting the national coordination of the insurance sector, although the office does not have a supervisory role. Supervisory responsibility still remains with the states.

Official Check Issued Bank issued check for certified funds.

"On Others" Withdrawal Fees Fees charged to the institution's own customers for making withdrawals at other institutions' ATMs.

On the Run The most recently issued U.S. Treasury security.

One-Bank Holding Company A holding company that owns or controls only one commercial bank.

"On-Us" Checks Cashed Checks drawn on the bank's customer's account. Deposits represent checks or currency directly deposited in the customer's account.

"On-Us" Withdrawal Fees Transaction fees for ATM withdrawals levied on the institution's depositor.

Open Account Credit not supported by a note or other written record.

Open Interest Total number of outstanding unfilled futures positions measured on one side of the transaction.

Open Market Operations Activities conducted by the Federal Reserve Bank of New York under the direction of the Federal Open Market Committee (FOMC). The sale or purchase of U.S. government securities in the "open market," or secondary market, is the Federal Reserve's most flexible means of carrying out its policy objectives.

Operating Income Sum of interest income and noninterest income.

Operating Leverage Ratio of fixed costs to total costs; measure of business risk that indicates the relative change in operating income that arises from a change in sales.

Operational Risk The risk of loss resulting from inadequate or failed internal processes, people, and systems, or from external events.

Option Right to buy or sell a specific asset at a fixed price during a specified interval of time.

Option Contract Agreement between two parties in which one party gives the other the right, but not the obligation, to buy or sell a specific asset at a set price for a specified period of time.

Option on Futures Contract Option contract in which the underlying asset is a futures contract.

Option Premium The price of an option.

Option-Adjusted Spread A procedure for valuing prepayment risk associated with mortgage-backed securities that recognizes the magnitude and timing of prepayments and required return to an investor; the corresponding yield spread over matched Treasury securities.

Originate-to-Distribute (OTD) The process of originating loans with the intent to sell the loans either individually or in packages of loans (securitization) and not hold the loans on the balance sheet of the originating institution. The process separates loan origination from loan ownership.

Origination Fee Fee charged by a lender for accepting the initial loan application and processing the loan.

Other Net Gains (Losses) Income from net gains (losses) on the sales or other disposal of other real estate owned, and on sales of other assets (excluding securities) such as premises and fixed assets and personal property acquired for debts previously contracted (such as automobiles, boats, equipment, and appliances).

Other Real Estate Owned (OREO) Real estate owned by a bank that is acquired in settlement of debts.

Out of the Money An option that has no intrinsic value. A call option in which the actual price is below the exercise price; a put option in which the actual price is above the exercise price.

Outsourcing Buying services from third-party vendors. For example, some banks might outsource their data processing.

Outstanding Leases Capitilized value of lease contracts held by the bank.

Overdraft Depositor writing a check for an amount greater than the deposit balance.

Overhead Expenses that generally do not vary with the level of output.

P

P/E Ratio A firm's stock price per share divided by earnings per share.

PAC (Planned Amortization Class CMO) A security that is retired according to a planned amortization schedule, while payments to other classes of securities are slowed or accelerated. The objective is to ensure that PACs exhibit highly predictable maturities and cash flows.

Par Value Dollar value of a bond's principal payment at maturity; face value printed on a security.

Parallel Shift in the Yield Curve A change in interest rates where rates at all maturities change by the same amount, in the same direction, at the same time. This never actually occurs.

Parent Company A firm that owns controlling interest in the stock of another firm.

Passbook Savings Nonnegotiable, small savings account evidenced by a passbook listing the account terms.

Passive Portfolio Management An investment policy whereby managers make predetermined securities purchases regardless of the level of interest rates and specific rate expectations. Examples include following a laddered maturity strategy whereby a bank continuously buys 10-year securities as previously owned securities mature.

Pass-Through Security Instrument secured by mortgages in which the mortgage banker passes mortgage interest and principal payments to the holder of the security minus a servicing charge.

Past-Due Loan A loan with a promised principal and/or interest payment that has not been made by the scheduled payment date.

Peer Group Sample firms used to generate average reference data for comparison with an individual firm's performance data.

Periodic GAP A measure of interest rate risk calculated as the difference between rate sensitive assets (RSAs) and rate sensitive liabilities (RSLs) within each time bucket. A measure of the timing of the impact of interest rate changes

Permanent Working Capital Minimum level of current assets minus minimum level of current liabilities net of short-term bank credit and current maturity of long-term debt; represents the amount of long-term financing required for current assets.

Perpetual Preferred Stock Nonmaturing preferred stock.

Perpetuity With respect to bonds, an infinite number of payments.

Personal Banker Individual assigned to a bank customer to handle a broad range of financial services.

Planned Amortization Class A collateralized mortgage obligation (CMO) that receives principal from the underlying mortgages based on a predetermined payment schedule, where the payments vary depending on whether prepayments fall inside or outside some predetermined range.

Pledged Securities Securities held by a third-party trustee that cannot be sold without a release from the party requiring the pledge. Pledging requirements often stipulate that depository institutions pledge either Treasury or municipal securities as collateral against deposit liabilities such as Treasury deposits, municipal deposits, and borrowings from Federal Reserve banks.

PO Principal-only security representing the principal portion of a stripped Treasury or stripped mortgage-backed security.

Point of Sale (POS) Electronic terminals that enable customers to directly access deposit accounts.

Political Risk The risk of loss due to such causes as currency inconvertibility, government action preventing entry of goods, expropriation or confiscation, and war.

Pooling of Interests An accounting procedure in an acquisition where the two companies simply report financial results by combining assets, liabilities, and equity at book values.

Position Trader A speculator who holds a position for a longer period in anticipation of a more significant, longer-term market move.

Preferred Stock Class of stock representing ownership with a claim on firm income senior to common stock.

Premium on a Bond Difference between the price of a bond and its par value when the price is higher.

Prepaid Cards A hybrid of the debit card in which customers prepay for services to be rendered and receive a card against which purchases are charged.

Prepayment Speed The percentage of the outstanding principal that is prepaid above and beyond normal amortization.

Pretax Net Operating Income Tax-equivalent net interest income, plus noninterest income, minus noninterest expense, minus provision for loan losses, plus realized securities gains (or losses). It represents the bank's operating profit before taxes and extraordinary items.

Primary Capital The sum of common stock, perpetual preferred stock, surplus, undivided profits, contingency and other capital reserves, valuation reserves, mandatory convertible securities, and minority interest in consolidated subsidiaries at a bank.

Primary Credit Borrowings from the Federal Reserve bank under the new primary credit program in which there are many fewer administrative requirements necessary to process the loan. Sometimes referred to as the "no questions asked" program.

Primary Dealer Credit Facility (PDCF) An overnight collateralized loan facility that provides loans for up to 120 days to primary dealers in exchange for a broader range of collateral than that accepted with the Term Securities Lending Facility (TSLF).

Prime Rate One of several base interest rates used as an index to price commercial loans.

Pro Forma Financial Statements Projected or forecasted balance sheet and income statements.

Probate Legal act of submitting a will before a court to verify authenticity of the document.

Problem Loans Loans currently in default or expected to obtain default status.

Profit Margin (PM) A measure of expense control defined as net income divided by total revenue.

Profitability Ratios Measures of a firm's sales and earnings performance.

Project Notes A short-term security used to finance a specific project or expenditure.

Prompt Regulatory Action Divides banks into categories or zones according to their capital positions and mandates action when capital minimums are not met.

Provisions for Loan and Lease Losses (PLL) Management's estimate of the potential incremental lost revenue from bad loans; a deduction from income representing a bank's periodic allocation to its loan and lease loss allowance (loan loss reserve) on the balance sheet.

Prudent Man Rule Requirement that a fiduciary exercise discretion, prudence, and sound judgment in managing the assets of a third party.

Purchase Accounting An accounting method for acquisitions in which the assets and liabilities of the combined firm reflect a revaluation of assets and liabilities of the subject firms, thus recognizing the value of goodwill and other intangibles.

Purchased Liabilities, see Volatile Liabilities.

Put Option to sell an asset (security) for a fixed price during a specific interval of time.

Putable Bond A bond where the investor has the option to put the security back to the issuer after some predetermined date prior to maturity and receive the principal invested or a stated price.

Q

Qualified mortgage A mortgage loan that charges less than 3 percent in fees; contains no risky features, such as negative amortization; provides for a maximum loan term of 30 years; and meets one of three criteria established by the Consumer Financial Protection Bureau.

Quality Spread The difference in market yields between yields on risky securities and matched maturity/duration Treasury securities.

Quick Ratio Cash plus accounts receivable divided by current liabilities.

R

RAROC Risk-adjusted return on capital; equals risk-adjusted income divided by capital.

Rate Boards Internet-based clearinghouses that display quotes that FDIC-insured borrowers are willing to pay for different-maturity CDs. The funds represent nonbrokered deposits; the investors are institutions, such as credit unions, banks, nonfinancial corporations and municipalities, and not individuals.

Rate Effects Impact of a change in interest rates on a bank's earnings after controlling for changes due to mix and volume effects.

Rate Sensitive Classification of assets and liabilities that can be repriced within a specific time frame, either because they mature or carry floating or variable rates.

Rate Sensitive Assets (RSAs) The dollar value of assets that either mature or can be repriced within a selected time period, such as 90 days.

Rate Sensitive Liabilities (RSLs) The dollar value of liabilities that either mature or can be repriced within a selected time period, such as 90 days.

Rating System of assigning letters to security issues indicating the perceived default risks associated with that class of issues.

Real Estate Loans Loans secured by real estate.

Real Interest Rate Interest rate after inflation expectations are netted from a nominal interest rate.

Realized Compound Yield A measure of total return calculated by comparing total future dollars equal to coupon interest or dividends plus reinvestment income and the maturity or sale value of the underlying asset, with the initial purchase price, over the appropriate number of compounding periods.

Realized Securities Gains or Losses (SG) Arise when a bank sells securities from its investment portfolio prior to final maturity at prices above (or below) the initial or amortized cost to the bank. All such profits are reported and taxed as ordinary income.

Rebate The return of a portion of unearned interest to a borrower.

Recourse Legal right to enforce a claim against another party.

Recoveries Dollar amount of loans that were previously charged off but are now collected.

Redlining A practice whereby lenders deny loans to residents living in predetermined geographic areas. Such a practice is illegal.

Regulation Z Part of the Truth in Lending Act (TILA) of 1968 that requires certain disclosures to be made to consumers when they are taking out a loan.

Reinvestment Risk The risk that future cash flows may be reinvested at rates below those expected or available at present.

REIT (Real Estate Investment Trust) An organization that obtains funds to invest in real estate or finance construction.

Relationship Banking Banking strategy that emphasizes the personal relationship between the banker and customer in which the banker offers value-added services beyond the transaction itself; for example, expertise in accounting, business, tax planning, and the continuity of management.

REMIC A "real estate mortgage investment conduit" issuing securities collateralized by mortgages and passing on principal and interest payments to investors. Like CMOs, REMIC securities represent claims on the underlying cash flows that are prioritized by multiple classes or tranches.

Reporting Period The period of time covered by a particular report such as monthly, quarterly, or annual.

Repurchase Agreements (RPs or Repos) Short-term loans secured by government securities and settled in immediately available funds.

Reputation Risk Risk that negative publicity, either true or untrue, can adversely affect a bank's customer base or bring forth costly litigation, hence negatively affecting profitability.

Reregulation The process of implementing new restrictions or modifying existing controls on individuals and activities associated with banking. Reregulation arises in response to market participants' efforts to circumvent existing regulations.

Reserve Balance Requirement The portion of the reserve requirement that is not satisfied by vault cash holdings.

Reserve for Bank Debts Amount appearing on a bank's balance sheet that represents the estimated value of uncollectible loans.

Reserve Maintenance Period The 14-day period during which a bank must hold sufficient deposit balances at the Federal Reserve to meet its legal reserve requirement.

Reserve Requirement Ratios Percentages applied to transactions accounts and time deposits to determine the dollar amount of required reserve assets.

Reserves Qualifying assets to meet reserve requirements, including vault cash and deposit balances held at Federal Reserve banks.

Resolution Trust Corporation (RTC) A government agency (1989–1996) that assisted in the management of savings and loans deemed to be insolvent during the thrift crisis.

Respondent Bank Bank that purchases services from a correspondent bank.

Restructured Loan Loan for which the lender has modified the required payments on principal or interest. The lender may have lengthened maturity and/or renegotiated the interest rate.

Retail Bank Bank that emphasizes lending to individuals.

Retail Funding Funding the bank receives from consumers and noninstitutional depositors. Retail funding generally consist of deposits accounts such as transactions accounts, money market demand accounts (MMDAs), savings accounts, and small time deposits.

Return Items Checks that have not been honored by the drawee bank and have been returned to the check writer.

Return on Assets (ROA) Net income divided by average total assets.

Return on Equity (ROE) Net income divided by average stockholders' equity.

Return on Equity Model A model that relates ROE to ROA and financial leverage and then decomposes ROA into its contributing elements.

Revenue Anticipation Notes Municipal securities that are backed by revenues from a specific project financed by the state or local government issuer.

Revenue Bond Municipal bond issued to finance a project in which debt service payments are secured by specific revenues from the project.

Reverse Collar As used in hedging by financial institutions, the simultaneous purchase of a floor and sale of a cap on interest rates; used to protect against falling rates.

Reverse Mortgage A mortgage in which the owner of the property can borrow against existing equity in the property.

Reverse Repo A contract in which a lender provides funds to a borrower for which collateral is provided in the event of nonpayment.

Reverse Repurchase Agreement Securities purchased under an agreement to resell them at a later date.

Revolver Loan commitment or line of credit that converts to a term loan.

Riding the Yield Curve An investment strategy where the investor buys a security that matures after the investor's assumed holding period. The investor plans to sell the security at the end of the holding period and earn an above-average return because interest rates are expected to remain stable or fall.

Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994 Overrides state branching laws and permits nationwide interstate branching by allowing adequately capitalized bank holding companies to acquire banks or branches in any state.

Risk Management Process by which managers identify, assess, monitor, and control risks associated with a financial institution's activities.

Risk Management Committee Central committee charged with enterprise-wide risk management, measurement, monitoring, and policies. Members typically set strategy regarding market risk within the organization.

Risk-Weighted Assets Total assets minus cash and due from balances minus U.S. government securities.

RORAC Return on risk-adjusted capital; equals income (revenue minus expense) divided by allocated risk capital.

Roth IRA An individual retirement account introduced in 1998 that allows individuals whose wages and salaries are below a predetermined minimum to contribute after-tax income. The contributions grow on a tax-sheltered basis and thus are not taxed at withdrawal.

Rule of 72 Divide 72 by the interest rate at which funds are invested. The value indicates how long it will take for the amount of funds invested to double in value.

Run on a Bank Situation in which a large number of depositors lose confidence in the safety of their deposits and attempt to withdraw their funds.

S

Safe Deposit Box Privacy boxes for storage located in a bank vault under lock and key.

SAIF Savings Association Insurance Fund that insures deposits at thrift institutions.

Sale and Lease Back Transaction in which an asset is sold, with title exchanged to a lessor who leases the asset to the original owner.

Sales Growth Demonstrates whether the firm is expanding or contracting and provides evidence of industry competitiveness.

Sales-to-Asset Ratio Total sales divided by average total assets.

Sallie Mae Student Loan Marketing Association that guarantees student loans.

Sarbanes-Oxley Act Passed by Congress in 2002, the act established the Public Company Oversight Board to regulate public accounting firms that audit publicly traded companies. It specifically addresses issues of conflict among company executives, accounting firms, and their affiliates; also requires CEOs and CFOs to certify the annual and quarterly reports of publicly traded companies. The act also established many required policies and procedures in the area of corporate governance for the boards of publicly traded companies.

Savings Account Small-denomination account (under $100,000) with no fixed maturity.

Savings Institutions Institutions that are generally referred to as "thrifts" because they originally offered only savings or time deposits to attract funds.

Scalper A trader who tries to time price movements over very short time intervals and takes positions that remain outstanding for just minutes.

Seasonal Credit Designed to assist small depository institutions in managing significant seasonal swings in their loans and deposits. Seasonal credit is available to depository institutions that can demonstrate a clear pattern of recurring intrayearly swings in funding needs. Eligible institutions are usually located in agricultural or tourist areas. The interest rate applied to seasonal credit is a floating rate based on market rates.

Seasonal Liquidity Needs Cash-flow needs that arise from predictable seasonal loan demands and deposit outflows.

Seasonal Working Capital Additional working capital needs that exceed the company's permanent working capital needs; often a result of seasonal patterns in a company's sales.

Second Mortgage Subordinate to first mortgages and usually shorter term but secured by real estate.

Secondary Capital Limited life preferred stock, subordinated debt, and mandatory convertible securities not included as primary capital.

Secondary Credit Available to depository institutions that are not eligible for primary credit. It is extended on a very short-term basis, typically overnight, at a rate that is above the primary credit rate.

Secondary Mortgage Market The trading of previously originated residential mortgages. Lenders that originate mortgages can either sell them directly to interested investors or package them into mortgage pools.

Secure and Fair Enforcement for Mortgage Licensing Act (SAFE) of 2008 Created with HERA, the act provided for the establishment of a nationwide licensing and registry system that would establish minimum national standards for all residential mortgage brokers and lenders.

Secured Investor Trusts Bonds secured by the cash flow from pieces of CMOs or related securities placed in trust. In most cases, the securities are high-risk instruments subject to substantial prepayment risk. The securities are labeled "kitchen-sink bonds" because they are backed "by everything but the kitchen sink."

Securitization Pooling loans into packages and selling the pooled assets by issuing securities collateralized by the pooled assets.

Security Collateral a borrower pledges against a loan or secondary source of repayment in case of default.

Security Interest The legal claim on property that secures a debt or the performance of an obligation.

Security Repurchase Agreements, see Repurchase Agreements.

Serial Bonds A series of bonds offered by the same issuer with principal payments that are due at different maturities. Serial bonds are common for municipal bond issuers.

Service Charges Fees imposed for bank services.

Servicemembers Civil Relief Act (SCRA) of 2003 Provides specific relief to active-duty military to allow for postponement or suspension of certain civil obligations.

Shiftability Theory An extension of the commercial loan theory recognizing that any liquid asset could be used to meet deposit withdrawals.

Short Hedge Sale of a futures contract to protect against a price decline.

Short Position The sale of an asset not owned.

Short-Term Securities Securities that mature in one year or less.

Sight Draft A draft payable "on sight."

Significantly Undercapitalized Bank Institution with capital that falls significantly below at least one of the three regulatory standards.

Simple Interest Interest applied against principal only.

Simulation An analysis of possible outcomes for net interest margin resulting from selecting hypothetical values for key variables that influence the repricing of assets, liabilities, and off-balance sheet items; and conducting forecasts to determine the effects of changes in these variables on a bank's net interest income.

Single-Balance, Single-Fee Noninterest Account Incurs no fee if a minimum balance is met; otherwise, there is a single monthly fee.

Single-Fee NOW accounts Similar to noninterest accounts in that they charge no fee if the account balance remains above a minimum amount; otherwise, the institution charges a monthly fee with no check charge.

Single-Fee, Single-Check-Charge NOW Accounts Similar to single-fee NOW accounts in that they charge a monthly fee if the account balance falls below a minimum, but this triggers a per-check charge as well.

Small Time Deposits Small-denomination accounts (under $100,000) with specified maturities ranging from seven days to any longer negotiated term, with interest penalties for early withdrawal.

Smart Card Similar to a debit or credit card, it contains a computer memory chip that stores and manipulates information.

Sovereign Risk Refers to the likelihood that foreign governments will unilaterally alter their debt service payments, regardless of the formal repayment schedule.

Specific Market Risks Those risks that arise from factors other than those categorized under general market risk (e.g., risk of certain events, default risk, and other nonsystematic variations).

Speculation Taking a position or implementing a transaction that increases risk in hopes of earning above-average returns.

Speculator A trader who takes a position to increase risk in the hope of earning extraordinary returns.

Spot Curve Yields on zero coupon Treasury securities that differ in terms of maturity.

Spot Market Market for immediate delivery of assets.

Spot Rate Yield on a zero coupon Treasury security.

Spread (SPRD) Average yield on earning assets minus the average rate paid on interest-bearing liabilities.

Spreader A trader who is not concerned with the direction in which the market moves, but only with the difference between the prices of each contract.

Statewide Branching Allowing banks to establish branches throughout an entire state.

Static Spread Yield premium, in percentage, that when added to Treasury spot rates (zero coupon Treasury rates) along the yield curve, equates the present value of the estimated cash flows for the security with options to the prevailing price of the matched-maturity Treasury.

Stock Market–Indexed CD Certificate of deposit with yields linked to a stock market index such as the S&P 500.

Stop Payment Request by a depositor to stop payment on a previously issued check that has not yet cleared.

Strategic Planning The process through which managers formulate the firm's mission and goals, and identify strengths, weaknesses, opportunities, and threats.

Strike Price Fixed price at which an asset may be purchased in a call option or sold under a put option.

Stripped Bond A bond in which individual coupon payments and principal payments are separated (stripped) from the bond and sold as distinct zero coupon securities.

Stripped Securities Securities that represent just the coupon interest or principal payments on a loan. The interest-only payment is referred to as an IO, while the principal-only payment is referred to as a PO.

Stripping Futures Buying or selling equal amounts of successive futures contracts.

Structured Note A security that will change in value or whose cash flows will change when some underlying index or base rate changes.

Subchapter S Firm A firm with 100 or fewer stockholders that chooses to be taxed as a partnership so as not to pay corporate income taxes.

Subordinated Debt In the case of bankruptcy, the claims of holders of subordinated debt are subordinated to the claims of other debt holders. In banks, insured depositors are paid in full before holders of subordinated debt receive anything.

Subordinated Notes and Debentures Notes and bonds with maturities in excess of one year. Most meet requirements as bank capital for regulatory purposes.

Substitute Check Legal equivalent of the original check and includes all the information contained on the original.

Supplementary Capital Also know as Tier 2 capital. See Tier 2 capital.

Support Tranche A class of mortgage-backed securities where the promised principal and interest payments are made after payments to holders of other classes of securities are made.

Surcharges Fees charged by ATM owners on users of their ATMs who are not the institution's customers.

Surplus (or Common Equity Surplus) The excess over par value at which common stock was issued plus the value of undivided profits allocated to surplus.

Swap Simultaneous purchase and sale of like securities to alter the portfolio composition and characteristics.

Swaption An option on a swap.

Syndicate Group of banks that jointly negotiate a contract to sell securities or make loans.

T

TAC Targeted amortization class mortgage-backed securities in which payments are guaranteed for one specific prepayment rate.

Takedown Actual borrowing against a line of credit or loan commitment.

Takeout Commitment An agreement whereby a different lender, such as a life insurance company or pension fund, agrees to provide long-term financing after construction is finished.

Tangible Equity Total assets minus intangible assets minus total liabilities.

Targeted Return on Equity Guideline based on the cost of debt plus a premium to evaluate the cost of equity.

TARP Capital Purchase Program (TARP-CCP) An economic recovery plan implemented in 2008 that called for direct purchases (by the U.S. Treasury) of the preferred stock of financial institutions.

Tax and Loan Account A deposit account held by the U.S. Treasury at a financial institution.

Tax Anticipation Note Short-term municipal security issued in anticipation of future tax receipts and repaid from same.

Tax Credit Direct reduction in tax liability arising from qualifying expenditures.

Tax-equivalent Yield Tax-exempt interest yield converted to a pretax taxable equivalent by dividing the nominal rate by 1 minus the investor's marginal income tax rate.

Tax-Exempt Commercial Paper Unsecured commercial paper that pays interest that is tax-sheltered to the investor; often the interest is exempt from federal income tax.

TED Spread The difference between the 3-month Eurodollar rate and 3-month Treasury rate.

Term Auction Facilities Consist of three new programs introduced in 2007: Term Auction Facility (TAF), the Term Securities Lending Facility (TSLF), and the Primary Dealer Credit Facility (PDCF). The three facilities allow financial institutions to borrow from the Fed using various collateral sources.

Term Auction Facility (TAF) Allows depository institutions (commercial banks and savings banks) to borrow for a fixed term, typically 28 days, against a variety of collateral that is normally accepted for discount window loans.

Term Commercial Loans Loans made to businesses which have an original maturity of more than one year. Most term commercial loans have maturities from one to seven years and are granted to finance either the purchase of depreciable assets, start-up costs for a new venture, or a permanent increase in the level of working capital.

Term Loan Loan with a maturity beyond one year, typically repaid from the borrower's future cash flow.

Term RP An RP with a maturity beyond one day.

Term Securities Lending Facility (TSLF) Allows primary dealers to borrow Treasury securities against other securities (e.g., mortgage-backed securities) as collateral for 28 days. The range of securities accepted for collateral is wider than with the TAF program. Under the TSLF, bank reserves are not altered because loans are "bond for bond."

Thrifts Savings and loan associations, savings banks, and mutual savings banks.

Tier 1 (or Core) Capital Total common equity capital plus noncumulative preferred stock, plus minority interest in unconsolidated subsidiaries, less ineligible intangibles.

Tier 2 (or Supplementary) Capital Limited to 100 percent of Tier 1 capital and consists of cumulative perpetual preferred stock and any related surplus, long-term preferred stock, limited amounts of term-subordinated debt and intermediate-term preferred stock, and a limited amount of the allowance for loan and lease losses (up to 1.25 percent of gross risk-weighted assets).

Time Value For an option, the amount by which the option premium exceeds the intrinsic value of the option.

Times Interest Earned Earnings before interest and taxes (EBIT) divided by interest expense; measures the number of times the company can pay the interest payments on its outstanding debt.

Too Big to Fail (TBTF) Refers to large banks considered to be "too big to fail"; depositors at such banks most likely know that they have de facto 100 percent coverage and would not be as concerned about the bank's capital cushion.

Total Equity Capital The sum of common stock, surplus, undivided profits, and capital reserves, and net unrealized holding gains (losses) on available-for-sale securities, cumulative foreign currency translation adjustments, and perpetual preferred stock.

Total Noncurrent Loans Sum of nonperforming and nonaccrual loans.

Total Operating Expense (EXP) Sum of interest expense, noninterest expense, and provisions for loan losses.

Total Revenue (TR) (or Total Operating Income [TOI]) Total interest income plus noninterest income and realized securities gains (losses).

Trading Account Inventory of securities held by a bank making a market for sale and purchase.

Trading Account Securities Defined by FASB 115 as securities that must be marked-to-market and unrealized gains and losses reported on the income statement.

Trading Revenue, Venture Capital Revenue, and Securitization Income Gains (losses) from trading securities (making a market in securities) and off-balance sheet derivatives; venture capital activities; net securitization income and fees from securitization transactions; and unrealized losses (recovery of losses) on loans and leases held for sale.

Traditional cash flow Net income plus depreciation and amortization.

Tranche The principal amount related to a specific class of stated maturities on a collateralized mortgage obligation.

Transaction Risk Current and prospective risk inherent in transactions from fraud; theft; error; integrity of computing systems; internal controls; and delays or disruptions in processing, clearing, and settling payment transactions, which could lead to credit and liquidity problems as well as affect earnings and capital.

TRANSACTIONS ACCOUNTS (OR TRANSACTIONS BANKING DEPOSIT ACCOUNTS) Accounts on which a customer can write checks.

TRANSACTIONS BANKING The provision of transactions services, such as checking accounts, credit card loans, and mortgage loans, that occur with high frequency and exhibit standardized features. Because the products are highly standardized, they can be critiqued mechanically and require little human input to manage.

TRANSFER PRICING The pricing of funds transferred between organizational units of a bank, such as determining the cost of collecting deposits and borrowed funds to finance a loan.

TRANSIT CHECKS DEPOSITED Checks drawn on any bank other than the subject bank where deposits are simply deposits from checks drawn on the subject bank.

TRANSIT ITEM Checks drawn on banks located outside the community of the bank in which they are deposited.

TREASURY EMERGENCY AUTHORITY Created with HERA; authorized the Treasury to purchase debt securities issued by GSEs and to purchase common stock.

TROUBLED ASSET RELIEF PROGRAM (TARP*)* Implemented in 2008; created $750 billion fund originally designed to allow the U.S. Treasury to purchase distressed assets from financial institutions.

TRUNCATED ACCOUNT Checking account in which the physical check is "truncated" at the bank; that is, checks are not returned to the customer.

TRUST A property interest held by one party for the benefit of another.

TRUST PREFERRED STOCK A hybrid form of equity capital at banks that meets the requirement for Tier 1 capital.

TRUSTEE Individual or firm charged with managing trust assets.

TRUTH IN LENDING ACT (TILA) OF 1968 United States federal law designed to protect consumers in credit transactions by requiring clear disclosure of key terms of the lending arrangement and all costs.

TRUTH IN SAVINGS A part of Regulation DD (see Chapter 2, established a uniform disclosure requirement of the terms and conditions as well interest and fees on savings accounts.

U

UBPR Uniform Bank Performance Report.

UNDERCAPITALIZED BANK Institution that does not meet at least one of the three minimum capital requirements.

UNDERWRITE To purchase securities from the initial issuer and distribute them to investors.

UNDERWRITING SYNDICATES Groups of investment banks.

UNDIVIDED PROFITS Retained earnings or cumulative net income not paid out as dividends.

UNEARNED INCOME Income that has been received but not yet earned.

UNEARNED INTEREST Interest received prior to completion of the underlying contract.

UNIT BANK Single, independent bank with one home office.

UNITARY THRIFT HOLDING COMPANY A thrift holding company that owns only one thrift.

UNIVERSAL BANK A financial institution that can conduct traditional commercial banking business, such as accepting deposits and making loans, plus offer investment banking services including market making, underwriting, mergers and acquisitions advice, and asset management.

USA PATRIOT ACT (TITLE III) Passed by Congress in 2001, the act, formally known as the International Money Laundering Abatement and Financial Anti-Terrorism Act, is designed to prevent terrorists and others from using the U.S. financial system to move funds to support illegal activity. The act specifically required financial institutions to keep additional records and establish anti–money laundering programs.

USURY Interest charges in excess of that legally allowed for a specific instrument.

V

VA (VETERANS ADMINISTRATION) A federal agency that insures mortgages.

VALUATION RESERVE Loan loss reserve reported on the balance sheet; losses can be charged only against this reserve.

VALUE-AT-RISK (VAR) A procedure for estimating the maximum loss associated with a security or portfolio over a specific period of time, associated with a given confidence level.

VARIABLE RATE Automatic repricing, usually by charging the interest rate at regular intervals.

VARIABLE-RATE CD Contracts with rates renegotiated at specified intervals such as every three months. The rate paid at each interval would be equal to the average of three-month CD rates quoted by securities dealers.

VARIATION MARGIN Daily change in value.

VENTURE CAPITAL (VC) A broad term used to describe funding acquired in the earlier stages of a firm's economic life, usually during a period in which the company is growing faster than its ability to generate internal financing and before the company has achieved the size needed to be efficient. Generally speaking, venture capital provides long-term, risk-sharing equity capital or debt to assist non-publicly traded companies with their growth opportunities.

VOLATILE DEPOSITS Difference between actual outstanding deposits and core deposits; represents balances with a high probability of being withdrawn.

Volatile and Purchased Liabilities Noncore liabilities, includoing jumbo CDs, deposits in foreign offices, federal funds purchased, and repurchase agreements (repos or RPs), as well as Federal Home Loan Bank borrowings and other borrowings with maturities of less than one year. They are normally issued in denominations above the amount that is federally insured so the depositor bears some risk of default.

Volker Rule Provision in Dodd–Frank that prohibits proprietary trading—trading on the bank's behalf rather than clients—using FDIC- insured funds. It also limits investing in, and the sponsoring of, hedge funds and private equity funds.

Volume Effects Impact of changes in the volume of earning assets and the volume of interest-bearing liabilities on a bank's net interest income.

W

Weighted Marginal Cost of Funds Marginal cost of pooled debt funds used in pricing decisions.

Well-Capitalized Bank A bank with a strong capital position that meets the required capital levels for well-capitalized banking companies and as a result is not subject to any regulatory directives regarding capital.

Wholesale Bank A bank that emphasizes business lending.

Wholesale Funding Includes borrowed funds as well as large institutional deposits such as large CDs (over $100,000).

Window Dressing The practice in financial reporting in which a firm engages in certain transactions at the end of a reporting period (quarter or fiscal year) to make the financial results appear better or different from those prevailing at the time.

Working Capital (or Net Working Capital) Current assets minus current liabilities (excluding short-term debt).

X,Y,Z

Yield Curve Diagram relating market interest rates to term-to-maturity on securities that differ only in terms of maturity.

Yield Rate Tax-equivalent interest income divided by earning assets.

Zero Coupon Bond A bond that does not pay periodic interest. Because the return must come from price appreciation, the bond is sold at a discount from face value. There is no reinvestment risk of interim cash flows.

Zero Coupon CD Certificate of deposit sold at a steep discount from par that appreciates to face value at maturity; it carries fixed rates and fixed maturities.

Zero GAP Rate-sensitive assets equal rate-sensitive liabilities.

Zero-Balance Account A checking account with a forced zero balance due to transfers of funds from the account at the close of each business day.

Z-Score A statistical measure that presumably indicates the probability of bankruptcy.

Z-Tranche The final class of securities in a CMO exhibiting the longest maturity and greatest price volatility. These securities often accrue interest until all other classes are retired.

Index