

INTERNATIONAL  
EDITION



# Money, Banking, and the Financial System

SECOND EDITION

R. Glenn Hubbard • Anthony Patrick O'Brien

ALWAYS LEARNING

PEARSON

# Money, Banking, and the Financial System

**Second Edition**

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Columbia University

**Anthony Patrick O'Brien**

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# Preface

## Do You Think This Might Be Important?

It's customary for authors to begin textbooks by trying to convince readers that their subject is important—even exciting. Following the events of the financial crisis and recession of 2007–2009, we doubt anyone needs to be convinced that the study of money, banking, and financial markets is important. And it's exciting . . . maybe a little too exciting. Nothing comparable to the upheaval of 2007–2009 had happened in the financial system since the Great Depression of the 1930s. The financial crisis changed virtually every aspect of how money is borrowed and lent, how banks and other financial firms operate, and how policy-makers regulate the financial system. More than five years after the beginning of the crisis, there seems little doubt that its effects will linger for a very long time, just as did the effects of the Great Depression.

## New to This Edition

We were gratified by the enthusiastic response of students and instructors who used the first edition. The response confirmed our view that a modern, relatively brief approach, paying close attention to recent developments in policy and theory, would find a receptive audience. In this second edition, we retain the approach of our first edition while making several changes to address feedback from instructors and students and also to reflect our own classroom experiences. Here is a summary of our key changes. Please see the pages that follow for details about these changes:

- Replaced 7 chapter-opening cases and updated retained cases
- Added 16 new *Making the Connection* features, including several that appeal to students' personal lives and decisions
- Added more than 40 new real-time data exercises that students can complete on MyEconLab
- Added 2 new *Solved Problems* features, and updated retained *Solved Problems*. Some *Solved Problems* also involve subjects that appeal to students' personal lives and decisions.
- Replaced or updated approximately one-half of the questions and problems at the end of each chapter
- Updated graphs and tables with the latest available data

## New Chapter-Opening Cases

Each chapter-opening case provides a real-world context for learning, sparks students' interest in money and banking, and helps to unify the chapter. The second edition includes the following new chapter-opening cases:

- “Will Investors Lose Their Shirts in the Market for Treasury Bonds?” (Chapter 3, “Interest Rates and Rates of Return”)
- “Are There Any Safe Investments?” (Chapter 4, “Determining Interest Rates”)
- “Searching for Yield” (Chapter 5, “The Risk Structure and Term Structure of Interest Rates”)
- “Using Financial Derivatives to Reduce Risk” (Chapter 7, “Derivatives and Derivative Markets”)
- “Is Ben Bernanke Responsible for Japanese Firms Moving to the United States?” (Chapter 8, “The Market for Foreign Exchange”)

- “Should You Crowd-Fund Your Startup?” (Chapter 9, “Transactions Costs, Asymmetric Information, and the Structure of the Financial System”)
- “To Buy a House, You Need a Loan” (Chapter 10, “The Economics of Banking”)

***New Making the Connection Features and Supporting Exercises at the End of Each Chapter***

Each chapter includes two or more *Making the Connection* features that provide real-world reinforcement of key concepts. Several of these *Making the Connections* cover topics that apply directly to the personal lives and decisions that students make and include the subtitle of *In Your Interest*.

- “Microlending Aids U.S. Small Businesses” (Chapter 1, “Introducing Money and the Financial System”)
- “What Do People Do with Their Savings?” (Chapter 1, “Introducing Money and the Financial System”)
- “*In Your Interest*: Interest Rates and Student Loans” (Chapter 3, “Interest Rates and Rates of Return”)
- “Why Are Bond Interest Rates So Low?” (Chapter 4, “Determining Interest Rates”)
- “*In Your Interest*: Should You Invest in Junk Bonds?” (Chapter 5, “The Risk Structure and Term Structure of Interest Rates”)
- “*In Your Interest*: Should You Invest in Emerging Markets?” (Chapter 8, “The Market for Foreign Exchange”)
- “*In Your Interest*: Is It Safe to Invest Through Crowd-funding?” (Chapter 9, “Transactions Costs, Asymmetric Information, and the Structure of the Financial System”)
- “*In Your Interest*: Corporations Are Issuing More Bonds; Should You Buy Them?” (Chapter 9, “Transactions Costs, Asymmetric Information, and the Structure of the Financial System”)
- “*In Your Interest*: Your Bank’s Message to You: ‘Please Go Away!’” (Chapter 10, “The Economics of Banking”)
- *In Your Interest*: “Is Your Neighborhood ATM About to Disappear?” (Chapter 10, “The Economics of Banking”)
- “*In Your Interest*: Would You Invest in a Hedge Fund if You Could?” (Chapter 11, “Investment Banks, Mutual Funds, Hedge Funds, and the Shadow Banking System”)
- “Greece Experiences a ‘Bank Jog’” (Chapter 12, “Financial Crises and Financial Regulation”)
- “The Consumer Financial Protection Bureau: The New Sheriff of Financial Town” (Chapter 12, “Financial Crises and Financial Regulation”)
- “Fedspeak vs. Transparency” (Chapter 13, “The Federal Reserve and Central Banking”)
- “*In Your Interest*: If You Were Greek, Would You Prefer the Euro or the Drachma?” (Chapter 16, “The International Financial System and Monetary Policy”)
- “‘Fracking’ Transforms Energy Markets in the United States” (Chapter 17, “Monetary Theory I: The Aggregate Demand and Aggregate Supply Model”)

***Added More Than 40 New Real-Time Data Exercises That Students Can Complete on MyEconLab***

MyEconLab is a powerful assessment and tutorial system that works hand-in-hand with *Money, Banking, and the Financial System*. MyEconLab includes comprehensive homework, quiz, test, and tutorial options, allowing instructors to manage all assessment needs

in one program. Key innovations in the MyEconLab course for *Money, Banking, and the Financial System*, second edition, include the following:

- Real-time *Data Analysis Exercises*, marked with , allow students and instructors to use the absolute latest data from FRED, the online macroeconomic data bank from the Federal Reserve Bank of St. Louis. By completing the exercises, students become familiar with a key data source, learn how to locate data, and develop skills to interpret data.
- In the eText available in MyEconLab, select figures labeled **MyEconLab** Real-time data allow students to display a popup graph updated with real-time data from FRED.
- Current News Exercises, new to this edition of the MyEconLab course, provide a turn-key way to assign gradable news-based exercises in MyEconLab. Every week, Pearson scours the news, finds a current article appropriate for the money and banking course, creates an exercise around this news article, and then automatically adds it to MyEconLab. Assigning and grading current news-based exercises that deal with the latest money, banking, financial system events and policy issues has never been more convenient.

### Other Changes

- New *Solved Problems*—Many students have great difficulty handling problems in applied economics. We help students overcome this hurdle by including worked-out problems in each chapter. The following *Solved Problems* are new to this edition:
  - “*In Your Interest: How Do You Value a College Education?*” (Chapter 3, “Interest Rates and Rates of Return”)
  - “*In Your Interest: Should You Worry About Falling Bond Prices When the Inflation Rate Is Low?*” (Chapter 4, “Determining Interest Rates”)
- Replaced or updated approximately one-half of the questions and problems at the end of each chapter
- Updated graphs and tables with the latest available data

## Our Approach

In this book, we provide extensive analysis of the financial events of the past few years. We believe these events are sufficiently important to be incorporated into the body of the text rather than just added as boxed features. In particular, we stress a lesson policymakers recently learned the hard way: What happens in the shadow banking system is as important to the economy as what happens in the commercial banking system.

We realize, however, that the details of the financial crisis and recession will eventually pass into history. What we strive to do in this text is not to add to the laundry list of facts that students must memorize. Instead, we present students with the underlying economic explanations of why the financial system is organized as it is and how the financial system is connected to the broader economy. We are gratified by the success of our principles of economics textbook, and we have employed a similar approach in this textbook: We provide students with a framework that allows them to apply the theory that they learn in the classroom to the practice of the real world. By learning this framework, students will understand not just the 2007–2009 financial crisis and other past events but also developments in the financial system during the years to come. To achieve this goal, we have built four advantages into this text:

1. A framework for understanding, evaluating, and predicting
2. A modern approach

3. Integration of international topics
4. A focus on the Federal Reserve

### Framework of the Text: Understand, Evaluate, Predict

The framework underlying all discussions in this text has three levels. First, students learn to *understand* economic analysis. “Understanding” refers to students developing the economic intuition they need to organize concepts and facts. Second, students learn to *evaluate* current developments and the financial news. Here, we challenge students to use financial data and economic analysis to think critically about how to interpret current events. Finally, students learn to use economic analysis to *predict* likely changes in the economy and the financial system. Having just come through a period in which Federal Reserve officials, members of Congress, heads of Wall Street firms, and nearly everyone else failed to predict a huge financial crisis, the idea that we can prepare students to predict the future of the financial system may seem overly ambitious—to say the least. We admit, of course, that some important events are difficult to anticipate. But knowledge of the economic analysis we present in this book does make it possible to predict many aspects of how the financial system will evolve. For example, in Chapter 12, “Financial Crises and Financial Regulation,” we discuss the ongoing cycle of financial crisis, regulatory response, financial innovation, and further regulatory response. The latest episode in this cycle was the passage in July 2010 of the Dodd-Frank *Wall Street Reform and Consumer Protection Act*. With our approach, students learn not just the new regulations contained in Dodd-Frank but, more importantly, the key lesson that over time innovations by financial firms are likely to supersede many of the provisions of Dodd-Frank. In other words, students will learn that the financial system is not static—it evolves over time in ways that can be understood using economic analysis.

### A Modern Approach

Textbooks are funny things. Most contain a mixture of the current and the modern alongside the traditional. Material that is helpful to students is often presented along with material that is not so helpful or that is—frankly—counterproductive. We believe the ideal is to produce a textbook that is modern and incorporates the best of recent research on monetary policy and the financial system without chasing every fad in economics or finance. In writing this book, we have looked at the topics in the money and banking course with fresh eyes. We have pruned discussion of material that is less relevant to the modern financial system or no longer considered by most economists to be theoretically sound. We have also tried to be as direct as possible in informing students of what is and is not important in the financial system and policymaking as they exist today. For example, rather than include the traditional long discussion of the role of reserve requirements as a monetary policy tool, we provide a brief overview and note that the Federal Reserve has not changed reserve requirements since 1992. Similarly, it has been several decades since the Fed paid serious attention to targets for M1 and M2. Therefore, in Chapter 18, “Monetary Theory II: The *IS-MP* Model,” we replace the *IS-LM* model—which assumes that the central bank targets the money stock, rather than an interest rate—with the *IS-MP* model, first suggested by David Romer more than 15 years ago. We believe that our modern approach improves the ability of students to make the connection between the text material and the economic and financial world they read about. (For those who do wish to cover the *IS-LM* model, we provide an appendix on that model at the end of Chapter 18.)

By cutting out-of-date material, we have achieved two important goals: (1) We provide a much briefer and more readable text, and (2) we have made room for discussion of essential topics, such as the “shadow banking system” of investment banks, hedge

funds, and mutual funds, as well as the origins and consequences of financial crises. See Chapter 11, “Investment Banks, Mutual Funds, Hedge Funds, and the Shadow Banking System,” and Chapter 12, “Financial Crises and Financial Regulation.” Other texts either omit these topics or cover them only briefly.

We have both taught money and banking to undergraduate and graduate students for many years. We believe that the modern, real-world approach in our text will engage students in ways that no other text can.

### **Integration of International Topics**

When the crisis in subprime mortgages began, Federal Reserve Chairman Ben Bernanke famously observed that it was unlikely to cause much damage to the U.S. housing market, much less the wider economy. (We discuss Bernanke’s argument in Chapter 12, “Financial Crises and Financial Regulation,” where we note that he was hardly alone in making such statements.) As it turned out, of course, the subprime crisis devastated not only the U.S. housing market but the U.S. financial system, the U.S. economy, and the economies of most of the developed world. That a problem in one part of one sector of one economy could cause a worldwide crisis is an indication that a textbook on money and banking must take seriously the linkages between the U.S. and other economies. Our text consists of only 18 chapters and is one of the briefest texts on the market. We achieved this brevity by carefully pruning many out-of-date and esoteric topics to focus on the essentials, which includes a careful exploration of international topics. We devote two full chapters to international topics: Chapter 8, “The Market for Foreign Exchange,” and Chapter 16, “The International Financial System and Monetary Policy.” In these chapters, we discuss such issues as the European sovereign debt crisis and the increased coordination of monetary policy actions among central banks. We realize, however, that, particularly in this course, what is essential to one instructor is optional to another. So, we have written the text in a way that allows instructors to skip one or both of the international chapters.

### **A Focus on the Federal Reserve**

We can hardly claim to be unusual in focusing on the Federal Reserve in a money and banking textbook . . . but we do! Of course, all money and banking texts discuss the Fed, but generally not until near the end of the book—and the semester. Based on speaking to instructors in focus groups and based on our own teaching experience, we believe that this approach is a serious mistake. We have found that students often have trouble integrating the material in the money and banking course. To them, the course often seems a jumble of unrelated topics. Particularly in light of recent events, the role of the Fed can serve as a unifying theme for the course. Accordingly, we provide an introduction and overview of the Fed in Chapter 1, “Introducing Money and the Financial System,” and in each subsequent chapter, we expand on the Fed’s role in the financial system. So, by the time students read Chapter 13, “The Federal Reserve and Central Banking,” where we discuss the details of the Fed’s operation, students already have a good idea of the Fed’s importance and its role in the system.

### **Special Features**

We can summarize our objective in writing this textbook as follows: to produce a streamlined, modern discussion of the economics of the financial system and of the links between the financial system and the economy. To implement this objective, we have developed a number of special features. Some are similar to the features that have proven popular and effective aids to learning in our principles of economics textbook, while others were developed specifically for this book.

**Key Issue and Question**

**Issue:** During the financial crisis, the bond rating agencies were criticized for having given high ratings to securities that proved to be very risky.

**Question:** Should the government more closely regulate the credit rating agencies?

*Answered on page 181*

**Answering the Key Question**

*Continued from page 154*

At the beginning of this chapter, we asked:

“Should the government more closely regulate credit rating agencies?”

Like other policy questions we will encounter in this book, this question has no definitive answer. We have seen in this chapter that many investors rely on the credit rating agencies for important information on the default risk on bonds. During the financial crisis of 2007–2009, many bonds—particularly mortgage-backed securities—turned out to have much higher levels of default risk than the credit rating agencies had indicated. Some observers argued that the rating agencies had given those bonds inflated ratings because the agencies have a conflict of interest in being paid by the firms whose bond issues they rate. Other observers, though, argued that the ratings may have been accurate when given, but the creditworthiness of the bonds declined rapidly following the unexpected severity of the housing bust and the resulting financial crisis.

**Key Issue—and–Question Approach**

We believe that having a key issue and related key question in each chapter provides us with an opportunity to explain how the financial system works within the context of topics students read about online and in newspapers and discuss among themselves and with their families. In Chapter 1, “Introducing Money and the Financial System,” we cover the key components of the financial system, introduce the Federal Reserve, and preview the important issues facing the financial system. At the end of Chapter 1, we present 17 key issues and questions that provide students with a roadmap for the rest of the book and help them to understand that learning the basic principles of money, banking, and the financial system will allow them to analyze in-

telligently the most important issues about the financial system and monetary policy. The goal here is not to make students memorize a catalog of facts. Instead, we use these key issues and questions to demonstrate that an economic analysis of the financial system is essential to understanding recent events. See pages 48–50 in Chapter 1 for a complete list of the issues and questions.

We start each subsequent chapter with a key issue and key question and end each of those chapters by using the concepts introduced in the chapter to answer the question.

**Contemporary Opening Cases**

Each chapter-opening case provides a real-world context for learning, sparks students’ interest in money and banking, and helps to unify the chapter. For example, Chapter 11, “Investment Banks, Mutual Funds, Hedge Funds, and the Shadow Banking System,” opens with a discussion of the rise of the shadow banking system in a case study entitled “When Is a Bank Not a Bank? When It’s a Shadow Bank!” We revisit this topic throughout the chapter.

**CHAPTER 11****Investment Banks, Mutual Funds, Hedge Funds, and the Shadow Banking System****Learning Objectives**

After studying this chapter, you should be able to:

**11.1** Explain how investment banks operate (pages 344–357)

**11.2** Distinguish between mutual funds and hedge funds and describe their roles in the financial system (pages 357–364)

**11.3** Explain the roles that pension funds and insurance companies play in the financial system (pages 364–368)

**11.4** Explain the connection between the shadow banking system and systemic risk (pages 369–372)

**When Is A Bank Not A Bank? When It’s A Shadow Bank!**

What is a hedge fund? What is the difference between a commercial bank and an investment bank? At the beginning of the financial crisis of 2007–2009, most Americans would have been unable to answer these questions. Many members of Congress were in a

been deposited in banks, and they were using these funds to provide credit that banks had previously provided. These nonbanks were using newly developed financial securities that even long-time veterans of Wall Street often did not fully understand.

and later became secretary of the Federal Reserve administration. A Federal Reserve System was set up in 1913 to stabilize and regulate the commercial banking system. By 2008, the shadow banking system had grown to be more than 50% larger than the commercial banking system. In 2008, two large investment banks—Lehman Brothers and American International Group—collapsed in the center of the storm. Although many other firms were also drawn into the crisis, 2007–2008 was the first time in U.S. history that a major financial crisis originated in the commercial banking system with nonbanks made dealing difficult because U.S. policymaking and regulatory structures were based on the assumption

that commercial banks were the most important financial firms. In particular, the Federal Reserve System had been set up in 1913 to stabilize and regulate the commercial banking system.

Partly as a result of the financial crisis, the size of the shadow banking system has declined relative to the size of the commercial banking system, although shadow banking remains larger. Following the financial crisis, in 2010 Congress passed the Wall Street Reform and Consumer Protection Act, or the Dodd-Frank Act, which increased to some extent federal regulation of the shadow banking system. But a number of policymakers and economists continue to believe that shadow banking remains a source of instability in the financial system.

Sources: Zoltan Pozar, et al., “The Shadow Banking System,” Federal Reserve Bank of New York, Staff Report No. 458, July 2010, Revised February 2012; Timothy F. Geithner, “Reducing Systemic Risk in a Dynamic Financial System,” talk at The Economic Club of New York, June 9, 2008; and Paul McCulley, “Discussion,” Federal Reserve Bank of Kansas City, *Housing, Housing Finance, and Monetary Policy*, 2007, p. 485.

### Making the Connection Features

Each chapter includes two to four *Making the Connection* features that present real-world reinforcement of key concepts and help students learn how to interpret what they read on the Web and in newspapers. Most *Making the Connection* features use relevant, stimulating, and provocative news stories, many focused on pressing policy issues. Several of these *Making the Connections* cover topics that apply directly to the personal lives and decisions that students make and include the subtitle of *In Your Interest*.

Here are examples:

- “*In Your Interest: Interest Rates and Student Loans*” (Chapter 3, page 91)
- “*In Your Interest: Interest Rates and Student Loans*” (Chapter 3, page 91)
- “*In Your Interest: How Much Volatility Should You Expect in the Stock Market?*” (Chapter 7, page 240)
- “*Has Securitization Increased Adverse Selection Problems in the Financial System?*” (Chapter 9, page 293)
- “*In Your Interest: Your Bank’s Message to You: ‘Please Go Away!’*” (Chapter 10, page 321)
- “*Did Moral Hazard Derail Investment Banks?*” (Chapter 11, page 352)
- “*Why Was the Severity of the 2007–2009 Recession So Difficult to Predict?*” (Chapter 12, page 385)

Each *Making the Connection* has at least one supporting end-of-chapter problem to allow students to test their understanding of the topic discussed.

Making the Connection In Your Interest

#### Interest Rates and Student Loans

With rising tuition costs, more students are taking out student loans, and the loans are for larger amounts. In 2012, the total amount of student loans outstanding passed \$1 trillion for the first time—more than the total value of credit card debt. Student loan payments are often the largest item in the budgets of recent college graduates. Even future presidents are not immune. According to Michelle Obama: “In fact, when [Barack and I] were first married . . . our combined monthly student loan bills were actually higher than our mortgage.”

There are three main types of student loans:

1. Subsidized student loans
2. Unsubsidized student loans
3. Private loans

In 2012, most undergraduate students were eligible to borrow up to \$31,000 in federal student loans, with a maximum of \$23,000 being subsidized loans. In 2012, subsidized federal student loans had a fixed interest rate of 3.4% and unsubsidized federal loans had an interest rate of 6.8%. Under the standard repayment plan, federal student loans are paid back over 10 years. Private student loans, obtained from banks, have a variety of interest rates and repayment times.

We can use the concepts of compounding and discounting to analyze some of the

are paying down the \$20,000 principal more slowly, so you are paying more in total interest over the life of your loan. With a 10-year payback period, your total interest payments are \$7,619.28, while with a 30-year payback period, your total interest payments are nearly \$27,000, or almost four times as high.

Being familiar with the interest rate concepts we are discussing in this chapter can help students and their parents as they decide how to finance a college education. Helpful loan calculators are available on the [studentaid.ed.gov](http://studentaid.ed.gov) and [bankrate.com](http://bankrate.com) Web sites.

Sources: Rachel Louise Ensign, “Time to Repay Student Loans,” *Wall Street Journal*, September 15, 2012; Charlie Spiering, “At Princeton, Michelle Obama Complains about Her Student Loans,” *Washington Examiner*, September 24, 2012; “Student Loans,” *New York Times*, September 9, 2012; and [studentaid.ed.gov](http://studentaid.ed.gov).

See related problem 2.6 at the end of the chapter.

### Solved Problem Features

Many students have great difficulty handling problems in applied economics. We help students overcome this hurdle by including worked-out problems in each chapter. Our goals are to keep students focused on the main ideas of each chapter and to give students a model of how to solve an economic problem by breaking it down step by step. Several of these *Solved Problems* cover topics that apply directly to the personal lives and decisions that students make and include the subtitle *In Your Interest*.

Additional exercises in the end-of-chapter *Problems and Applications* section are tied to every *Solved Problem*. Students can also complete related *Solved Problems* on [www.myeconlab.com](http://www.myeconlab.com). (See page 25 of this preface for more on MyEconLab.)

Solved Problem 3.1A In Your Interest

#### Using Compound Interest to Select a Bank CD

Suppose you are considering investing \$1,000 in one of the following bank CDs:

- The first CD will pay an interest rate of 4% per year for three years
- The second CD will pay an interest rate of 10% the first year, 1% the second year, and 1% the third year

Which CD should you choose?

#### Solving the Problem

**Step 1** Review the chapter material. This problem is about compound interest, so you may want to review the section “Compounding for More Than One Period” on page 82.

**Step 2** Calculate the future value. The interest rate is the same for both CDs, so the interest earned in each year will be equal to the principal, multiplied by 1.04 for the first CD and 1.10 for the second CD.

\$1,000

**Step 3** Calculate the future value. For the first CD, the interest is compounded annually for three years.

$\$1,000 \times (1 + 0.04)^3$

**Step 4** Decide which CD you should choose. You should choose the investment with the highest future value, so you should choose the first CD.

**EXTRA CREDIT:** Note that the average interest rate received across the three years is 4% for both CDs. When asked to guess the answer to this problem without first doing the calculations, many students choose the second CD. They reason that the high 10% interest rate received in the first year means that even though the interest rates in the second and third years are low, the second CD will end up with the higher future value. As the table below shows, although the first CD starts out well behind after the first year, it finishes the third year with the higher value. This example illustrates the sometimes surprising results of compounding.

	First CD	Second CD
<b>After 1 year</b>	\$1,040.00	\$1,100.00
<b>After 2 years</b>	1,081.60	1,111.00
<b>After 3 years</b>	1,124.86	1,122.11

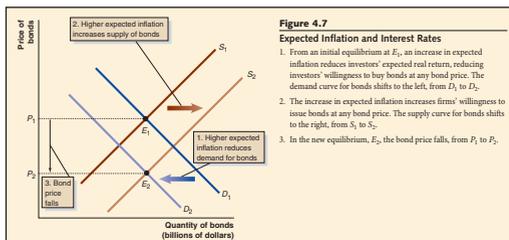
See related problem 1.6 at the end of the chapter.

Table 4.2 Factors That Shift the Demand Curve for Bonds			Graph of effect on equilibrium in the bond market
All else being equal, an increase in ...	causes the demand for bonds to ...	because ...	
wealth	increase	more funds are allocated to bonds.	
expected returns on bonds	increase	holding bonds is relatively more attractive.	
expected inflation	decrease	holding bonds is relatively less attractive.	
expected returns on other assets	decrease	holding bonds is relatively less attractive.	
riskiness of bonds relative to other assets	decrease	holding bonds is relatively less attractive.	
liquidity of bonds relative to other assets	increase	holding bonds is relatively more attractive.	
information costs of bonds relative to other assets	decrease	holding bonds is relatively less attractive.	

## Graphs and Summary Tables

We use four devices to help students read and interpret graphs:

1. Detailed captions
2. Boxed notes
3. Color-coded curves
4. Summary tables with graphs



## Key Terms and Problems

### Key Terms

- |                                       |                                                                |                                          |
|---------------------------------------|----------------------------------------------------------------|------------------------------------------|
| Bond rating, p. 156                   | Liquidity premium theory (or preferred habitat theory), p. 177 | Segmented markets theory, p. 176         |
| Default risk (or credit risk), p. 156 | Municipal bonds, p. 162                                        | Term premium, p. 177                     |
| Expectations theory, p. 170           | Risk structure of interest rates, p. 155                       | Term structure of interest rates, p. 167 |

### 5.1 The Risk Structure of Interest Rates

Explain why bonds with the same maturity can have different interest rates.

#### Review Questions

- 1.1 What is default risk? Is it different from default risk premium?
- 1.2 List the different ways in which rating agencies measure the creditworthiness of a bond.
- 1.3 How does the interest rate on an illiquid bond compare with the interest rate on a liquid bond? How does the interest rate on a bond with high information costs compare with the interest rate on a bond with low information costs?

#### 1.10 [Related to the Making the Connection on page 159]

According to an article in the *New York Times*, "It was the near universal agreement that potential conflicts were embedded in the [bond] ratings model." What is the bond ratings model? What potential conflicts are embedded in it?  
 Source: David Segal, "Debt Raters Avoid Overhaul After Crisis," *New York Times*, December 7, 2009.

#### Problems

- 1.6 Draw a graph showing the term structure of interest rates. Why might the market goals that the managers?
- 1.7 According to the article, "The average yields on these bonds have dropped to 6.6 percent, hovering near a record low."
  - a. What are junk bonds?
  - b. Is there a connection between everyone's demand for Spanish government bonds was increasing or decreasing? Briefly explain.
  - c. Can we tell from the headline whether the prices of Spanish government bonds were increasing or decreasing? Briefly explain.
  - d. The article observes that Spain is "reaping the bitter harvest of a decade of ambitious and often unchecked spending on infrastructure and services." What does this observation have to do with the article's headline?

### 5.2 The Term Structure of Interest Rates

Explain why bonds with different maturities can have different interest rates.

#### Review Questions

- 2.1 How does the Treasury yield curve illustrate the term structure of interest rates?
- 2.2 What are the shortcomings of the expectations theory?
- 2.3 How does a change in default risk affect the interest rate on a bond?

#### Problems and Applications

- 2.4 Suppose that you want to invest for three years to earn the highest possible return. You have three options: (a) Roll over three one-year bonds, which pay interest rates of 8% in the first year, 11% in the second year, and 7% in the third year; (b) buy a two-year bond with a 10% interest rate
- 2.6 Suppose that the interest rate on a one-year Treasury bill is currently 1% and that investors expect that the interest rates on one-year Treasury bills over the next three years will be 2%, 3%, and 2%. Use the expectations theory to calculate the current interest rates on two-year, three-year, and four-year Treasury notes.

## Review Questions and Problems and Applications—Grouped by Learning Objective to Improve Assessment

The end-of-chapter *Review Questions and Problems and Applications* are grouped under learning objectives. The goals of this organization are to make it easier for instructors to assign problems based on learning objectives, both in the book and in MyEconLab, and to help students efficiently review material that they find difficult. If students have difficulty with a particular learning objective, an instructor can easily identify which end-of-chapter questions and problems support that objective and assign them as homework or discuss them in class. Exercises in a chapter's *Problems and Applications* section are available in MyEconLab. Using MyEconLab, students can complete these and many other exercises online, get tutorial help, and receive instant feedback and assistance on exercises they answer incorrectly. Also, student learning will be enhanced by having the summary material and problems grouped together by learning objective, which will allow students to focus on the parts of the chapter they find most challenging. Each major section of the chapter, paired with a learning objective, has at least two review questions and three problems.

We include one or more end-of-chapter problems that test students' understanding of the content presented in each *Solved Problem*, *Making the Connection*, and chapter opener. Instructors can cover a feature in class and assign the corresponding problem for homework. The Test Item Files also include test questions that pertain to these special features.

### Data Exercises

Each chapter ends with at least two *Data Exercises* that help students become familiar with a key data source, learn how to locate data, and develop skills to interpret data.

Real-time *Data Analysis Exercises*, marked with , allow students and instructors to use the very latest data from FRED, the online macroeconomic data bank from the Federal Reserve Bank of St. Louis.

**Data Exercises**

**D5.1: [The yield curve and recessions]** Go to the Web site of the Federal Reserve Bank of St. Louis (FRED) ([research.stlouisfed.org/fred2/](http://research.stlouisfed.org/fred2/)) and for the period from January 1957 to the present download to the same graph the data series for the 3-month Treasury bill (TB3MS) and the 10-year Treasury note (GS10). Go to the Web site of the National Bureau of Economic Research (nber.org) and find the dates for business cycle peaks and troughs (the period between a business cycle peak and trough is a recession). During which months was the yield curve inverted? How many of these periods were followed within a year by a recession?

**D5.2: [Predicting with the yield curve]** Go to [www.treasury.gov](http://www.treasury.gov) and find the page "Daily Treasury Yield Curve Rates." Briefly describe the current shape of the yield curve. Can you use the yield curve to draw any conclusion about what investors in the bond market expect will happen to the economy in the future?

org/fred2/) and for the period from January 1997 to the present, download to the same graph the data series for the BofA Merrill Lynch US Corporate AAA Effective Yield (BAMLCOA1CAAEEY) and the BofA Merrill Lynch US High Yield CCC or Below Effective Yield (BAMLH0A3HYCEY). Describe how the difference between the yields on high-grade corporate bonds and on junk bonds have changed over this period.

### Supplements

The authors and Pearson Education have worked together to integrate the text, print, and media resources to make teaching and learning easier.

### MyEconLab

MyEconLab is a powerful assessment and tutorial system that works hand-in-hand with *Money, Banking, and the Financial System*, second edition. MyEconLab includes comprehensive homework, quiz, test, and tutorial options, allowing instructors to manage all assessment needs in one program. Key innovations in the MyEconLab course for *Money, Banking, and the Financial System*, second edition, include the following:

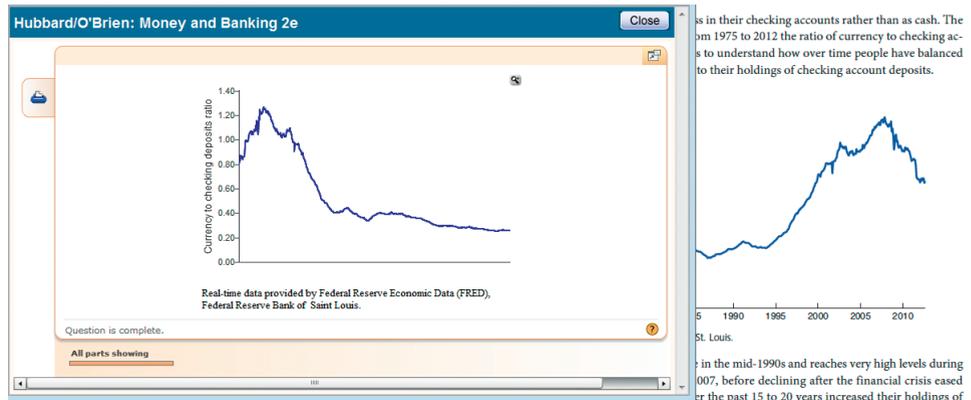
- Real-time *Data Analysis Exercises*, marked with , allow students and instructors to use the very latest data from FRED, the online macroeconomic data bank from the Federal Reserve Bank of St. Louis. By completing the exercises, students become familiar with a key data source, learn how to locate data, and develop skills to interpret data.

The image shows two side-by-side screenshots. The left screenshot is a homework assignment page titled 'Homework: RTDA' with a 'Real-Time Data Analysis Exercise' section. It instructs the user to view GDP data from FRED and compute statistics for the second quarter of 2012. A table lists series IDs and values:

Series ID	Value
GDP	\$ [ ] billion
GDPC1	\$ [ ] billion
GDPPOT	\$ [ ] billion

The right screenshot is the FRED website interface for 'GDP/GNP'. It shows search filters for 'Selected Series' and 'Add to Data List'. A list of series is displayed, including 'Real Gross Domestic Product, 1 Decimal' and 'Real Potential Gross Domestic Product'.

- In the eText available in MyEconLab, select figures labeled **MyEconLab Real-time data** allow students to display a popup graph updated with real-time data from FRED.



- Current News Exercises, new to this edition of the MyEconLab course, provide a turn-key way to assign gradable news-based exercises in MyEconLab. Each week, Pearson scours the news, finds a current article appropriate for the money and banking course, creates an exercise around this news article, and then automatically adds it to MyEconLab. Assigning and grading current news-based exercises that deal with the latest macro events and policy issues has never been more convenient.

Do Homework - Noel Lotz - Windows Internet Explorer

http://www.math.com/Student/PlayerHomework.aspx?homeworkId=80950425&questionId=1&flushed=false

Homework: Current News

Exercise Score: 0 of 4 pts Assignment Score: 0% (0 of 4 pts)

**Bernanke Sees More Scope for Easing to Spur U.S. Economy**

Source: Zumbun, Joshua. "Bernanke Sees More Scope for Easing to Spur U.S. Economy." Bloomberg article.

The Federal Reserve continues to wait prior to taking additional action to stimulate the economy indicated the Fed still has the ability to use monetary policy to "strengthen the recovery." Bernanke said that fiscal policy measures to increase growth should also be explored.

Bernanke maintained the Fed would not succumb to political pressure but would do what the price level stability and full employment. In defense of the current wait and see policy Bernanke said several quarters to achieve their full effect on economic activity."

**Analyzing the News**

The Fed faces more political pressure during election years since incumbent politicians with reelection bids. However the Fed was constructed to remain as independent as possible, central bank could take the steps necessary to promote stable prices and economic growth.

**Thinking Critically Questions**

1. Which of the following is a goal of the Fed?

A. political reelection

B. economic growth

Click to select your answer, then click Check Answer.

2 parts remaining

Clear All

Bernanke Sees More Scope for Easing to Spur U.S. Economy - Bloomberg - Windows Internet Explorer

http://www.bloomberg.com/news/2012-08-24/bernanke-sees-further-scope-for-easing-to-spur-u-s-economy.html

**Bernanke Sees More Scope for Easing to Spur U.S. Economy**

By Joshua Zumbun - Aug 24, 2012 10:56 AM CT

43 COMMENTS

Federal Reserve Chairman Ben S. Bernanke said the central bank has the ability to take additional steps to boost the economy.

"There is scope for further action by the Federal Reserve to ease financial conditions and strengthen the recovery," Bernanke said in a letter dated Aug. 22 to California Republican Darrell Issa, the chairman of the House Oversight and Government Reform Committee.

Bernanke repeated the statement from the Federal Open Market Committee's Aug. 1 meeting that the Fed will provide "additional accommodation as needed." He has an opportunity to expand on his views in an Aug. 31 speech at the Kansas City Fed's annual economic symposium in Jackson Hole, Wyoming.

U.S. stocks rose, paring the Standard & Poor's 500 Index's first weekly decline in almost two months, on speculation the central bank will act to boost economic growth. The S&P 500 added 0.7 percent to 1,411.13 at the close of trading in New York.

Other features of MyEconLab include:

- All end-of-chapter Questions and Problems, including algorithmic, graphing, and numerical questions and problems, are available for student practice and instructor assignment. Test Item File multiple-choice questions are available for assignment as homework.
- The Custom Exercise Builder allows instructors the flexibility of creating their own problems or modifying existing problems for assignment.
- The powerful Gradebook records each student's performance and time spent on the Tests and Study Plan and generates reports by student or chapter.

A more detailed walk-through of the student benefits and features of MyEconLab can be found at the beginning of this book. Visit [www.myeconlab.com](http://www.myeconlab.com) for more information on and an online demonstration of instructor and student features.

MyEconLab content has been created through the efforts of Melissa Honig, executive media producer, and Noel Lotz and Courtney Kamauf, content leads.

Access to MyEconLab can be bundled with your printed text or purchased directly with or without the full eText, at [www.myeconlab.com](http://www.myeconlab.com).

### Test Item File

William Seyfried of Rollins College prepared the *Test Item File*, which includes more than 1,500 multiple-choice and short-answer questions. Test questions are annotated with the following information:

- **Difficulty:** 1 for straight recall, 2 for some analysis, and 3 for complex analysis
- **Type:** Multiple-choice, short-answer, and essay
- **Topic:** The term or concept that the question supports
- **Learning objective:** The major sections of the main text and its end-of-chapter questions and problems are organized by learning objective. The Test Item File questions continue with this organization to make it easy for instructors to assign questions based on the objective they wish to emphasize.
- **Advanced Collegiate Schools of Business (AACSB) Assurance of Learning Standards:**
  - Communication
  - Ethical Reasoning
  - Analytic Skills
  - Use of Information Technology
  - Multicultural and Diversity
  - Reflective Thinking
- **Page number:** The page in the main text where the answer appears allows instructors to direct students to where supporting content appears.
- **Special features in the main book:** Chapter-opening story, the *Key Issue & Question*, *Solved Problem*, and *Making the Connection*.

The Test Item File is available for download from the Instructor's Resource Center ([www.pearsoninternationaleditions.com/hubbard](http://www.pearsoninternationaleditions.com/hubbard)).

The multiple-choice questions in the Test Item File are also available in TestGen software for both Windows and Macintosh computers, and questions can be assigned via MyEconLab. The computerized TestGen package allows instructors to customize, save, and generate classroom tests. The TestGen program permits instructors to edit, add, or delete questions from the Test Item Files; analyze test results; and organize a database of tests and student results. This software allows for extensive flexibility and ease of use. It provides many options for organizing and displaying tests, along with search and sort features. The software and the Test Item Files can be downloaded from the Instructor's Resource Center ([www.pearsoninternationaleditions.com/hubbard](http://www.pearsoninternationaleditions.com/hubbard)).

### PowerPoint Lecture Presentation

Instructors can use the PowerPoint slides for class presentations, and students can use them for lecture preview or review. These slides include all the graphs, tables, and equations from the textbook. Student versions of the PowerPoint slides are available as PDF files. These files allow students to print the slides and bring them to class for note taking. Instructors can download these PowerPoint presentations from the Instructor's Resource Center ([www.pearsoninternationaleditions.com/hubbard](http://www.pearsoninternationaleditions.com/hubbard)).

## Blackboard and WebCT Course Content

Pearson Education offers fully customizable course content for the Blackboard and WebCT Course Management Systems.



**CourseSmart for Instructors** CourseSmart goes beyond traditional expectations, providing instant online access to the textbooks and course materials you need at a lower cost to students. And, even as students save money, you can save time and hassle with a digital textbook that allows you to search the most relevant content at the very moment you need it. Whether it's evaluating textbooks or creating lecture notes to help students with difficult concepts, CourseSmart can make life a little easier. See how when you visit [www.coursesmart.co.uk/instructors](http://www.coursesmart.co.uk/instructors).

**CourseSmart for Students** CourseSmart goes beyond traditional expectations, providing instant, online access to the textbooks and course materials students need at lower cost. Students can also search, highlight, and take notes anywhere, at any time. See all the benefits to students at [www.coursesmart.co.uk/students](http://www.coursesmart.co.uk/students).

## Accuracy Checkers, Class Testers, and Reviewers

The guidance and recommendations of the following instructors helped us to revise the content and features of this text. While we could not incorporate every suggestion from every reviewer, we carefully considered each piece of advice we received. We are grateful for the hard work that went into their reviews and truly believe that their feedback was indispensable in revising this text. We appreciate their assistance in making this the best text it could be; they have helped teach a new generation of students about the exciting world of money and banking.

Special thanks to Edward Scahill of the University of Scranton for preparing some of the *Making the Connection* features. We also extend special thanks to Bob Gillette of the University of Kentucky for his extraordinary work accuracy checking these chapters in page proof format and playing a critical role in improving the quality of the final product.

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## First Edition Accuracy Checkers, Class Testers, and Reviewers

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### First Edition Accuracy Checkers

In a long and relatively complicated manuscript, accuracy checking is of critical importance. Our thanks go to a dedicated group who provided thorough accuracy checking of both the manuscript and page proof chapters. Special thanks to Timothy Yeager of the University of Arkansas for both commenting on and checking the accuracy of all 18 chapters of the manuscript.

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### First Edition Reviewers and Focus Group Participants

We also appreciate the thoughtful comments of our reviewers and focus group participants. They brought home to us once again that there are many ways to teach a money and banking class. We hope that we have written a text with sufficient flexibility to meet the needs of most instructors. We carefully read and considered every comment and suggestion we received and incorporated many of them into the text. We believe that our text has been greatly improved as a result of the reviewing process.

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Director of Key Markets David Theisen provided valuable insight into the changing needs of money and banking instructors. We have worked with Executive Marketing Manager Lori DeShazo on all three of our books, and we continue to be amazed at her energy and creativity in promoting the field of economics. We also appreciate the input of Steve Deitmer, Director of Development. Lindsey Sloan managed the supplement package that accompanies the text. Emily Brodeur managed the review program. Kathryn Dinovo and Jonathan Boylan turned our manuscript pages into a beautiful published book. Tammy Haskins and Nancy Kincade went above and beyond the call of duty to carefully incorporate all the changes we requested while ensuring consistency and accuracy. We are grateful for their flexibility and the care they took in preparing the text.

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The publishers wish to thank Pradeep Banerjee of IMT Ghaziabad for reviewing the content of the International Edition.

# Introducing Money and the Financial System

## Learning Objectives

After studying this chapter, you should be able to:

- 1.1** Identify the key components of the financial system (pages 32–45)
- 1.2** Provide an overview of the financial crisis of 2007–2009 (pages 45–48)
- 1.3** Explain the key issues and questions the financial crisis raises (pages 48–50)

## Is Prosperity Just Around the Corner?

In 2007, the United States entered what is likely to be the worst recession of your lifetime. Millions of people lost their jobs during the recession. Although the recession ended in June 2009, the recovery was weak and in late 2012, the unemployment rate was still very high at just below 8%. When the recession began, few economists or policymakers suspected that it would be so deep or that the recovery would be so slow.

The only comparable episode in the past 100 years was the Great Depression of the 1930s. In 1931, President Herbert Hoover famously announced, “Prosperity is just around the corner,” even though nine more years of high unemployment lay ahead. During and after the recession of 2007–2009, some policymakers and economists made similarly incorrect predictions that prosperity would soon return. In the fall of 2012, there were some signs that the economic recovery was picking up steam and the unemployment rate was heading toward more normal levels. Even the most optimistic forecasters, however, believed it would take several more years for the economy to return to unemployment rates of 5% to 5.5%, which economists consider to be full employment.

Why was the recession of 2007–2009 so severe, and why was the recovery so weak? The simple answer is that unlike any other recession since the Great Depression of the 1930s, the recession of 2007–2009 had been accompanied by a financial crisis.

To understand why a financial crisis deepens a recession, think about how dependent farmers are on water. Large areas of southern Arizona and California’s central valley have rich soils but receive very little rain. Without an elaborate irrigation system of reservoirs and canals, water would not flow to these areas, and farmers could not raise their vast crops of lettuce, asparagus, cotton, and more. The financial system is like an irrigation system, although it is money, not water, that flows through the financial system. During the economic crisis that began in 2007, the financial system was disrupted, and large sections of the U.S. economy were cut off from the flow of funds they needed to thrive. Just as cutting off the irrigation water in California’s San Joaquin Valley would halt the production of crops, the financial crisis resulted in a devastating decline in production of goods and services throughout the economy.

Like engineers trying to repair a damaged irrigation canal to restore the flow of water, officials of the U.S. Treasury Department and the Federal Reserve (the Fed) took strong actions during the financial crisis to restore the flow of money through banks and financial markets to the firms and households that depend on it. Although some of these policies were controversial, most economists believe that some government intervention was necessary to pull the economy out of a deep recession.

Few households or firms escaped the fallout from the financial crisis and the recession it caused, so they came to realize the importance of the financial system. However, people also came to realize that the financial system had become very complex.

In this chapter, we provide an overview of the important components of the financial system and introduce key issues and questions that we will explore throughout the book.

## 1.1

### Learning Objective

Identify the key components of the financial system.

## Key Components of the Financial System

The purpose of this book is to provide you with the tools you need to understand the modern financial system. First, you should be familiar with the three major components of the financial system:

1. Financial assets
2. Financial institutions
3. The Federal Reserve and other financial regulators

As vendors in baseball parks like to yell: “You can’t tell the players without a program.” We will briefly consider each of these components now and then return to them in later chapters.

### Financial Assets

**Asset** Anything of value owned by a person or a firm.

**Financial asset** An asset that represents a claim on someone else for a payment.

**Security** A financial asset that can be bought and sold in a financial market.

**Financial market** A place or channel for buying or selling stocks, bonds, and other securities.

An **asset** is anything of value owned by a person or a firm. A **financial asset** is a financial claim, which means that if you own a financial asset, you have a claim on someone else to pay you money. For instance, a bank checking account is a financial asset because it represents a claim you have against a bank to pay you an amount of money equal to the dollar value of your account. Economists divide financial assets into those that are *securities* and those that aren’t. A **security** is *tradable*, which means that it can be bought and sold in a *financial market*. **Financial markets** are places or channels for buying and selling stocks, bonds, and other securities, such as the New York Stock Exchange. If you own a share of stock in Apple or Google, you own a security because you can sell that share in the stock market. If you have a checking account at Citibank or Wells Fargo, you can’t sell it. So, your checking account is an asset but not a security.

In this book, we will discuss many financial assets. The following are five key categories of assets:

1. Money
2. Stocks
3. Bonds
4. Foreign exchange
5. Securitized loans

**Money** Although we typically think of “money” as coins and paper currency, even the narrowest government definition of *money* includes funds in checking accounts. In fact,

economists have a very general definition of **money**: Anything that people are willing to accept in payment for goods and services or to pay off debts. The **money supply** is the total quantity of money in the economy. As we will see in Chapter 2, money plays an important role in the economy, and there is some debate about the best way to measure it.

**Stocks** **Stocks**, also called *equities*, are financial securities that represent partial ownership of a corporation. When you buy a share of Microsoft stock, you become a Microsoft *shareholder*, and you own part of the firm, although only a tiny part because Microsoft has issued millions of shares of stock. When a firm sells additional stock, it is doing the same thing that the owner of a small firm does when taking on a partner: increasing the funds available to the firm, its *financial capital*, in exchange for increasing the number of the firm's owners. As an owner of a share of stock in a corporation, you have a legal claim to a share of the corporation's assets and to a share of its profits, if there are any. Firms keep some of their profits as retained earnings and pay the remainder to shareholders in the form of **dividends**, which are payments corporations typically make every quarter.

**Bonds** When you buy a **bond** issued by a corporation or a government, you are lending the corporation or the government a fixed amount of money. The **interest rate** is the cost of borrowing funds (or the payment for lending funds), usually expressed as a percentage of the amount borrowed. For instance, if you borrow \$1,000 from a friend and pay him back \$1,100 a year later, the interest rate on the loan was  $\$100/\$1,000 = 0.10$ , or 10%. Bonds typically pay interest in fixed dollar amounts called *coupons*. When a bond *matures*, the seller of the bond repays the principal. For example, if you buy a \$1,000 bond issued by IBM that has a coupon of \$65 per year and a maturity of 30 years, IBM will pay you \$65 per year for the next 30 years, at the end of which IBM will pay you the \$1,000 principal. A bond that matures in one year or less is a *short-term bond*. A bond that matures in more than one year is a *long-term bond*. Bonds can be bought and sold in financial markets, so, bonds are securities just as stocks are.

**Foreign Exchange** Many goods and services purchased in a country are produced outside that country. Similarly, many investors buy financial assets issued by foreign governments and firms. To buy foreign goods and services or foreign assets, a domestic business or a domestic investor must first exchange domestic currency for foreign currency. For example, consumer electronics giant Best Buy exchanges U.S. dollars for Japanese yen when importing Sony televisions. **Foreign exchange** refers to units of foreign currency. The most important buyers and sellers of foreign exchange are large banks. Banks engage in foreign currency transactions on behalf of investors who want to buy foreign financial assets. Banks also engage in foreign currency transactions on behalf of firms that want to import or export goods and services or to invest in physical assets, such as factories, in foreign countries.

**Securitized Loans** If you don't have the cash to pay the full price of a car or a house, you can apply for a loan at a bank. Similarly, if a developer wants to build a new office building or shopping mall, the developer can also take out a loan with a bank. Until about 30 years ago, banks made loans with the intention of making profits by collecting interest

**Money** Anything that is generally accepted in payment for goods and services or to pay off debts.

**Money supply** The total quantity of money in the economy.

**Stock** Financial securities that represent partial ownership of a firm; also called *equities*.

**Dividend** A payment that a corporation makes to its shareholders.

**Bond** A financial security issued by a corporation or a government that represents a promise to repay a fixed amount of money.

**Interest rate** The cost of borrowing funds (or the payment for lending funds), usually expressed as a percentage of the amount borrowed.

**Foreign exchange** Units of foreign currency.

**Securitization** The process of converting loans and other financial assets that are not tradable into securities.

**Financial liability** A financial claim owed by a person or a firm.

**Financial intermediary** A financial firm, such as a bank, that borrows funds from savers and lends them to borrowers.

payments on a loan until the borrower paid off the loan. It wasn't possible to sell most loans in financial markets, so loans were financial assets but not securities. Then, the federal government and some financial firms created markets for many types of loans (see Chapter 11). Loans that banks could sell on financial markets became securities, so the process of converting loans into securities is known as **securitization**.

For example, a bank might grant a *mortgage*, which is a loan a borrower uses to buy a home, and sell it to a government-sponsored enterprise or a financial firm that will bundle the mortgage together with similar mortgages that other banks granted. This bundle of mortgages will form the basis of a new security called a *mortgage-backed security* that will function like a bond. Just as an investor can buy a bond from IBM, the investor can buy a mortgage-backed security from the government agency or financial firm. The bank that grants, or *originates*, the original mortgages will still collect the interest paid by the borrowers and send those interest payments to the government agency or financial firm to distribute to the investors who have bought the mortgage-backed security. The bank will receive fees for originating the loan and for collecting the loan payments from borrowers and distributing them to lenders.

Note that what a saver views as a financial asset a borrower views as a *financial liability*. A **financial liability** is a financial claim owed by a person or a firm. For example, if you take out a car loan from a bank, the loan is an asset from the viewpoint of the bank because it represents your promise to make a certain payment to the bank every month until the loan is paid off. But the loan is a liability to you, the borrower, because you owe the bank the payments specified in the loan.

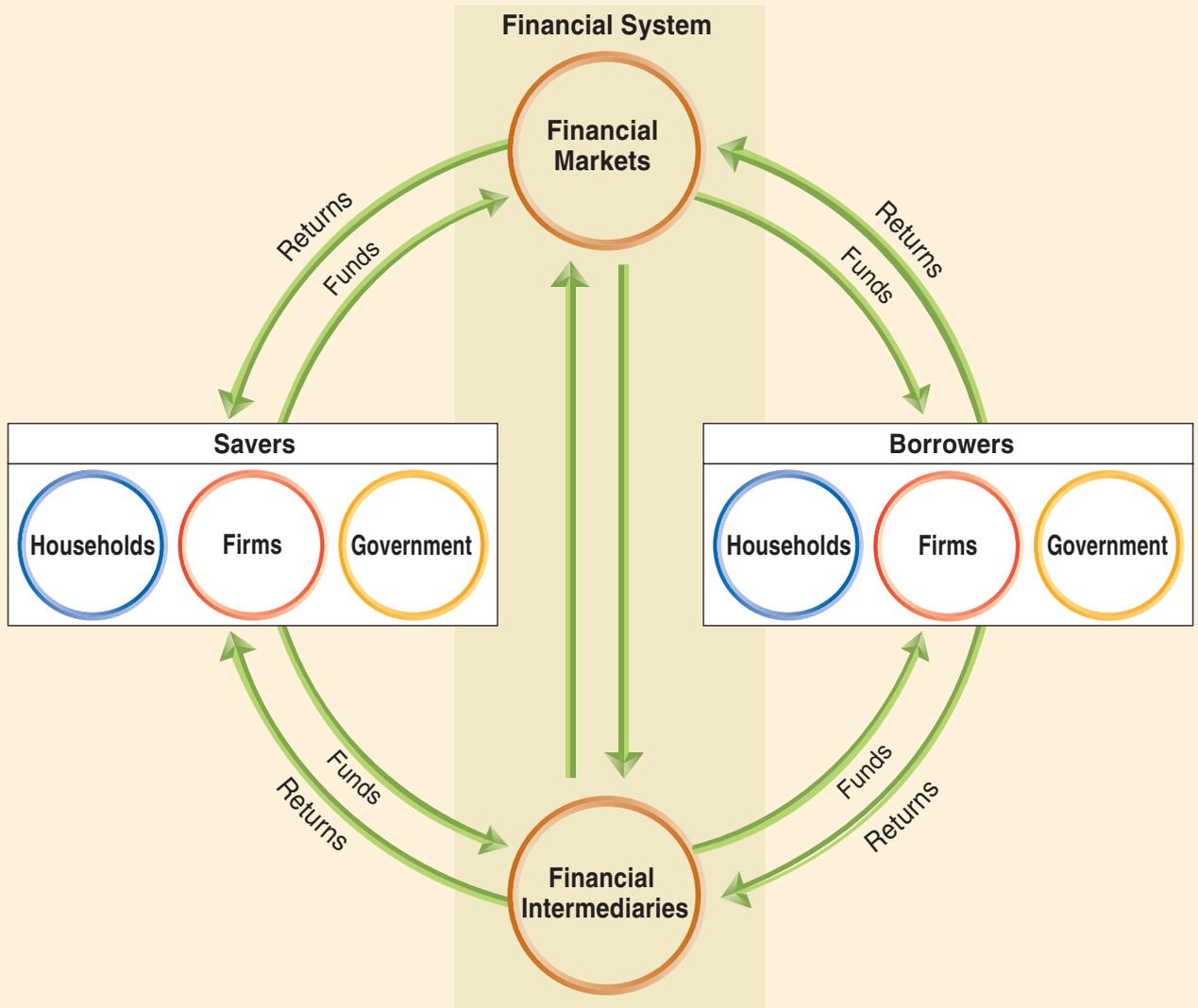
## Financial Institutions

The financial system matches savers and borrowers through two channels: (1) Banks and other *financial intermediaries* and (2) *financial markets*. These two channels are distinguished by how funds flow from savers, or lenders, to borrowers and by the financial institutions involved.<sup>1</sup> Funds flow from lenders to borrowers indirectly through **financial intermediaries**, such as banks, or directly through financial markets, such as the New York Stock Exchange.

If you get a loan from a bank to buy a car, economists refer to this flow of funds as *indirect finance*. The flow is indirect because the funds the bank lends to you come from people who have put money in checking or savings deposits in the bank; in that sense, the bank is not lending its own funds directly to you. On the other hand, if you buy stock that a firm has just issued, the flow of funds is *direct finance* because the funds are flowing directly from you to the firm.

Savers and borrowers can be households, firms, or governments, both domestic and foreign. Figure 1.1 shows that the financial system channels funds from savers to borrowers, and channels *returns* back to savers, both directly and indirectly. Savers receive

<sup>1</sup>Note that for convenience, we sometimes refer to households, firms, and governments that have funds they are willing to lend or invest as *lenders*, and we refer to households, firms, and governments that wish to use those funds as *borrowers*. These labels are not strictly accurate because the flow of funds does not always take the form of loans. For instance, investors who buy stock are buying part ownership in a firm, not lending money to the firm.



**Figure 1.1** Moving Funds Through the Financial System

The financial system transfers funds from savers to borrowers. Borrowers transfer returns back to savers through the financial system. Savers and borrowers include domestic and foreign households, businesses, and governments.

their returns in various forms, including dividend payments on stock, coupon payments on bonds, and interest payments on loans.

**Financial Intermediaries** **Commercial banks** are the most important financial intermediaries. Commercial banks play a key role in the financial system by taking in deposits from households and firms and investing most of those deposits, either by making loans to households and firms or by buying securities, such as government bonds or securitized loans. Most households rely on borrowing money from banks when they purchase

**Commercial bank** A financial firm that serves as a financial intermediary by taking in deposits and using them to make loans.

“big-ticket items,” such as cars or homes. Similarly, many firms rely on bank loans to meet their short-term needs for *credit*, such as funds to pay for inventories or to meet their payrolls. Many firms rely on bank loans to bridge the gap between the time they must pay for inventories or meet their payrolls and when they receive revenues from the sales of goods and services. Some firms also rely on bank loans to meet their long-term credit needs, such as funds they require to physically expand the firm.

In each chapter, the *Making the Connection* feature discusses a news story or another application related to the chapter material. Read the following *Making the Connection* for a discussion of how firms were affected by the decline in bank lending during the financial crisis that began in 2007.

### Making the Connection

#### Microlending Aids U.S. Small Businesses

Low-income countries generally have poorly developed financial markets. Typically, these countries have no stock and bond markets and only weak banking systems. As a result, the owners of small firms in these countries have had to rely for funds on their own savings, the savings of relatives and friends, or a few local lenders who often charge very high interest rates. In recent years, some small firms have gained access to funds through *microlending* or *microfinance*. Microlending involves making small loans, often just a few hundred dollars or less, to people attempting to start or expand small businesses. The loans are made by a variety of groups, including pooled savings from a village, international aid agencies, or large financial firms, such as Citigroup, often operating through small local banks.

According to many economists, microlending has aided economic growth in low-income countries. Few economists saw microlending playing a role in the U.S. financial system because U.S. firms typically have access to bank loans. But the financial crisis of 2007–2009 greatly reduced the ability of small businesses to borrow from banks.

Large businesses can raise funds in financial markets by selling stocks and bonds, but small businesses don’t have this option. Because it’s costly for investors to gather information on small businesses, these businesses cannot sell stocks and bonds and must rely instead on loans from banks. Firms use bank loans for a variety of purposes, including to bridge the gap between when the firms must pay employees and suppliers and when they receive revenue from selling their products.

Over the past 20 years, the relationship between banks and small businesses has changed. At one time, government regulations kept many banks small. As a result, banks made most of their loans in a limited geographic area. In those circumstances, bank loan officers usually had extensive personal knowledge of the finances of most local businesses and used that knowledge to determine whether to grant loans. By the 2000s, changes in banking law meant that many small businesses were receiving loans from banks that operated on a regional, or even national, basis. These larger banks typically applied fixed guidelines for granting loans that left little room for the personal judgment traditionally exercised by loan officers of small banks. Such guidelines were both good news and bad news for small businesses. On the one hand, businesses that met the

guidelines would receive loans even if aspects of their financial situation not covered by the guidelines made them riskier borrowers. On the other hand, businesses that failed to meet the guidelines might be turned down for loans even though they were very likely to be able to make their payments.

By the mid-2000s, though, many banks became convinced that it would be profitable to loosen their loan guidelines to make more borrowers eligible to receive credit. These banks believed that the larger number of borrowers who would *default* on their loans because of the looser guidelines would be more than offset by the payments received from the additional borrowers who would now qualify for loans. Unfortunately, during the financial crisis that began in mid-2007, the number of borrowers defaulting on loans turned out to be much higher than banks had predicted. Loan losses began rising in the spring of 2008, and by the end of 2009, they were four times greater than at the end of 2007.

In fact, the loan losses during 2007–2009 were by far the largest since the Great Depression of the 1930s. Partly as a result of these losses and partly because of pressure from government bank regulators, most banks tightened their loan guidelines, which made it much more difficult for households and businesses to qualify for loans. Between 2009 and 2010, business loans declined by about 40% before beginning to recover. Large U.S. banks have significantly reduced their small business lending, offering these businesses credit cards instead. Because the credit cards often have low credit limits, involve fees, and have high interest rates, many small businesses find credit cards much less desirable than loans.

Cut off from their normal source of funds, many small businesses had to resort to drastic measures, such as borrowing from pawnshops or borrowing from friends and family members, in order to survive. It was no surprise, then, when many economists argued during the crisis that the economy would not recover until banks increased their lending to small businesses.

In 2012, some small firms began to turn to lenders willing to make microloans similar to those seen in low-income countries. For example, Mohamed Diallo is a cab driver in New York City who needed a loan to buy a cab and go into business for himself. Unable to find a bank willing to lend him money, he was finally able to secure a \$2,000 microloan from the Business Center for New Americans, a nonprofit organization. The U.S. Small Business Administration, a federal government agency, has provided funds to a number of microlenders across the country, in an attempt to increase lending to small businesses.

As the U.S. financial system has evolved since the financial crisis, a surprising change has been the increased importance of microlending to small businesses.

Sources: Joseph Adinolfi, "Mini Loans Feed Bigger Ambitions," *Wall Street Journal*, September 8, 2012; Ian Mount, "When Banks Won't Lend, There Are Alternatives, Though Often Expensive," *New York Times*, August 1, 2012; and Gary Fields, "People Pulling Up to Pawnshops Today Are Driving Cadillacs and BMWs," *Wall Street Journal*, December 30, 2008.

See related problem 1.8 at the end of the chapter.

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**Nonbank Financial Intermediaries** Some financial intermediaries, such as *savings and loans*, *savings banks*, and *credit unions*, are legally distinct from banks, although these "nonbanks" operate in a very similar way by taking in deposits and making loans. Other

financial intermediaries include investment banks, insurance companies, pension funds, mutual funds, and hedge funds. Although these institutions don't at first glance appear to be very similar to banks, they fulfill a similar function in the financial system by channeling funds from savers to borrowers.

**Investment Banks** Investment banks, such as Goldman Sachs and Morgan Stanley, differ from commercial banks in that they do not take in deposits and rarely lend directly to households. Instead, they provide advice to firms issuing stocks and bonds or considering mergers with other firms. They also engage in *underwriting*, in which they guarantee a price to a firm issuing stocks or bonds and then make a profit by selling the stocks or bonds at a higher price. In the late 1990s, investment banks increased their importance as financial intermediaries by becoming heavily involved in the securitization of loans, particularly mortgage loans. Investment banks also began to engage in *proprietary trading*, which involves earning profits by buying and selling securities.

**Insurance Companies** Insurance companies specialize in writing contracts to protect their policyholders from the risk of financial losses associated with particular events, such as automobile accidents or fires. Insurance companies collect *premiums* from policyholders, which the companies then invest to obtain the funds necessary to pay claims to policyholders and to cover their other costs. So, for instance, when you buy an automobile insurance policy, the insurance company may lend the premiums you pay to a hotel chain that needs funds to expand.

**Pension Funds** For many people, saving for retirement is the most important form of saving. Pension funds invest contributions from workers and firms in stocks, bonds, and mortgages to earn the money necessary to pay pension benefit payments during workers' retirements. With about \$13 trillion in assets in 2011, private and state and local government pension funds are an important source of demand for financial securities.

**Mutual Funds** A mutual fund, such as Fidelity Investment's Magellan Fund, obtains money by selling shares to investors. The mutual fund then invests the money in a **portfolio** of financial assets, such as stocks and bonds, typically charging a small management fee for its services. By buying shares in a mutual fund, savers reduce the costs they would incur if they were to buy many individual stocks and bonds. Small savers who have only enough money to buy a few individual stocks and bonds can also lower their investment risk by buying shares in a mutual fund because most mutual funds hold a large number of stocks and bonds. If a firm issuing a stock or a bond declares bankruptcy, causing the stock or bond to lose all of its value, the effect on a mutual fund's portfolio is likely to be small. The effect might be devastating, though, on a small investor who had invested most of his or her savings in the stock or bond. Because mutual funds are willing to buy back their shares at any time, they also provide savers with easy access to their money.

**Hedge Funds** Hedge funds, such as Bridgewater run by Ray Dalio, are similar to mutual funds in that they accept money from investors and use the funds to buy a portfolio of assets. However, a hedge fund typically has no more than 99 investors, all of whom are wealthy individuals or institutions such as pension funds. Hedge funds typically make riskier investments than do mutual funds, and they charge investors much higher fees.

**Portfolio** A collection of assets, such as stocks and bonds.

**Financial Markets** Financial markets are places or channels for buying and selling stocks, bonds, and other securities. Traditionally, financial markets have been physical places, such as the New York Stock Exchange, which is located on Wall Street in New York City, or the London Stock Exchange, which is located in Paternoster Square in London. On these exchanges, dealers would meet face-to-face to trade stocks and bonds. Today, most securities trading takes place electronically between dealers linked by computers and is called “over-the-counter” trading. *NASDAQ*, which originally stood for the *National Association of Securities Dealers Automated Quotation System*, is an over-the-counter market on which the stocks of many high-tech firms such as Apple and Intel are traded. Stocks and bonds sold in a particular market are “listed” on that market. For instance, General Electric is listed on the New York Stock Exchange, and Apple is listed on NASDAQ.

Economists make a distinction between *primary markets* and *secondary markets*. A **primary market** is a financial market in which stocks, bonds, and other securities are sold for the first time. An *initial public offering (IPO)* refers to when a company for the first time sells its stock in the primary market. For example, Facebook’s IPO took place in May 2012. A **secondary market** is a financial market in which investors buy and sell already existing securities. For example, if you purchased Facebook stock in 2012 and sold it in 2013, that sale took place in the secondary market. Primary and secondary markets can be in the same physical—or virtual—place, as when an IPO takes place for a stock listed on the New York Stock Exchange or on NASDAQ.

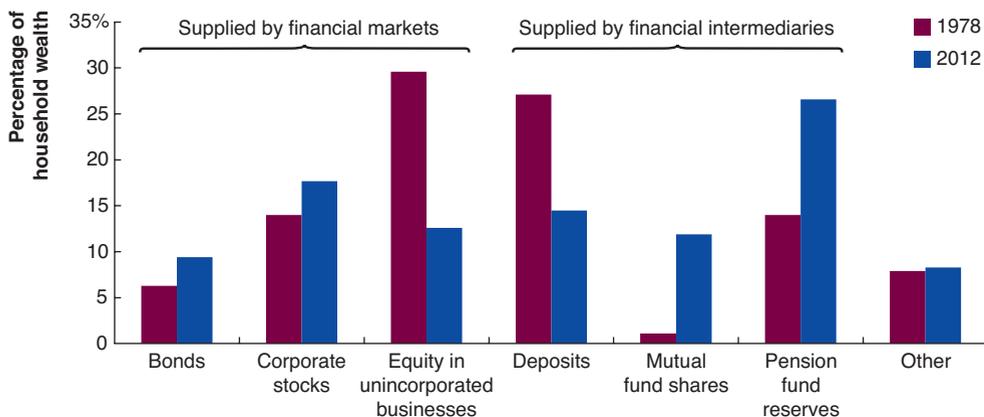
**Primary market A** financial market in which stocks, bonds, and other securities are sold for the first time.

**Secondary market A** financial market in which investors buy and sell existing securities.

## Making the Connection

### What Do People Do with Their Savings?

If you’re like most college students, your primary financial asset is your checking account. After you begin your career, though, you’ll accumulate a variety of different assets. The Federal Reserve System publishes data on household holdings of financial assets that shows how households divide up their total financial wealth. The figure below compares households’ holdings of financial assets in 1978 and 2012. Some assets, such as stocks and bonds, are supplied by financial markets. Other assets, such as bank deposits and mutual fund shares, are supplied by financial intermediaries.



The figure shows some significant changes over the decades in how households hold their financial wealth. The categories of wealth held in assets supplied by financial markets show that households increased their holdings of bonds—including Treasury bonds, corporate bonds, and bonds issued by state and local governments—and stocks from about 22.5% of their total wealth in 1978 to about 27.5% in 2012. But households now have much less equity in unincorporated businesses. Unincorporated businesses include partnerships and sole proprietorships, which are businesses owned by a single person. The equity in these businesses represents the difference between what the businesses could be sold for minus their debts. This equity is a less important part of household wealth partly because many relatively large firms that were organized as partnerships in 1978 had become corporations by 2012.

The categories of wealth held in assets supplied by financial intermediaries show that households now hold a much smaller percentage of their wealth in bank deposits, including checking accounts, savings accounts, and certificates of deposit. Households hold much larger percentages of their wealth in mutual fund shares and as pension fund reserves, which represent the value of household claims on pension plans at private companies, state and local government pension plans, and the value of individual retirement accounts (IRAs). The increase in the value of household pensions is a result of substantial increases in pensions that state and local governments have promised their workers and an increase in the funds workers have deposited in IRAs and 401(k) plans offered by companies. The income workers deposit in IRAs and 401(k) accounts is not taxed until they withdraw the funds after they retire.

Source: Board of Governors of the Federal Reserve, *Flow of Funds Accounts of the United States*, various issues.

See related problem 1.9 at the end of the chapter.

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## The Federal Reserve and Other Financial Regulators

During the financial crisis of 2007–2009, many people looked around at failing banks, the frozen markets for some financial assets, and plummeting stock prices and asked: “Who’s in charge here? Who runs the financial system?” In a sense, these are unusual questions to ask because the point of a market system is that no one individual or group is in charge. Consumers decide which goods and services they value the most, and firms compete to offer those goods and services at the lowest price. Few people think to ask: “Who’s in charge of the frozen pizza market?” or “Who’s in charge of the breakfast cereal market?” In most markets, the government plays a very limited role in deciding what gets produced, how it gets produced, what prices firms charge, or how firms operate. But policymakers in the United States and most other countries view the financial system as different from the markets for most goods and services. It is different because, when left largely alone, the financial system has experienced periods of instability that have led to economic recessions.

The federal government of the United States has several agencies that are devoted to regulating the financial system, including these:

- The Securities and Exchange Commission (SEC), which regulates financial markets
- The Federal Deposit Insurance Corporation (FDIC), which insures deposits in banks

- The Office of the Comptroller of the Currency, which regulates federally chartered banks
- The Federal Reserve System, which is the central bank of the United States

Although we will discuss all these federal agencies in this book, we will focus on the Federal Reserve System. Here we provide a brief overview of the Federal Reserve. We explore its operations in greater detail in later chapters.

**What Is the Federal Reserve?** The **Federal Reserve** (usually referred to as “the Fed”) is the central bank of the United States. Congress established the Fed in 1913 to deal with problems in the banking system. As we have seen, the main business of banking is to take in deposits and to make loans. Banks can run into difficulties, though, because depositors have the right to withdraw their money at any time, while many of the loans banks grant to people buying cars or houses will not be repaid for years. As a result, if large numbers of depositors simultaneously demand their money back, banks may not have the funds necessary to satisfy the demand. One solution to this problem is for a country’s central bank to act as a *lender of last resort* and make short-term loans that provide banks with funds to pay out to their depositors. Because Congress believed that the Fed had failed to carry out its duties as a lender of last resort during the Great Depression of the 1930s, it established the Federal Deposit Insurance Corporation (FDIC) in 1934. The FDIC insures deposits in banks up to a limit of \$250,000 per account.

**What Does the Federal Reserve Do?** The modern Fed has moved far beyond its original role as a lender of last resort. In particular, the Fed is now responsible for *monetary policy*. **Monetary policy** refers to the actions the Federal Reserve takes to manage the money supply and interest rates to pursue macroeconomic policy objectives. These policy objectives include high levels of employment, low rates of inflation, high rates of growth, and stability in the financial system. The Fed is run by the Board of Governors, which consists of seven members who are appointed by the president of the United States and confirmed by the U.S. Senate. One member of the Board of Governors is designated as chair. Currently, the chair is Ben Bernanke, who was first appointed by President George W. Bush in 2006 and then reappointed by President Barack Obama in 2010. The Federal Reserve System is divided into 12 districts, each of which has a District Bank, as shown in Figure 1.2. The Federal Open Market Committee (FOMC) is the main policymaking body of the Fed. The FOMC consists of the seven members of the Board of Governors, the president of the Federal Reserve Bank of New York, and four presidents from the other 11 Federal Reserve District Banks.

The FOMC meets in Washington, DC, eight times per year to discuss monetary policy. At these meetings, the FOMC decides on a target for a particularly important interest rate: the **federal funds rate**, which is the interest rate that banks charge each other on short-term loans.

The Fed was heavily involved in the financial crisis of 2007–2009. Before providing a brief discussion of the financial crisis, we conclude our overview of the financial system by discussing the key services that the financial system provides.

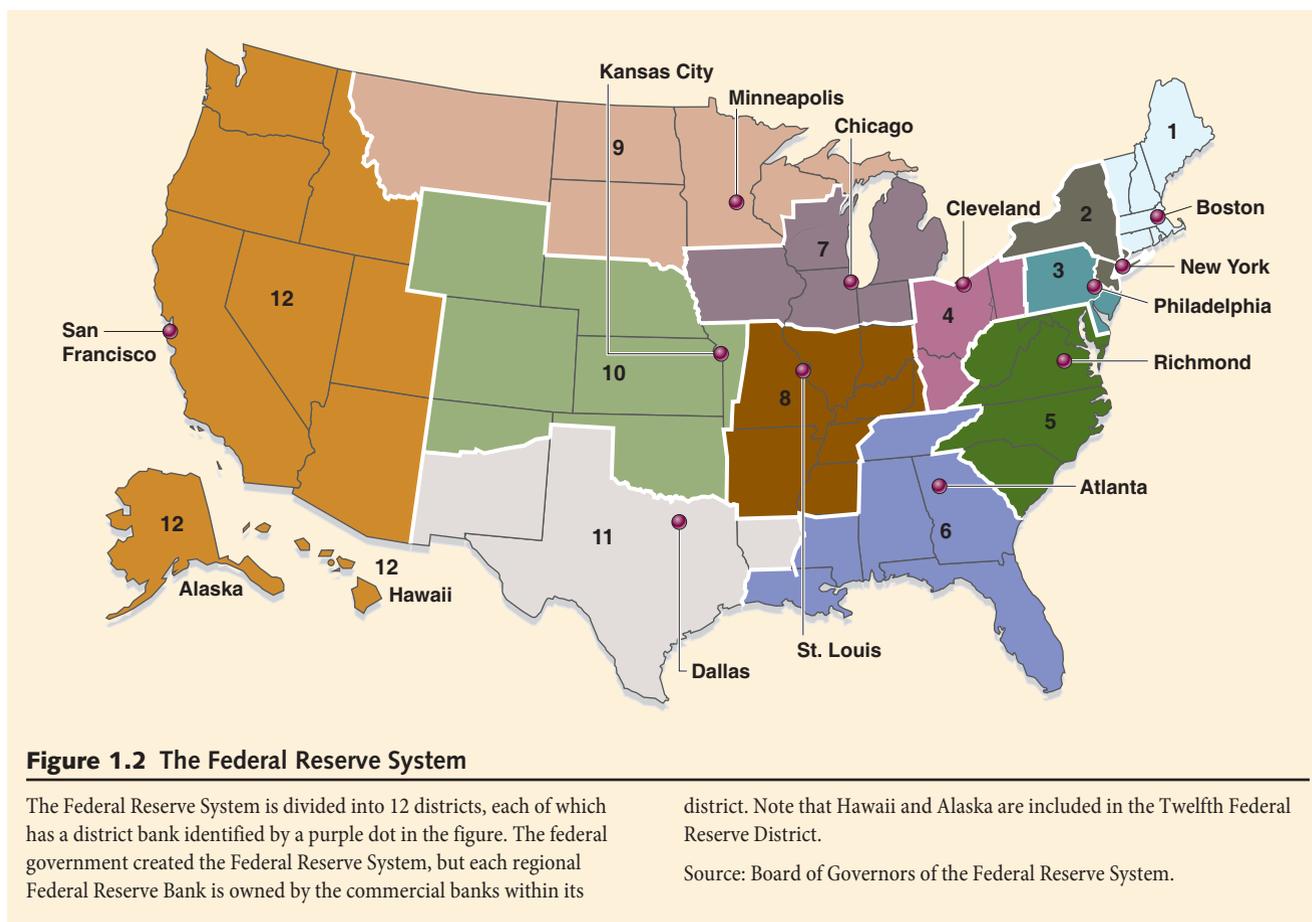
## What Does the Financial System Do?

In this book, we will do much more than just describe the financial system. We will also use the basic tools of economics to *analyze* how the system works. In your principles of economics class, you learned about these tools, including the model of demand

**Federal Reserve** The central bank of the United States; usually referred to as “the Fed.”

**Monetary policy** The actions the Federal Reserve takes to manage the money supply and interest rates to pursue macroeconomic policy objectives.

**Federal funds rate** The interest rate that banks charge each other on short-term loans.



and supply and marginal analysis. You also learned the basic economic idea that firms compete to supply the goods and services that consumers most want. Therefore, it is important in discussing the financial system to consider the key services provided by the banks, insurance companies, mutual funds, stock brokers, and the other *financial services firms* that make up the financial system.

Economists believe there are three key services that the financial system provides to savers and borrowers: *risk sharing*, *liquidity*, and *information*. Financial services firms provide these services in different ways, which makes different financial assets and financial liabilities more or less attractive to individual savers and borrowers.

**Risk Sharing** *Risk* is the chance that the value of financial assets will change relative to what you expect. One advantage of using the financial system to match individual savers and borrowers is that it allows the sharing of risk. For example, if you buy a share of Apple stock for \$200, that share may be worth \$100 or \$300 in one year's time, depending on how profitable Apple is. Most individual savers seek a steady return on their assets rather than erratic swings between high and low earnings. One way to improve the chances of a steady return is by holding a portfolio of assets. For example, you might hold some U.S.

savings bonds, some shares of stock, and some shares in a mutual fund. Although during any particular period one asset or set of assets may perform well and another not so well, overall the returns tend to average out. This splitting of wealth into many assets to reduce risk is known as **diversification**. The financial system provides **risk sharing** by allowing savers to hold many assets.

The ability of the financial system to provide risk sharing makes savers more willing to buy stocks, bonds, and other financial assets. This willingness, in turn, increases the ability of borrowers to raise funds in the financial system.

**Liquidity** The second service that the financial system offers savers and borrowers is **liquidity**, which is the ease with which an asset can be exchanged for money. Savers view the liquidity of financial assets as a benefit. When they need their assets for consumption or investment, they want to be able to sell them easily. More liquid assets can be quickly and easily exchanged for money, while less liquid—or *illiquid*—assets can be exchanged for money only after a delay or by incurring costs. For instance, if you want to buy groceries or clothes, you can easily use dollar bills or a debit card linked to your checking account. Selling your car, however, takes more time because personal property is illiquid. To sell your car, you may incur the costs of advertising or have to accept a relatively low price from a used car dealer. By holding financial claims on a factory—such as stocks or bonds issued by the firm that owns the factory—individual investors have more liquid savings than they would if they owned the machines in the factory. Investors could convert the stocks or bonds into money much more easily than they could convert a specialized machine into money.

In general, we can say that assets created by the financial system, such as stocks, bonds, or checking accounts, are more liquid than are physical assets, such as cars, machinery, or real estate. Similarly, if you lend \$100,000 directly to a small business, you probably can't resell the loan, so your investment would be illiquid. If, however, you deposit the \$100,000 in a bank, which then makes the loan to the business, your deposit is a much more liquid asset than the loan.

Financial markets and intermediaries help make financial assets more liquid. For instance, investors can easily sell their holdings of government securities and the stocks and bonds of large corporations, making those assets very liquid. As we noted earlier, during the past two decades, the financial system has increased the liquidity of many other assets besides stocks and bonds. The process of securitization has made it possible to buy and sell securities based on loans. As a result, mortgages and other loans have become more desirable assets for savers to hold. Savers are willing to accept lower interest rates on assets with greater liquidity, which reduces the costs of borrowing for many households and firms. One measure of the efficiency of the financial system is the extent to which it can transform illiquid assets into the liquid assets that savers want to buy.

**Information** A third service of the financial system is the collection and communication of **information**, or facts about borrowers and expectations of returns on financial assets. Your local bank is a warehouse of information. It collects information on borrowers to forecast their likelihood of repaying loans. Borrowers fill out detailed loan applications, and the bank's loan officers determine how well each borrower is doing financially. Because the bank specializes in collecting and processing information, its costs for

**Diversification** Splitting wealth among many different assets to reduce risk.

**Risk sharing** A service the financial system provides that allows savers to spread and transfer risk.

**Liquidity** The ease with which an asset can be exchanged for money.

**Information** Facts about borrowers and expectations of returns on financial assets.

information gathering are lower than yours would be if you tried to gather information about a pool of borrowers. The profits the bank earns on its loans are partly compensation for the bank's work in gathering information.

Financial markets convey information to both savers and borrowers by determining the prices of stocks, bonds, and other securities. When the price of your shares of Apple stock rises, you know that other investors must expect that Apple's profits will be higher. This information can help you decide whether to continue investing in Apple stock. Likewise, the managers of Apple can use the price of the firm's stock to determine how well investors think the firm is doing. For example, a major increase in Apple's stock price conveys investors' positive outlook for the firm. Apple may use this information in deciding whether to sell more stock or bonds to finance an expansion of the firm. The incorporation of available information into asset prices is an important feature of well-functioning financial markets.

In each chapter of this book, you will see the special feature *Solved Problem*. This feature will increase your understanding of the material by leading you through the steps of solving an applied problem in money, banking, and financial markets. After reading the problem, you can test your understanding by working the related problems that appear at the end of the chapter. You can also complete related Solved Problems on [www.myeconlab.com](http://www.myeconlab.com) and receive tutorial help.

### Solved Problem 1.1

## The Services Securitized Loans Provide

We noted earlier that securitized loans are an important new financial asset that has increased in importance during the past 20 years. Briefly discuss

the extent to which securitized loans embody the key services of risk sharing, liquidity, and information. In your answer, be sure to explain what securitized loans are.

### Solving the Problem

**Step 1 Review the chapter material.** This problem is about the services securitized loans provide, so you may want to review the sections “Financial Assets,” which begins on page 32, and “What Does the Financial System Do?” which begins on page 41.

**Step 2 Define securitized loans.** Ordinary (non-securitized) loans cannot be resold after they have been granted by a bank or another lender. Therefore, non-securitized loans are financial assets but not financial securities. Securitized loans are loans that have been bundled with other loans and resold to investors. Therefore, securitized loans are both financial assets and financial securities.

**Step 3 Explain whether securitized loans provide risk sharing, liquidity, and information.** Securitized loans provide all three of these key services. For example, before mortgage loans were securitized, the risk that the borrower would default, or stop making payments on the loan, was borne by the bank or other lender. When a mortgage is bundled together with similar mortgages in

mortgage-backed securities, the buyers of the securities jointly share the risk of a default. Because any individual mortgage represents only a small part of the value of the security in which it is included, the buyers of the securities will suffer only a small loss if a borrower defaults on that individual mortgage.

A loan that is not securitized is illiquid because it cannot be resold. A securitized loan can be resold and so has a secondary market, which makes it liquid. One reason individual investors are reluctant to make loans directly to firms or households is that they lack good information on the financial condition of the borrowers. When loans are securitized, investors can, in effect, make loans to households and firms by buying a securitized loan without needing to have direct information on the financial condition of the borrowers. In buying the securitized loan, investors are relying on the bank or other *loan originator* to have gathered the necessary information.

So, securitized loans provide all three key financial services: risk sharing, liquidity, and information.

See related problem 1.12 at the end of the chapter.

## The Financial Crisis of 2007–2009

We can use the overview of the financial system in this chapter to briefly discuss the financial crisis of 2007–2009. A **financial crisis** is a significant disruption in the flow of funds from lenders to borrowers. Because the financial crisis has had far-reaching and lasting effects on the financial system, we will discuss it in later chapters as well.

### Origins of the Financial Crisis

The origins of the financial crisis lie in large part in the housing bubble of 2000–2005. A **bubble** is an unsustainable increase in the price of a class of assets, such as stocks issued by high-tech companies, oil and other commodities, or houses. Figure 1.3 shows the growth of the housing bubble and its eventual implosion. Panel (a) shows new home sales in the United States, and panel (b) shows the Case-Shiller index, which measures changes in the prices of single-family homes. Panel (a) shows that new home sales rose by 60% between January 2000 and July 2005 and then fell by an astonishing 80% between July 2005 and July 2010. Panel (b) shows that home prices followed a similar pattern: They increased by nearly 90% between the beginning of 2000 and the beginning of 2006 and then declined more than 30% between the beginning of 2006 and the beginning of 2009.

Many economists believe that changes in the market for mortgages played a key role in the housing bubble. Mortgages were the first loans to be widely securitized. To promote home ownership, Congress created a secondary market in mortgages that made it easier for families to borrow money to buy houses. To reach this goal, Congress used two *government-sponsored enterprises (GSEs)*: the Federal National Mortgage Association (“Fannie Mae”) and the Federal Home Loan Mortgage Corporation (“Freddie Mac”). Fannie Mae and Freddie Mac sell bonds to investors and use the funds to purchase mortgages from banks. By the 1990s, a large secondary market existed in mortgages, with funds flowing from investors through Fannie Mae and Freddie Mac to banks and, ultimately, to people borrowing money to buy houses.

### 1.2

#### Learning Objective

Provide an overview of the financial crisis of 2007–2009.

**Financial crisis** A significant disruption in the flow of funds from lenders to borrowers.

**Bubble** An unsustainable increase in the price of a class of assets.

MyEconLab Real-time data

**Figure 1.3** The Housing Bubble

Panel (a) shows that the housing bubble resulted in rapid increases in sales of new houses between 2000 and 2005, followed by sharp decreases in sales from early 2006 through early 2009 and then a slow revival.

Panel (b) shows that home prices followed a similar pattern to home sales.

Sources: U.S. Bureau of the Census; and S&P/Case-Shiller, [standardandpoors.com](http://standardandpoors.com).

By the 2000s, important changes had taken place in the mortgage market. First, investment banks became significant participants in the secondary market for mortgages. Investment banks began buying mortgages, bundling large numbers of them together as mortgage-backed securities, and reselling them to investors. Mortgage-backed securities proved very popular with investors because they often paid higher interest rates than other securities with comparable default risk. Second, by the height of the housing bubble in 2005 and early 2006, lenders had greatly loosened the standards for obtaining a mortgage loan. Traditionally, only borrowers who had good credit histories and who were willing to make a down payment equal to at least 20% of the value of the house they were buying would be able to receive a mortgage. By 2005, however, many mortgages were being issued to *subprime borrowers* with flawed credit histories. In addition, *Alt-A borrowers*, who stated—but did not document—their incomes, and borrowers who made very small down payments found it easier to take out loans. Lenders also created new types of *adjustable-rate mortgages* that allowed borrowers to pay a very low interest rate for the first few years of the mortgage and then pay a higher rate in later years. The chance that the borrowers using these nontraditional mortgages would default was higher than for borrowers using traditional mortgages. Why would borrowers take out mortgages on which they might have trouble making the payments, and why would lenders grant such mortgages? Both borrowers and lenders anticipated that housing prices would continue to rise, which would reduce the chance of borrowers defaulting on their mortgages and also make it easier for borrowers to convert to more traditional mortgages in the future.

Unfortunately, the decline in housing prices that began in 2006 led to rising defaults among subprime and Alt-A borrowers, borrowers with adjustable-rate mortgages, and

borrowers who had made only small down payments. When borrowers began defaulting on mortgages, the value of many mortgage-backed securities declined sharply, and investors feared that they would lose money by purchasing them. Many commercial and investment banks owned mortgage-backed securities, and the decline in the value of the securities caused those banks to suffer heavy losses. By mid-2007, the decline in the value of mortgage-backed securities and the large losses suffered by commercial and investment banks began to cause turmoil in the financial system. Many investors refused to buy mortgage-backed securities, and some investors would buy only bonds issued by the U.S. Treasury. Banks began to restrict credit to all but the safest borrowers. The flow of funds from savers to borrowers, on which the economy depends, began to be greatly reduced.

Beginning in the spring of 2008, the Federal Reserve and the U.S. Department of the Treasury took unusual policy actions to deal with the results of the financial crisis and the recession that began in December 2007. Although the Fed had traditionally made loans only to commercial banks, in March 2008 it began making loans to some investment banks. Also in March, the Fed and the Treasury helped JPMorgan Chase acquire the investment bank Bear Stearns, which was in danger of failing. The Fed and Treasury were convinced that a failure by Bear Stearns had the potential of causing a financial panic, as many investors and financial firms would have stopped making short-term loans to other investment banks.

### The Deepening Crisis and the Response of the Fed and Treasury

Some economists and policymakers criticized the decision by the Fed and the Treasury to help arrange the sale of Bear Stearns to JPMorgan Chase. The main concern was with the *moral hazard problem*, which is the possibility that managers of financial firms such as Bear Stearns might make riskier investments if they believe that the federal government will save them from bankruptcy. The Treasury and Fed acted in March 2008 to save Bear Stearns because they believed that the failure of a large financial firm could have wider economic repercussions. In September 2008, when the investment bank Lehman Brothers was near bankruptcy, the Fed and the Treasury were again concerned that the failure of the firm would endanger the flow of funds through the financial system.

The Fed and the Treasury allowed Lehman Brothers to go bankrupt, which it did on September 15, 2008. The adverse reaction in financial markets was stronger than the Fed and Treasury had expected, which led them to decide two days later to have the Fed provide an \$85 billion loan to American International Group (AIG)—the largest insurance company in the United States—in exchange for an 80% ownership stake, effectively giving the federal government control of the company. However, the fallout from the Lehman Brothers bankruptcy had widespread repercussions, including a sharp decline in most types of lending. Finally, in October 2008, Congress passed the *Troubled Asset Relief Program (TARP)*, under which the Treasury provided funds to commercial banks in exchange for stock in those banks. Taking partial ownership of private commercial banks was an unprecedented action for the federal government. Many policies of the Fed and Treasury during the recession of 2007–2009 were controversial because they involved partial government ownership of financial firms, implicit guarantees to large financial firms that they would not be allowed to go bankrupt, and unprecedented

intervention in financial markets. These actions by the Fed and the Treasury were meant to restore the flow of funds from savers to borrowers. Without an increase in the flow of funds to more normal levels, households would lack the credit they needed to buy houses, cars, and other consumer durables, and firms would lack the credit they needed to finance new investment in plant and equipment, or, in many cases, even to finance their inventories and meet their payrolls.

Most economists and policymakers believed the severity of the crisis justified the Fed's use of innovative policies, but many feared that the Fed's actions might reduce its independence. Traditionally, Fed chairmen have closely guarded the Fed's independence from the rest of the executive branch—including the Treasury Department—and from Congress. But during the financial crisis, the Fed worked closely with the Treasury in arranging to inject funds into the commercial banking system by taking partial ownership of some banks and in several other policy actions. Close collaboration between the Fed and the Treasury, were it to continue, raises the question of whether the Fed would be able to pursue policies independent from those of the administration in power.

### 1.3

#### Learning Objective

Explain the key issues and questions the financial crisis raises.

## Key Issues and Questions About Money, Banking, and the Financial System

In this text, we will cover many different topics. Beginning in Chapter 2, we highlight one key issue and related question at the start of each chapter, and we end each chapter by using the analysis from the chapter to answer the question. Here are the issues and questions that provide a framework for the chapters that follow:

### Chapter 2: Money and the Payments System

**Issue:** The Federal Reserve's actions during the financial crisis led to concerns about whether it could maintain its independence.

**Question:** Should a central bank be independent of the rest of the government?

### Chapter 3: Interest Rates and Rates of Return

**Issue:** Some investment analysts argue that very low interest rates on some long-term bonds make them risky investments.

**Question:** Why do interest rates and the prices of financial securities move in opposite directions?

### Chapter 4: Determining Interest Rates

**Issue:** Federal Reserve policies to combat the recession of 2007–2009 led some economists to predict that inflation would rise and make long-term bonds a poor investment.

**Question:** How do investors take into account expected inflation and other factors when making investment decisions?

### Chapter 5: The Risk Structure and Term Structure of Interest Rates

**Issue:** During the financial crisis, the bond rating agencies were criticized for having given high ratings to securities that proved to be very risky.

**Question:** Should the government more closely regulate credit rating agencies?

**Chapter 6: The Stock Market, Information, and Financial Market Efficiency**

*Issue:* During the financial crisis, many small investors sold their stock investments, fearing that they had become too risky.

*Question:* Is the 2007–2009 financial crisis likely to have a long-lasting effect on the willingness of individuals to invest in the stock market?

**Chapter 7: Derivatives and Derivative Markets**

*Issue:* During the 2007–2009 financial crisis, some investors, economists, and policy-makers argued that financial derivatives had contributed to the severity of the crisis.

*Question:* Are financial derivatives “weapons of financial mass destruction”?

**Chapter 8: The Market for Foreign Exchange**

*Issue:* Volatility in exchange rates during recent years has led some Japanese firms to relocate production to the United States and other countries.

*Question:* Why has the value of the dollar declined against other major currencies during the past 10 years?

**Chapter 9: Transactions Costs, Asymmetric Information, and the Structure of the Financial System**

*Issue:* Following the financial crisis, many firms complained that they were having difficulty borrowing funds to expand their operations.

*Question:* Why do firms rely more on loans and bonds than on stocks as a source of external finance?

**Chapter 10: The Economics of Banking**

*Issue:* During and immediately following the 2007–2009 financial crisis, there was a sharp increase in the number of bank failures.

*Question:* Is banking a particularly risky business? If so, what types of risks do banks face?

**Chapter 11: Investment Banks, Mutual Funds, Hedge Funds, and the Shadow Banking System**

*Issue:* During the 1990s and 2000s, the flow of funds from lenders to borrowers outside the banking system increased.

*Question:* Does the shadow banking system pose a threat to the stability of the U.S. financial system?

**Chapter 12: Financial Crises and Financial Regulation**

*Issue:* The financial crisis of 2007–2009 was the most severe since the Great Depression of the 1930s.

*Question:* Was the severity of the 2007–2009 recession due to the financial crisis?

**Chapter 13: The Federal Reserve and Central Banking**

*Issue:* Following the financial crisis, Congress debated whether to reduce the independence of the Federal Reserve.

*Question:* Should Congress and the president have greater authority over the Federal Reserve?

**Chapter 14: The Federal Reserve’s Balance Sheet and the Money Supply Process**

*Issue:* Years after the end of the financial crisis, banks continued to hold record levels of reserves.

*Question:* Why did bank reserves increase rapidly during and after the financial crisis, and should policymakers be concerned about the increase?

**Chapter 15: Monetary Policy**

*Issue:* During the financial crisis, the Federal Reserve employed a series of new policy tools in an attempt to stabilize the financial system.

*Question:* Should price stability still be the most important policy goal of central banks?

**Chapter 16: The International Financial System and Monetary Policy**

*Issue:* The financial crisis led to controversy over the European Central Bank’s monetary policy.

*Question:* Should European countries abandon using a common currency?

**Chapter 17: Monetary Theory I: The Aggregate Demand and Aggregate Supply Model**

*Issue:* During the recovery from the financial crisis, the unemployment rate remained stubbornly high.

*Question:* What explains the high unemployment rates during the economic expansion that began in 2009?

**Chapter 18: Monetary Theory II: The IS–MP Model**

*Issue:* By December 2008, the Federal Reserve had driven the target for the federal funds rate to near zero.

*Question:* In what circumstances is lowering the target for the federal funds rate unlikely to be effective in fighting a recession?

## Key Terms and Problems

**Key Terms**

- |                           |                               |                         |
|---------------------------|-------------------------------|-------------------------|
| Asset, p. 32              | Financial crisis, p. 45       | Money, p. 33            |
| Bond, p. 33               | Financial intermediary, p. 34 | Money supply, p. 33     |
| Bubble, p. 45             | Financial liability, p. 34    | Portfolio, p. 38        |
| Commercial bank, p. 35    | Financial market, p. 32       | Primary market, p. 39   |
| Diversification, p. 43    | Foreign exchange, p. 33       | Risk sharing, p. 43     |
| Dividend, p. 33           | Information, p. 43            | Secondary market, p. 39 |
| Federal funds rate, p. 41 | Interest rate, p. 33          | Securitization, p. 34   |
| Federal Reserve, p. 41    | Liquidity, p. 43              | Security, p. 32         |
| Financial asset, p. 32    | Monetary policy, p. 41        | Stock, p. 33            |

## 1.1

**Key Components of the Financial System**

Identify the key components of the financial system.

**Review Questions**

- 1.1 Briefly define each of the five key financial assets. Is every financial asset also a financial security? Is it possible that what a saver would consider a financial asset a borrower would consider a financial liability?
- 1.2 What are non-banking financial intermediaries? List the different types and briefly explain their role in connecting savers with borrowers in the financial system.
- 1.3 Name and briefly explain the three key components of a modern financial system.
- 1.4 What is the Federal Reserve? Who appoints the members of the Federal Reserve's Board of Governors? How do the Fed's current responsibilities compare with its responsibilities when Congress created it?
- 1.5 Briefly explain the process of asset securitization in the financial system.

**Problems and Applications**

- 1.6 A student remarks:

When I pay my car insurance premiums, I never get that money back. My insurance premiums represent payments for a service I receive from the insurance company. When I deposit money in the bank, I can always withdraw the money later if I want to. So, my bank deposit represents a financial investment for me. Therefore, a bank is a financial intermediary, but an insurance company is not.

Briefly explain whether you agree with the student's argument.

- 1.7 [Related to the **Chapter Opener** on page 31] In a talk at the White House in December 2009, President Barack Obama argued, "Ultimately in this country we rise and fall together: banks and small businesses, consumers and large corporations." Why in this statement did the president

single out banks? Aren't supermarkets, airlines, software companies, and many other businesses also important to the economy?

Source: Helene Cooper and Javier C. Hernandez, "Obama Tells Bankers That Lending Can Spur Economy," *New York Times*, December 14, 2009.

- 1.8 [Related to the **Making the Connection** on page 36] An article in the *New York Times* in mid-2012 noted, "with the economy still struggling and new regulations meant to eliminate bad lending, bank loans continue to lag."
  - a. What does the article mean by "bad lending"?
  - b. Which types of firms might find it harder to receive loans if banks reduce "bad lending"? Briefly explain.
  - c. What alternatives do the firms you identified in part (b) have for obtaining credit if they are unable to get bank loans?

Source: Ian Mount, "When Banks Won't Lend, There Are Alternatives, Though Often Expensive," *New York Times*, August 1, 2012.

- 1.9 [Related to the **Making the Connection** on page 39] Households have a much larger fraction of their savings in stocks than in bonds. Can you think of reasons why this is the case?
- 1.10 Typically, you will receive a very low interest rate on money you deposit in a bank. Interest rates on car loans and business loans are much higher. Why, then, do most people prefer putting their money in a bank to lending it directly to individuals or businesses?
- 1.11 Suppose financial intermediaries did not exist and only direct finance were possible. How would this affect the process of an individual buying a car or a house?
- 1.12 [Related to **Solved Problem 1.1** on page 44] During the 2007–2009 recession, many people who had taken out mortgages to buy homes had trouble making the payments on their mortgages. Because housing prices were falling, the amount

that people owed on their mortgages was greater than the price of their homes. Significant numbers of people defaulted on their mortgages. The following appeared in an article discussing this issue in the *Economist* magazine:

Since foreclosures are costly for lenders as well as painful for borrowers, both sides could be better off by renegotiating a mortgage. The sticking-point, according to conventional wisdom, is securitization. When mortgages are sliced into numerous pieces it is far

harder to get lenders to agree on changing their terms.

Why might both lenders and borrowers be better off as a result of renegotiating a mortgage? How does securitization result in mortgages being “sliced into numerous pieces”? Why would securitization make renegotiating a loan more difficult? How would these difficulties affect the services that securitization provides to savers and borrowers?

Source: “Mortgage Mistakes,” *Economist*, July 9, 2009.

## 1.2

## The Financial Crisis of 2007–2009

Provide an overview of the financial crisis of 2007–2009.

### Review Questions

- 2.1 What do economists mean by a “bubble”? Why do many economists believe that there was a housing bubble in the United States between 2000 and 2005?
- 2.2 By the 2000s, what significant changes had taken place in the mortgage market? What is a “subprime” borrower? What is an “Alt-A” borrower?
- 2.3 What problems did the decline in housing prices that began in 2006 cause for the financial system?
- 2.4 What actions did the Federal Reserve and Treasury take in dealing with the financial crisis? What is the moral hazard problem? How is it related to the Federal Reserve’s and Treasury’s actions?

### Problems and Applications

- 2.5 Why is a bubble more likely to occur in the housing market than in the market for automobiles or the market for refrigerators?
- 2.6 Panel (b) of Figure 1.3 on page 46 shows the Case-Shiller price index of houses. Economists Karl Case of Wellesley College and Robert Shiller of Yale University developed this index. Many economists consider changes in the average price of houses in the United States to be difficult to measure. What challenges might exist in accurately measuring housing prices?
- 2.7 How does the creation of a secondary market in mortgages help to promote home ownership? Why might the federal government decide to intervene in the housing market to promote home ownership?

### Data Exercises

**D1.1:** Go to the Web site of the Bureau of Economic Analysis ([www.bea.gov](http://www.bea.gov)) and use the data there to calculate the percentage change in GDP for each year from 2000 through 2009. Graph your data.



Do the movements in GDP correspond well to the movements in the Case-Shiller price index of houses shown in panel (b) of Figure 1.3 on page 46? Briefly explain.

# Money and the Payments System

## Learning Objectives

After studying this chapter, you should be able to:

- 2.1** Analyze the inefficiencies of a barter system (pages 54–56)
- 2.2** Discuss the four key functions of money (pages 56–59)
- 2.3** Explain the role of the payments system in the economy (pages 59–62)
- 2.4** Explain how the U.S. money supply is measured (pages 62–65)
- 2.5** Use the quantity theory of money to analyze the relationship between money and prices in the long run (pages 66–73)

## Who Hates the Federal Reserve?

The annual inflation rate in the United States has averaged 2.5% since 1994. What if it jumped to 10%? How would you be affected? If you have student loans, car loans, or other debt with a fixed interest rate, you would benefit from paying your debts back with dollars that were rapidly losing their value. A larger issue, though, is that such high inflation rates cause problems that can affect an entire economy. For example, the United States experienced high inflation rates during the late 1970s and early 1980s. The Federal Reserve responded vigorously to the high inflation rates. Partly due to the Fed's actions, the unemployment rate soared to 10.8% in November 1982, its highest level since the

Great Depression of the 1930s. So, if high inflation rates were to return, you might have difficulty finding a job or you could lose the job you have.

The Federal Reserve is widely blamed for having allowed inflation to increase during the 1970s. Since that time, avoiding another period of such high inflation has been a top priority of Federal Reserve officials and members of Congress. But in the view of some economists and policymakers, the actions the Fed took during the financial crisis of 2007–2009 had the potential to increase inflation significantly. In addition, some of the Fed's actions were far removed from its normal policies. Some economists and

*Continued on next page*

## Key Issue and Question

**Issue:** The Federal Reserve's actions during the financial crisis led to concerns about whether it could maintain its independence.

**Question:** Should a central bank be independent of the rest of the government?

*Answered on page 73*

policymakers argued that in using these policies, the Fed was acting contrary to the basic idea embodied in the Federal Reserve Act of 1913: The Fed was granted substantial independence from Congress and the president, but in exchange would only engage in monetary policy, narrowly defined.

Following the financial crisis, several members of Congress introduced bills that would have sharply increased Congressional oversight of the Federal Reserve. During debate over the bills, Federal Reserve Chairman Ben Bernanke protested that if they became law, the bills would greatly reduce the independence of the Fed from the rest of the federal government. Bernanke argued that making the Fed less independent would actually increase the risk of high inflation. In the end, Bernanke's arguments were successful, and Congress did not pass any of the bills.

The struggle over central bank independence and its potential effect on inflation is not just a political issue in the United States. In the African country of Zimbabwe, the inflation rate during 2008 was an almost

unimaginable 15 *billion* percent. The country's central bank began printing Zimbabwean dollar currency in denominations of \$50 billion, then \$100 billion, and then \$100 trillion. The extraordinary inflation rates in Zimbabwe contributed to disastrous declines in production and employment. Finally, in 2009, in an attempt to rein in inflation, the Zimbabwean government decided to abandon its own currency entirely in favor of the U.S. dollar.

Is there a connection between the attempts of the U.S. Congress to reduce the independence of the Fed and the decision by the government of Zimbabwe to abandon using its own currency in a desperate attempt to rein in ruinous inflation? While it is highly unlikely that the United States will ever suffer from inflation rates like those Zimbabwe experienced, as we will see, most economists believe that there is a connection between how independent a country's central bank is and how much inflation the country experiences. This connection is one reason why government control of the money supply can be a heated political issue in many countries.

Sources: John Cochrane, "The Federal Reserve: From Central Bank to Central Planner," *Wall Street Journal*, August 31, 2012; and Luca Di Leo, "Bernanke Continues Fight Against More Fed Scrutiny," *Wall Street Journal*, May 26, 2010.

Because very high rates of inflation in a country almost always lead to declines in production and employment, the links between money, inflation, and the policies of a country's central bank are very important. In this chapter, we begin to explore these links, starting with a brief discussion of what money is and how it is measured. At the end of the chapter, we discuss the quantity theory of money, which shows the links between changes in the money supply and the inflation rate in the long run.

## 2.1

### Learning Objective

Analyze the inefficiencies of a barter system.

**Money** Anything that is generally accepted as payment for goods and services or in the settlement of debts.

## Do We Need Money?

Economists define **money** very broadly as *anything* that is generally accepted as payment for goods and services or in the settlement of debts. Do we need money? It may seem obvious that an economy needs money to operate, but think back to your introductory economics course. In the discussions of supply and demand, production, competition, and other microeconomic topics, money may not have been mentioned. Of course, there was an unstated understanding that money is involved in all the buying and selling. But the fact that you can tell the basic story of how a market system operates without mentioning money suggests that the services that money provides to households and firms are not always obvious.

## Barter

Economies *can* function without money. In the early stages of an economy's development, individuals often exchange goods and services by trading output directly with each other. This type of exchange is called **barter**. For example, on the frontier in colonial America, a farmer whose cow died might trade several pigs to a neighboring farmer in exchange for one of the neighbor's cows. In principle, people in a barter economy could satisfy all their needs by trading for goods and services, in which case they would not need money. In practice, though, barter economies are inefficient.

There are four main sources of inefficiency in a barter economy. First, a buyer or seller must spend time and effort searching for trading partners. The first neighbor the farmer approaches may not want to trade a cow for pigs. In a barter system, each party to a trade must want what the other party has available to trade. That is, there must be a *double coincidence of wants*. Because of the time and effort spent searching for trading partners in a barter economy, the **transactions costs**, or the costs in time or other resources of making a trade or exchange, will be high. A second source of inefficiency is that under barter, each good has many prices. The farmer might be able to exchange three pigs for a cow, 10 bushels of wheat for a plow, or a table for a wagon. So, what is the price of a cow, a plow, or a wagon? The answer is that each good will have many prices—one for every other good it might be exchanged for. A cow will have a price in terms of pigs, a price in terms of wheat, a price in terms of wagons, and so forth. A barter economy with only 100 goods would have 4,950 prices; one with 10,000 goods would have 49,995,000 prices!<sup>1</sup> A third source of inefficiency arises from a lack of standardization: All pigs and cows are not the same, so the price of cows in terms of pigs would have to specify the size and other characteristics of the animals. Finally, imagine the difficulty of accumulating wealth. The only way to do so in a barter system would be by accumulating stores of goods.

## The Invention of Money

The inefficiencies of barter forced most people to be self-sufficient. On the frontier in colonial America, most people grew their own food, built their own homes, and made their own clothes and tools. Such economies have trouble growing because, in doing everything, an individual does some tasks well and does others poorly. To improve on barter, people had an incentive to identify a specific product that most people would generally accept in an exchange. In other words, they had a strong incentive to invent money. For example, in colonial times, animal skins were very useful in making clothing. The first governor of Tennessee received a salary of 1,000 deerskins per year, and the state's secretary of the treasury received 450 otter skins per year. A good used as money that also has value independent of its use as money is called **commodity money**. Historically, once a good became widely accepted as money, people who did not have an immediate use for it were still willing to accept it. A colonial farmer—or the governor of Tennessee—might not want a deerskin, but as long as he knew he could use it to buy other goods and services, he would be willing to accept it in exchange for what he had to sell.

**Barter** A system of exchange in which individuals trade goods and services directly for other goods and services.

**Transactions costs** The costs in time or other resources that parties incur in the process of agreeing and carrying out an exchange of goods and services.

**Commodity money** A good used as money that has value independent of its use as money.

<sup>1</sup>These calculations are based on the formula for determining how many prices we need with  $N$  goods—that is, the number of prices when there are  $N$  items: Number of prices =  $N(N - 1)/2$ .

## Making the Connection

### What's Money? Ask a Taxi Driver!

Some years ago, one of the authors of this book learned a great lesson about money from Russian taxi drivers. In August 1989, as part of a group of American economists, he traveled to Moscow and Leningrad (now St. Petersburg) in what was then the Soviet Union to discuss with Soviet economists some economic problems both countries faced.

Taking taxis in Moscow to and from meetings and dinners was an ordeal. The author's hosts had given the U.S. economists rubles (Soviet currency at the time), but Russian merchants and taxi drivers discouraged payments in rubles. Taxi drivers quoted a bewildering array of fares in terms of U.S. dollars, German marks, or Japanese yen. And the fares varied from cab to cab.

When the author relayed this frustration to his wife, she explained that she had no difficulties with taxis. She paid the fare with Marlboro cigarettes instead of currency! The author used Marlboros the next day (no other brand worked as well) and was able to pay taxi drivers with great success. He found that the taxi drivers could easily convert all major currencies to Marlboro equivalents.

At least during that period, Marlboro cigarettes had displaced the official currency (rubles) as the money most widely used by Moscow taxi drivers.

See related problems 1.6 and 1.7 at the end of the chapter.

**Specialization** A system in which individuals produce the goods or services for which they have relatively the best ability.

Once a society invents money—as has happened many times and in many places around the world—transactions costs are greatly reduced, as are the other inefficiencies of barter. People can take advantage of **specialization**, producing the good or service for which they have relatively the best ability. Most people in modern economies are highly specialized. They do only one thing—work as an accountant, a teacher, or an engineer—and use the money they earn to buy everything else they need. By specializing, people are far more productive than they would be if they tried to produce all the goods and services they consume themselves. The high income levels in modern economies are based on the specialization that money makes possible.

So, the answer to the question “Do we need money?” is: “Yes, because money allows for specialization, higher productivity, and higher incomes.”

## 2.2

### Learning Objective

Discuss the four key functions of money.

## The Key Functions of Money

Money serves four key functions in the economy:

1. It acts as a medium of exchange.
2. It is a unit of account.
3. It is a store of value.
4. It offers a standard of deferred payment.

### Medium of Exchange

If you are a teacher or an accountant, you are paid money for your services. You then use that money to buy goods and services. You essentially exchange your teaching or

accounting services for food, clothing, rent, and other goods and services. But unlike with barter, where goods and services are exchanged directly for other goods and services, the exchanges you participate in involve money. Money is providing the service of a **medium of exchange**. That is, money is the *medium* through which exchange takes place. Because, by definition, money is generally accepted as payment for goods and services or as payment for debts, you know that the money your employer pays you will be accepted at the stores where you purchase food, clothing, and other goods and services. In other words, you can specialize in producing teaching or accounting services without having to worry about directly producing the other goods and services you require to meet your needs, as you would in a barter economy.

### Unit of Account

Using a good as a medium of exchange provides another benefit: Instead of having to quote the price of a single good in terms of many other goods—as is the case with barter—each good has a single price quoted in terms of the medium of exchange. This function of money gives households and firms a **unit of account**, or a way of measuring value in the economy in terms of money. For instance, in the U.S. economy, each good or service has a price in terms of dollars.

### Store of Value

Money allows value to be stored easily, thereby providing the service of a **store of value**. If you do not use all your accumulated dollars to buy goods and services today, you can hold the rest for future use. Note, though, that if prices in an economy rise rapidly over time, the amount of goods and services a given amount of money can purchase declines, and money's usefulness as a store of value is reduced.

Of course, money is only one of many *assets* that can be used to store value. In fact, any asset—shares of Apple stock, Treasury bonds, real estate, or Renoir paintings, for example—represents a store of value. Indeed, financial assets, such as stocks and bonds, offer an important benefit relative to holding money because they generally pay interest or offer the possibility of increasing in value. Other assets also have advantages relative to money because they provide services. For instance, a house provides its owner with a place to sleep. Why, then, does anyone bother to hold money? The answer is *liquidity*, or the ease with which an asset can be exchanged for money. Money itself is, of course, perfectly liquid, while you incur transactions costs when you exchange other assets for money. When you sell bonds or shares of stock, for example, you pay a fee, or commission, either online or to your broker. If you have to sell your house on short notice because you take a job in a different state, you will have to pay a commission to a real estate agent and probably have to accept a lower price to sell the house quickly. To avoid such transactions costs, people are willing to hold money as well as other assets, even though other assets offer a greater return as a store of value.

### Standard of Deferred Payment

Money is also useful because of its ability to serve as a **standard of deferred payment**. Money can facilitate exchange at a *given point in time* by providing a medium of exchange and unit of account. Money can also facilitate exchange *over time* by providing a store of value and standard of deferred payment. For example, a furniture store may

#### Medium of exchange

Something that is generally accepted as payment for goods and services; a function of money.

**Unit of account** A way of measuring value in an economy in terms of money; a function of money.

**Store of value** The accumulation of wealth by holding dollars or other assets that can be used to buy goods and services in the future; a function of money.

**Standard of deferred payment** The characteristic of money by which it facilitates exchange over time; a function of money.

order 25 dining room tables from a furniture manufacture by promising to make full payment at an agreed price in 60 days.

### Distinguishing Among Money, Income, and Wealth

It's important to keep straight the differences among *money*, *income*, and *wealth*. We often say that people in *Forbes* magazine's list of richest Americans have a lot of money. We don't really mean that they have a lot of paper currency in their pockets (or hidden away in their mansions or yachts); instead, we mean that they own valuable assets, such as stocks, bonds, or houses. Money, like other assets, is a component of **wealth**, which is the sum of the value of a person's assets minus the value of the person's liabilities. However, only if an asset serves as a medium of exchange can we call it *money*. A person's *income* is equal to his or her earnings over a period of time. So, a person typically has considerably less money than income or wealth.

**Wealth** The sum of the value of a person's assets minus the value of the person's liabilities.

### What Can Serve as Money?

We noted earlier that any asset can be used as money, provided that it is generally accepted as payment. In practical terms, an asset is suitable to use as a medium of exchange if it is:

- *Acceptable* to (that is, usable by) most people
- *Standardized in terms of quality*, so that any two units are identical
- *Durable*, so that it does not quickly become too worn out to be usable
- *Valuable* relative to its weight, so that amounts large enough to be useful in trade can be easily transported
- *Divisible*, because prices of goods and services vary

U.S. paper currency—Federal Reserve Notes—meet all these criteria.

### The Mystery of Fiat Money

Notice that paper currency has no intrinsic value. You can use a \$20 bill to buy goods and services, but beyond that, it has no value to you—except, perhaps, as a bookmark. The Federal Reserve issues the paper currency of the United States, but the Fed is under no obligation to redeem it for gold or any other commodity. Money, such as paper currency, that has no value apart from its use as money is called **fiat money**.

**Fiat money** Money, such as paper currency, that has no value apart from its use as money

People accept paper currency in exchange for goods and services partly because the federal government has designated it to be **legal tender**, which means the government accepts paper currency in payment of taxes and requires that individuals and firms accept it in payment of debts. In reality, though, the more important reason paper currency circulates as a medium of exchange is the confidence of consumers and firms that if they accept paper currency, they will be able to pass it along to someone else when they need to buy goods and services. Basically, it is a case of self-fulfilling expectations: You value something as money only if you believe that others will accept it from you as payment. Our society's willingness to use green pieces of paper issued by the Federal Reserve System as money makes them an acceptable medium of exchange.

**Legal tender** The government designation that currency is accepted as payment of taxes and must be accepted by individuals and firms in payment of debts.

As we will see later in the chapter, if consumers and firms ever lose confidence that they will be able to pass along currency in buying goods and services, then the currency will cease to be a medium of exchange.

## Making the Connection

### Apple Didn't Want My Cash!

If Federal Reserve Notes are legal tender, doesn't that mean that everyone in the United States, including every business, has to accept paper money? The answer to this question is "no," as a woman in California found out when she went to an Apple store in Palo Alto and tried to buy an iPad using \$600 in currency. Apple had just released the iPad and did not want to sell large numbers to people who were buying them to resell on eBay, Craigslist, or elsewhere. So, a customer wanting to buy an iPad had to pay either with a credit card or a debit card, which would make it easier for Apple to keep track of anyone attempting to buy more than the limit of two per customer.

Because Federal Reserve Notes are legal tender, creditors must accept them in payment of debts, and the government will accept them in payment of taxes. However, as this incident made clear, firms do not have to accept cash as payment for goods and services. As the U.S. Treasury Department explains on its Web site:

There is . . . no Federal statute mandating that a private business, a person or an organization must accept currency or coins as payment for goods and/or services. . . . For example, a bus line may prohibit payment of fares in pennies or dollar bills. In addition, movie theaters, convenience stores and gas stations may refuse to accept large denomination currency (usually notes above \$20) as a matter of policy.

The woman who tried to buy an iPad for cash was disabled and on a limited income, so the incident led to bad publicity for Apple. As a result, Apple decided to lift its ban on paying for iPads with cash, provided that the customer was willing to set up an Apple account at the time of purchase. In addition, Apple presented a free iPad to the customer who was originally turned down when she tried to pay with cash.

Sources: Michael Winter, "Apple Ends No-Cash Policy and California Woman Gets Free iPad," *usatoday.com*, May 20, 2010; and "FAQs: Currency," [www.treasury.gov/resource-center/faqs/Currency/Pages/legal-tender.aspx](http://www.treasury.gov/resource-center/faqs/Currency/Pages/legal-tender.aspx).

See related problem 2.8 at the end of the chapter.

## The Payments System

Money facilitates transactions in the economy. The mechanism for conducting such transactions is known as a **payments system**. The payments system has evolved over time from relying on payments made in gold and silver coins, to payments made with paper currency and checks written on deposits in banks, to payments made by electronic funds transfers.

### The Transition from Commodity Money to Fiat Money

Historians disagree about precisely when people began using metallic coins. Evidence suggests that people in China were using metallic coins in the year 1000 B.C., and people in Greece were using them in the year 700 B.C. For centuries thereafter, buyers and sellers

### 2.3

#### Learning Objective

Explain the role of the payments system in the economy.

**Payments system** The mechanism for conducting transactions in the economy.

used coins minted from precious metals, such as gold, silver, and copper, as money. Gold and silver coins suffer from some drawbacks, however. For instance, from the days of the Roman Empire, to gain additional funds, governments would sometimes *debase* the currency, melting down coins and re-minting them with a greater amount of less valuable metals mixed in with the gold and silver. An economy's reliance on gold and silver coins alone makes for a cumbersome payments system. People had difficulty transporting large numbers of gold coins to settle transactions and also ran the risk of being robbed. To get around this problem, beginning around the year A.D. 1500 in Europe, governments and private firms—early banks—began to store gold coins in safe places and issue paper certificates. Anyone receiving a paper certificate could claim the equivalent amount of gold. As long as people had confidence that the gold was available if they demanded it, the paper certificates would circulate as a medium of exchange. In effect, paper currency had been invented.

In modern economies, the central bank, such as the Federal Reserve in the United States, issues paper currency. The modern U.S. payments system is a fiat money system because the Federal Reserve does not exchange paper currency for gold or any other commodity money. The Federal Reserve issues paper currency and holds deposits from banks and the federal government. Banks can use these deposits to settle transactions with one another. Today, the Fed has a legal monopoly on the right to issue currency. Although in the nineteenth century private banks issued their own currency, they can no longer do so.

### The Importance of Checks

Paper money has drawbacks. For instance, it can be expensive to transport paper money to settle large commercial or financial transactions. Imagine going to buy a car with a suitcase full of dollar bills! Another major innovation in the payments system came in the early twentieth century, with the increasing use of *checks*. **Checks** are promises to pay on demand money deposited with a bank or other financial institution. They can be written for any amount, and using them is a convenient way to settle transactions.

Settling transactions with checks does, however, require more steps than settling transactions with currency. Suppose that your roommate owes you \$50. If she gives you \$50 in cash, the transaction is settled. Suppose, however, that she writes you a check for \$50. You first must take the check to your bank. Your bank, in turn, must present the check for payment to your roommate's bank, which must then collect the money from her account. Processing the enormous flow of checks in the United States costs the economy several billion dollars each year. There are also information costs to using checks—the time and effort required for the seller to verify whether the check writer (the buyer) has a sufficient amount of money in her checking account to cover the amount of the check. Accepting checks requires more trust on the part of the seller than does accepting dollar bills.

### Electronic Funds and Electronic Cash

Breakthroughs in electronic telecommunication have improved the efficiency of the payments system, reducing the time needed for clearing checks and for transferring funds. Settling and clearing transactions now occur over *electronic funds transfer systems*, which are computerized payment-clearing devices such as *debit cards*, *Automated Clearing House (ACH)* transactions, *automated teller machines (ATMs)*, and *e-money*.

**Check** A promise to pay on demand money deposited with a bank or other financial institution.

Debit cards can be used like checks: Cash registers in supermarkets and retail stores are linked to bank computers, so when a customer uses a debit card to buy groceries or other products, his bank instantly credits the store's account with the amount and deducts it from his account. Such a system eliminates the problem of trust between the buyer and seller that is associated with checks because the bank computer authorizes the transaction.

ACH transactions include direct deposits of payroll checks into the checking accounts of workers and electronic payments on car loans and mortgages, where the payments are sent electronically from the payer's account and deposited in the lender's account. ACH transactions reduce the transactions costs associated with processing checks, reduce the likelihood of missed payments, and reduce the costs lenders incur in notifying borrowers of missed payments.

Forty years ago, ATMs did not exist, so to deposit or withdraw money from your checking account, you needed to fill out a deposit or withdrawal slip and wait in line at a bank teller's window. Adding to the inconvenience was the fact that many banks were open only between the hours of 10 A.M. and 3 P.M. Today, ATMs allow you to carry out the same transactions at your bank whenever it is most convenient for you. Moreover, ATMs are connected to networks (such as Cirrus) so you can withdraw cash from the ATMs of banks other than your own.

The boundaries of electronic funds transfers have expanded to include **e-money**, or electronic money, which is digital cash people use to buy goods and services over the Internet. A consumer purchases e-money from an Internet bank, which transfers the money to a merchant's computer when the consumer makes a purchase. The best-known form of e-money is the PayPal service, which is owned by eBay, the online auction site. An individual or a firm can set up a PayPal account by transferring funds from a checking account or credit card. As long as sellers are willing to accept funds transferred from a buyer's PayPal (or other e-money) account, e-money functions as if it were conventional, government-issued money. The central bank does not control e-money, though, so it is essentially a private payments system. PayPal was originally developed to make payments for online auctions easier, but in recent years, PayPal and other e-money providers have attempted to expand to capture a greater share of the payments made online.

**E-money** Digital cash people use to buy goods and services over the Internet; short for electronic money.

The developments in e-money are exciting and lead some commentators to predict a "cashless society." A Federal Reserve study found that noncash payments continue to increase as a fraction of all payments, and electronic payments now make up more than two-thirds of all noncash payments. Not surprisingly, the number of checks written has been dropping by more than 2 billion per year. In reality, though, an entirely cashless (or checkless) society is unlikely for two key reasons. First, the infrastructure for an e-payments system is expensive to build. Second, many households and firms worry about protecting their privacy in an electronic system that is subject to computer hackers. While the flow of paper in the payments system is likely to continue to shrink, it is unlikely to disappear.

The efficiency of the payments system, which increases as the cost of settling transactions decreases, is important for the economy. Suppose that the banking system broke down, and all transactions—commercial and financial—had to be carried out in

cash. You would have to carry large amounts of cash to finance all your purchases and would incur additional costs for protecting your cash from theft. No bank credit would be possible, which would prevent the financial system from performing its key role of matching savers and borrowers. Disruptions in the payments system increase the cost of trade and credit. Many economists, for example, blame problems in the banking system for the severity of the Great Depression of the 1930s. The efficient functioning of the economy's payments system is a significant public policy concern, so governments typically establish safeguards to protect it.

## 2.4

### Learning Objective

Explain how the U.S. money supply is measured.

## Measuring the Money Supply

Households, firms, and policymakers are all interested in measuring money because, as we will see, changes in the quantity of money are associated with changes in interest rates, prices, production, and employment. If the only function of money was to serve as a medium of exchange, then we might want to include in the money supply only currency, checking account deposits, and traveler's checks because households and firms can easily use these assets to buy goods and services.

But including just these three assets would result in too narrow a measure of the money supply in the real world. Households and firms can use many other assets as mediums of exchange, even though they are not as liquid as cash or a checking account deposit. For example, you can easily convert your savings account at a bank into cash. Likewise, if you own shares in a money market mutual fund—which is a mutual fund that invests exclusively in short-term bonds, such as Treasury bills—you can write checks against the value of your shares. So, we may want to consider assets such as savings accounts and money market mutual fund shares part of the medium of exchange.

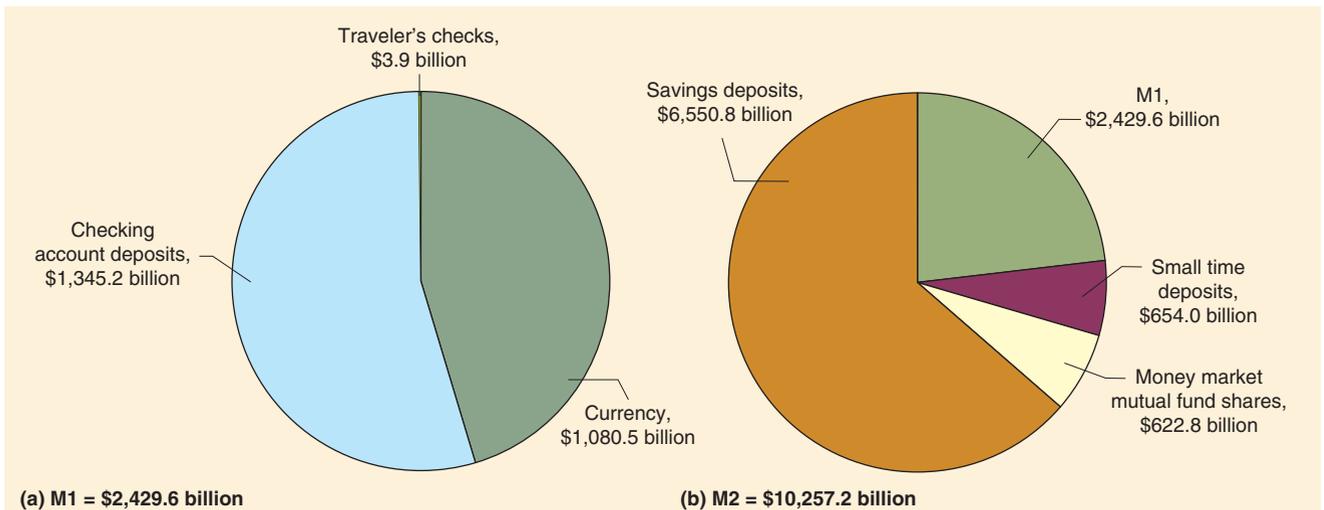
### Measuring Monetary Aggregates

As part of its responsibility to regulate the quantity of money in the United States, the Federal Reserve currently publishes data on two different definitions of the money supply. Figure 2.1 illustrates these definitions—referred to as **monetary aggregates**.

**Monetary aggregate** A measure of the quantity of money that is broader than currency; M1 and M2 are monetary aggregates.

**M1** A narrow definition of the money supply: The sum of currency in circulation, checking account deposits, and holdings of traveler's checks.

**M1 Aggregate** The narrow definition of the money supply is **M1**. As panel (a) in Figure 2.1 shows, M1 measures money as the traditional medium of exchange: currency, checking account deposits, and traveler's checks. Through the early 1980s, government regulations did not allow banks to pay interest on checking accounts, which made them close substitutes for currency. Since then, financial innovation in the banking industry and government deregulation in the 1970s, 1980s, and 1990s have made more types of accounts close substitutes for traditional bank checking accounts. These new accounts include checking accounts at savings institutions and credit unions, as well as interest-bearing checking accounts at commercial banks. Measures of M1 now include these other deposits against which checks may be written, along with non-interest-bearing checking account deposits called *demand deposits*, traveler's checks, and currency.



**Figure 2.1 Measuring the Money Supply, October 2012**

The Federal Reserve uses two different measures of the money supply: M1 and M2. M1 includes currency, checking account deposits, and traveler's checks. M2 includes all the assets in M1, as well as the additional assets shown in panel (b).

Note: In panel (b), savings deposits include money market deposit accounts.

Source: Board of Governors of the Federal Reserve System, *Federal Reserve Statistical Release, H6*, November 8, 2012.

**M2 Aggregate** M2 is a broader definition of the money supply than M1 and includes accounts that many households treat as short-term investments. These accounts can be converted into currency, although not as easily as the components of M1. As shown in panel (b) of Figure 2.1, in addition to the assets included in M1, M2 includes:

- Time deposits with a value of less than \$100,000, primarily *certificates of deposits* in banks
- Savings accounts
- Money market deposit accounts at banks
- Noninstitutional money market mutual fund shares (“Noninstitutional” means that individual investors rather than institutional investors, such as pension funds, own the money market fund shares. Noninstitutional is also sometimes referred to as “retail.”)

**M2** A broader definition of the money supply: all the assets that are included in M1, as well as time deposits with a value of less than \$100,000, savings accounts, money market deposit accounts, and noninstitutional money market mutual fund shares.

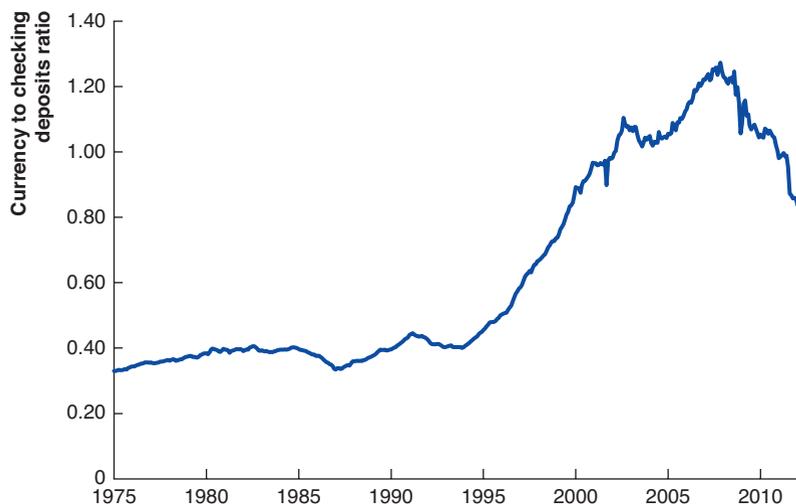
## Making the Connection

### Show Me the Money!

Panel (a) of Figure 2.1 shows that in October 2012, the total value of U.S. currency was \$1,080.5 billion. The value for currency included in M1 is technically “currency outstanding,” which includes all paper currency and coins outside the Federal Reserve, the Treasury, and the banking system. That total represents more than \$3,400 for every person in the United States. Even given that firms hold some of the currency, \$3,400 still seems like far more currency than the typical person holds. Most people keep the

funds that they want to easily access in their checking accounts rather than as cash. The figure below shows for the years from 1975 to 2012 the ratio of currency to checking account deposits, a ratio that helps us to understand how over time people have balanced their holdings of currency relative to their holdings of checking account deposits.

MyEconLab Real-time data



Source: Federal Reserve Bank of St. Louis.

Note that the ratio starts to rise in the mid-1990s and reaches very high levels during the financial crisis that began in 2007, before declining after the financial crisis eased during 2009. Why have people over the past 15 to 20 years increased their holdings of cash relative to their checking account balances? The Federal Reserve estimates that as much as two-thirds of the \$1,080.5 billion in currency outstanding in October 2012 was held by individuals, firms, and governments outside the United States. During the 1990s, a number of economies in Asia, Latin America, and Eastern Europe experienced high rates of inflation or other problems with their currencies. In these countries, many individuals and firms switched to conducting transactions in U.S. dollars rather than in their domestic currencies. Even though the U.S. dollar is not legal tender in most other countries, it still can be used as a medium of exchange, as long as most households and firms are willing to accept it. Some countries, including Panama, El Salvador, and Ecuador, use the U.S. dollar as their official currency. As we saw in the chapter opener, in 2009, the government of Zimbabwe abandoned its own currency in favor of the dollar. Countries can use the U.S. dollar as their currency without the formal approval of the U.S. government.

Finally, note in the figure that demand for U.S. currency spiked in late 2008, during the worst period of the financial crisis, before declining again during 2009, as the crisis eased. Although some of this increase may have been due to consumers in the United States converting their checking accounts into currency because of fears of bank failures, most of the increase came once again from households and firms in other countries, who saw the dollar as a safe haven during a time when they doubted the stability of their own currencies.

Source: Federal Reserve Bank of New York, "The Money Supply," July 2008.

**See related problem 4.9 at the end of the chapter.**

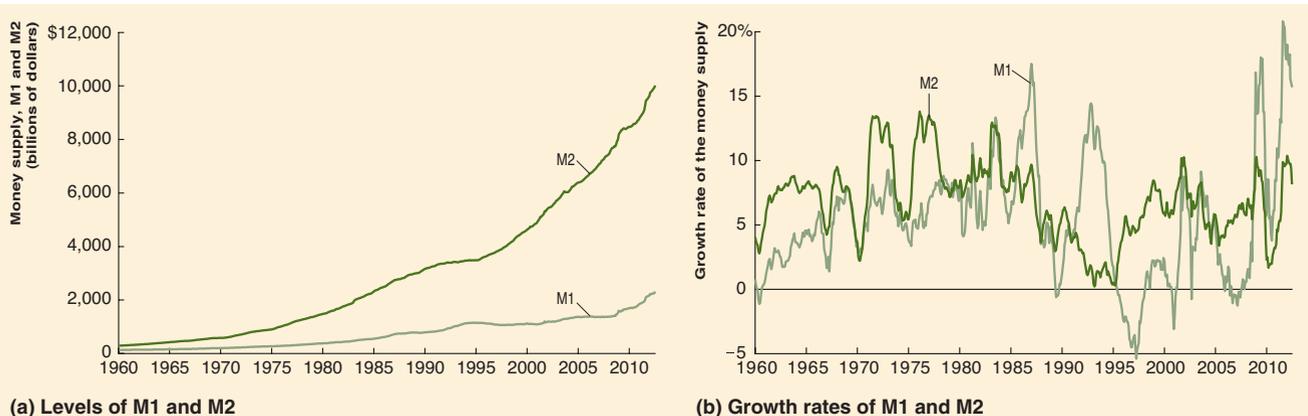
## Does It Matter Which Definition of the Money Supply We Use?

Which is the better measure of money: M1 or M2? If M1 and M2 move together closely enough, the Fed could use either of them to try to influence the economy's output, prices, or interest rates. If M1 and M2 do not move together, they may tell different stories about what is happening to the money supply.

Panel (a) of Figure 2.2 shows the levels of M1 and M2 from January 1960 through July 2012. Note that M2 grew much more over these years than did M1. This is not surprising because certificates of deposit, money market mutual fund shares, and other assets that are included only in M2 have grown much faster than have currency or checking accounts. Economists believe that *changes* in an economic variable are usually more important than are *levels* of the variable. For instance, as we make financial plans for the future, we are usually more interested in the *inflation rate*—which measures the percentage change in the price level—than we are in the current price level. If we believe that changes in the money supply cause inflation, then a graph like panel (b), showing growth rates M1 and M2, measured as percentage changes at an annual rate, provides more information than does the graph in panel (a).

Panel (b) in Figure 2.2 shows that growth rates of M1 and M2 were significantly different over the past 20 years. Overall, the growth rate of M2 was more stable than the growth of M1, which soared during the recessions of 1990–1991, 2001, and 2007–2009 and also had several periods of being negative. A negative growth rate means that the money supply measured by M1 actually declined during those periods. Given the difference in growth rates of M1 and M2, how do the Fed and private forecasters decide which measures to use to explain changes in other economic variables, such as the economy's total output, the price level, and interest rates? In fact, which measure of the money supply is best for forecasting remains an open question that Federal Reserve economists, academic economists, and private forecasters continue to research.

MyEconLab Real-time data



**Figure 2.2** M1 and M2, 1960–2012

Panel (a) shows that since 1960 M2 has increased much more rapidly than has M1. Panel (b) uses quarterly data to show the annual growth rates of M1 and M2 since 1960. M1 has experienced much more instability than has M2.

Note: In panel (b), percentage changes are measured as the compound annual rate of change using quarterly data.

Source: Federal Reserve Bank of St. Louis.

## 2.5

## Learning Objective

Use the quantity theory of money to analyze the relationship between money and prices in the long run.

## The Quantity Theory of Money: A First Look at the Link Between Money and Prices

The relationship between increases in the money supply and increases in prices has been discussed by writers dating back at least as far as the Greek philosopher Aristotle in the fourth century B.C. During the sixteenth century, the Spanish conquest of Mexico and Peru resulted in huge quantities of gold and silver being exported to Europe, where they were minted into coins, greatly increasing the European money supply. Many writers noted that this increase in the money supply was followed by an increase in the price level and a corresponding loss of *purchasing power*, which is the ability of consumers to use money to acquire goods and services. In this section, we explore how economists continue to study this link between changes in the money supply and changes in the price level.

### Irving Fisher and the Equation of Exchange

In the early twentieth century, Irving Fisher, an economist at Yale University, developed the quantity theory of money to make more explicit the relationship between the money supply and inflation. Fisher began his analysis by using the *equation of exchange*:

$$M \times V = P \times Y.$$

The equation states that the quantity of money,  $M$ , multiplied by the velocity of money,  $V$ , equals the price level,  $P$ , multiplied by the level of real GDP,  $Y$ . Recall that the price level measures the average level of the prices of goods and services in the economy. There are several measures of the price level. The measure that is most relevant here is the *GDP deflator*, which includes the prices of all goods and services included in GDP. If we multiply real GDP by the GDP deflator, we get nominal GDP, so the right side of the equation of exchange equals nominal GDP. Fisher defined the *velocity of money*—or, simply, *velocity*—as the number of times during a period of time each dollar in the money supply is spent on a good or a service that is included in GDP, or:

$$V = \frac{PY}{M}.$$

For example, in 2011, nominal GDP was \$15,075 billion and M1 was \$2,006 billion, so velocity in 2011 was \$15,075 billion/\$2,006 billion = 7.5. This result tells us that during 2011, on average, each dollar of M1 was spent 7.5 times on goods or services included in GDP.

Because Fisher defined velocity to be equal to  $PY/M$ , we know that the equation of exchange must always be true. The left side *must* be equal to the right side. A theory is a statement about the world that might possibly be false. Therefore, the equation of exchange is not a theory. Fisher turned the equation of exchange into the **quantity theory of money**, by asserting that velocity is constant. Fisher argued that the average number of times a dollar is spent depends on how often people get paid, how often they go shopping, how often businesses send out bills, and other factors that change very slowly. Because this assertion about velocity may be true or false, the quantity theory of money is, in fact, a theory.

### Quantity theory of money

A theory about the connection between money and prices that assumes that the velocity of money is constant.