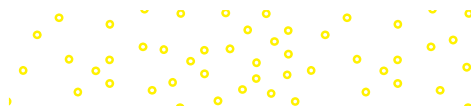


SIXTH EDITION

# Money, Banking, and Financial Markets

Stephen G. Cecchetti | Kermit L. Schoenholtz

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Hill



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Sixth Edition

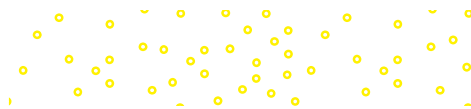
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Leonard N. Stern School of Business

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## MONEY, BANKING, AND FINANCIAL MARKETS, SIXTH EDITION

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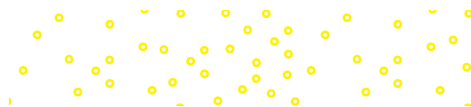
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**About the cover:** The Hubble telescope captured this infrared light image of a portion of the Carina Nebula (NGC 3372), a large emission nebula about 230 light years from earth and visible from the Southern Hemisphere. We chose this cover image for several reasons: first and foremost, it is beautiful. Second, it reminds us that we have much to learn about how the financial system and economy behave, much as we are learning about the universe around us. Third, it is an emblem for change: much as a financial system fosters new instruments, institutions and markets, the Carina Nebula is a stellar nursery—a birthplace for new stars.

[mheducation.com/highered](http://mheducation.com/highered)



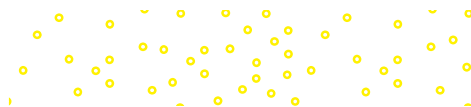
## Dedication

To my father, Giovanni Cecchetti, who argued tirelessly that financial markets are not efficient; and to my grandfather, Albert Schwabacher, who patiently explained why inflation is destructive.

*Stephen G. Cecchetti*

To my wife, Elvira Pratsch, who continues to teach me what is true, good, and beautiful.

*Kermit L. Schoenholtz*





## About the Authors



**Stephen G. Cecchetti** is Rosen Family Chair in International Finance at the Brandeis International Business School (<http://people.brandeis.edu/~cecchetti/>). He previously taught at Brandeis from 2003 to 2008. Before rejoining Brandeis in 2014, Cecchetti completed a five-year term as Economic Adviser and Head of the Monetary and Economic Department at the Bank for International Settlements in Basel, Switzerland. During his time at the Bank for International Settlements, Cecchetti was involved in numerous postcrisis global regulatory reform initiatives, including the work of the Basel Committee on Banking Supervision and the Financial Stability Board.

He has also taught at the New York University Leonard N. Stern School of Business and at The Ohio State University. In addition to his other appointments, Cecchetti served as Executive Vice President and Director of Research, Federal Reserve Bank of New York (1997–1999); Editor, *Journal of Money, Credit, and Banking* (1992–2001); Research Associate, National Bureau of Economic Research (1989–2011); and Research Fellow, Centre for Economic Policy Research (2008–present), among others.

Cecchetti's research interests include inflation and price measurement, monetary policy, macroeconomic theory, economics of the Great Depression, and the economics of financial regulation.

Cecchetti's research interests include inflation and price measurement, monetary policy, macroeconomic theory, economics of the Great Depression, and the economics of financial regulation.

Cecchetti received an SB in Economics from the Massachusetts Institute of Technology in 1977 and a PhD in Economics from the University of California at Berkeley in 1982. In 2016, he received an Honorary Doctorate in Economics from the University of Basel.

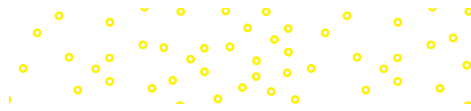


**Kermit L. Schoenholtz** is the Henry Kaufman Professor of the History of Financial Institutions and Markets in the Department of Economics of New York University's Leonard N. Stern School of Business, where he teaches courses on money and banking (<http://pages.stern.nyu.edu/~kschoenh>). He also directs NYU Stern's Center for Global Economy and Business ([www.stern.nyu.edu/cgeb](http://www.stern.nyu.edu/cgeb)). Schoenholtz was Citigroup's global chief economist from 1997 until 2005.

Schoenholtz joined Salomon Brothers in 1986, working in its New York, Tokyo, and London offices. In 1997, he became chief economist at Salomon, after which he became chief economist at Salomon Smith Barney and later at Citigroup.

Schoenholtz has published extensively for the professional investment community about financial, economic, and policy developments; more recently, he has contributed to policy-focused scholarly research in economics. He is a member of the Financial Research Advisory Committee of the U.S. Treasury's Office of Financial Research, a panel member of the U.S. Monetary Policy Forum, and a member of the Council on Foreign Relations. He also has served as a member of the Executive Committee of the London-based Centre for Economic Policy Research.

From 1983 to 1985, Schoenholtz was a Visiting Scholar at the Bank of Japan's Institute for Monetary and Economic Studies. He received an MPhil in economics from Yale University in 1982 and an AB from Brown University in 1977.



## Preface

The world of money, banking, and financial markets is constantly evolving. Every year, people explore new ways to pay for purchases, save for the future, and borrow to meet current needs.

New technology is an ongoing source of change. Internet banking makes it easier than ever for individuals to take control of their finances. And smartphones not only allow American college students to pay for their morning coffee but also are giving hundreds of millions of people in poor countries their first access to the financial system.

In some instances, crises provided the impetus for change. For example, new regulations aimed at making the financial system safer have pushed many banks to take fewer risks than they did just a few years ago. Financial markets also have become more resilient and less likely to need public support. And monetary policymakers, especially in places where economic growth has slowed and deflation is a risk, have adopted a slew of policies never seen before. In much of Europe and Japan, interest rates have fallen below zero—breaking through what had long been seen as a permanent barrier—while new policies are in place to boost bank lending and restore inflation and growth to pre-crisis levels.

The same things that are reshaping the global financial system also are transforming the study of money and banking. Some old questions are surfacing with new intensity: How can individuals use the changing financial system to improve their lives? How can governments ensure that the financial system remains stable? How should we balance the need for financial resilience with the goals of competition, efficiency, and innovation? And how can monetary policymakers keep inflation low, employment high, and both of them stable?

Against this background, students who memorize the operational details of today's financial system are investing in a short-lived asset. Our purpose in writing this book is to focus on the basic functions served by the financial system while deemphasizing its current structure and rules. Learning the economic rationale behind current financial tools, rules, and structures is much more valuable than concentrating

on the tools, rules, and structures themselves. It is an approach designed to give students the lifelong ability to understand and evaluate whatever financial innovations and developments they may one day confront.

## The Core Principles Approach

Toward that end, the entire content of this book is based on five *core principles*. Knowledge of these principles is the basis for understanding what the financial system does, how it is organized, how it is linked to the real economy, and how it is changing. If you understand these five principles, you will understand the future:

1. Time has value.
2. Risk requires compensation.
3. Information is the basis for decisions.
4. Markets determine prices and allocate resources.
5. Stability improves welfare.

These five core principles serve as a framework through which to view the history, current status, and future development of money and banking. They are discussed in detail in Chapter 1; throughout the rest of the text, marginal icons remind students of the principles that underlie particular discussions.

Focusing on core principles has created a book that is both concise and logically organized. This approach does require some adjustments to the traditional methodology used to teach money and banking, but for the most part they are changes in emphasis only. That said, some of these changes have greatly improved both the ease of teaching and the value students draw from the course. Among them are the emphasis on risk and on the lessons from the financial crisis; use of the term *financial instrument*; parallel presentation of the Federal Reserve and the

European Central Bank; a streamlined, updated section on monetary economics; and the adoption of an integrated global perspective.

## Innovations in This Text

In addition to the focus on core principles, this book introduces a series of innovations designed to foster coherence, relevance, and timeliness in the study of money and banking.

### The Money and Banking Blog

The global economy and financial system of the 21st century is evolving quickly. Changes in technology, in the structure of financial institutions and markets, and in monetary and regulatory policy are occurring at a pace that far outstrips the normal three- or four-year cycle at which textbooks are revised. We designed the *Money and Banking* blog to keep examples and applications current. Available at [www.moneyandbanking.com](http://www.moneyandbanking.com), the blog provides timely commentary on events in the news and on questions of more lasting interest.

The blog is closely linked to this book. Like the book, it aims to enhance students' understanding of the world around them. Based on the five core principles of money and banking, each blog entry is associated with a specific chapter. Students following the blog will learn how current events affect the various parts of the financial system—money, financial instruments, financial markets, financial institutions, financial regulators, and central banks.

The material from the blog also is integrated into the book in two ways. First, each chapter includes a “Money and Banking Blog” boxed reading. These are short versions of postings that have appeared on [www.moneyandbanking.com](http://www.moneyandbanking.com) since the publication of the previous edition of this text. These excerpts describe current issues that highlight the lessons in the body of the chapter. Second, the website includes a listing of the posts by chapter. This listing allows students and instructors alike to find new, up-to-date material that illustrates the lessons and core principles emphasized in each chapter.

To receive the latest commentary as it is posted every week or so, subscribe to the blog at [www.moneyandbanking.com](http://www.moneyandbanking.com). You can also follow the authors on Twitter (@MoneyBanking1).

### Federal Reserve Economic Data (FRED)

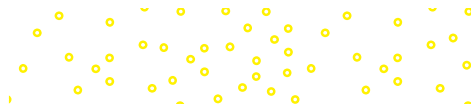
*Money, Banking, and Financial Markets* systematically integrates the use of economic and financial data from FRED, the online database provided free of charge to the public by the Federal Reserve Bank of St. Louis. As of this writing, FRED offers nearly 600,000 data series from more than 85 sources, including indicators for about 200 countries. Information on using FRED appears in Appendix B to Chapter 1.

Through frequent use of FRED, students will gain up-to-date knowledge of the U.S. and other economies and an understanding of the real-world challenges of economic measurement; they will also gain skills in analysis and data manipulation that will serve them well for years to come. Many of the graphs in this book were produced (and can be easily updated) using FRED. In addition, end-of-chapter Data Exploration problems call on students to use FRED to analyze key economic and financial indicators highlighted in that chapter. (For detailed instructions for using FRED online to answer the Data Exploration problems in Chapters 1 to 10, visit [www.mhhe.com/moneyandbanking6e](http://www.mhhe.com/moneyandbanking6e) and click on Data Exploration Hints.) Students can even do some assignments using the FRED app for their mobile devices.

### Impact of the Crises

The effects of the global financial crisis of 2007–2009 and the euro-area crisis that began in 2010 transformed money, banking, and financial markets. Accordingly, from beginning to end, the book integrates the issues raised by these crises and by the responses of policymakers.

The concept of a liquidity crisis surfaces in Chapter 2, and the risks associated with leverage and the rise of shadow banking are introduced in Chapter 3. Issues specific to the 2007–2009 crisis—including securitization, rating agencies, subprime mortgages, over-the-counter trading, and complex financial instruments like credit-default swaps—are included in the appropriate intermediate chapters of the text. Chapter 16 explores the role of the European Central Bank in managing the euro-area crisis. More broadly, the sources of threats to the financial system as a whole are identified throughout the book, and there is a



focused discussion on regulatory initiatives to limit such systemic threats. Finally, we present—in a logical and organized manner—the unconventional monetary policy tools, including the use of negative interest rates and the concept of the effective lower bound, that have become so prominent in postcrisis policy debates and remain relevant today.

## Early Introduction of Risk

It is impossible to appreciate how the financial system works without understanding risk. In the modern financial world, virtually all transactions transfer some degree of risk between two or more parties. These risk trades can be extremely beneficial, as they are in the case of insurance markets. But there is still potential for disaster. In 2008, risk-trading activity at some of the world's largest financial firms threatened the stability of the international financial system.

Even though risk is absolutely central to an understanding of the financial system, most money and banking books give very little space to the topic. In contrast, this book devotes an entire chapter to defining and measuring risk. Chapter 5 introduces the concept of a risk premium as compensation for risk and shows how diversification can reduce risk. Because risk is central to explaining the valuation of financial instruments, the role of financial intermediaries, and the job of central bankers, the book returns to this concept throughout the chapters.

## Emphasis on Financial Instruments

Financial instruments are introduced early in the book, where they are defined based on their economic function. This perspective leads naturally to a discussion of the uses of various instruments and the determinants of their value. Bonds, stocks, and derivatives all fit neatly into this framework, so they are all discussed together.

This approach solves one of the problems with existing texts, use of the term *financial market* to refer to bonds, interest rates, and foreign exchange. In its conventional microeconomic sense, the term *market* signifies a place where trade occurs, not the instruments that are traded. This book follows standard usage of the term *market* to mean a place for trade. It uses the term *financial instruments* to describe virtually all financial arrangements, including loans,

bonds, stocks, futures, options, and insurance contracts. Doing so clears up the confusion that can arise when students arrive in a money and banking class fresh from a course in the principles of economics.

## Parallel Presentation of the Federal Reserve and the European Central Bank

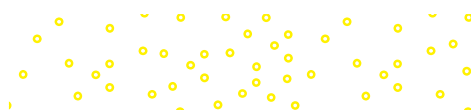
To foster a deeper understanding of central banking and monetary policy, the presentation of this material begins with a discussion of the central bank's role and objectives. Descriptions of the Federal Reserve and the European Central Bank follow. By starting on a theoretical plane, students gain the tools they need to understand how all central banks work. This avoids focusing on institutional details that may quickly become obsolete. Armed with a basic understanding of what central banks do and how they do it, students will be prepared to grasp the meaning of future changes in institutional structure.

Another important innovation is the parallel discussion of the two most important central banks in the world, the Federal Reserve and the European Central Bank (ECB). Students of the 21st century are ill-served by books that focus entirely on the U.S. financial system. They need a global perspective on central banking, the starting point for which is a detailed knowledge of the ECB.

## Modern Treatment of Monetary Economics

The discussion of central banking is followed by a simple framework for understanding the impact of monetary policy on the real economy. Modern central bankers think and talk about changing the interest rate when inflation deviates from its target and output deviates from its normal level. Yet traditional treatments of monetary economics employ aggregate demand and aggregate supply diagrams, which relate output to the *price level*. Our approach is consistent with that in the most recent editions of the leading macroeconomics textbooks and directly links output to *inflation*, simplifying the exposition and highlighting the role of monetary policy. Because this book also skips the IS-LM framework, its presentation





of monetary economics is several chapters shorter. Only those topics that are most important in a monetary economics course are covered: long-run money growth and inflation and short-run monetary policy and business cycles. This streamlined treatment of monetary theory is not only concise but more modern and more relevant than the traditional approach. It helps students to see monetary policy changes as part of a strategy rather than as one-off events, and it gives them a complete understanding of business cycle fluctuations.

## Integrated Global Perspective

Technological advances have dramatically reduced the importance of a bank's physical location, producing a truly global financial system. Twenty-five years ago money and banking books could afford to focus primarily on the U.S. financial system, relegating international topics to a separate chapter that could be considered optional. But in today's financial world, even a large country like the United States cannot be treated in isolation. The global financial system is truly an integrated one, rendering separate discussion of a single country's institutions, markets, or policies impossible. This book incorporates the discussion of international issues throughout the text, emphasizing when national borders are important to bankers and when they are not.

## Organization

This book is organized to help students understand both the financial system and its economic effects on their lives. That means surveying a broad series of topics, including what money is and how it is used; what a financial instrument is and how it is valued; what a financial market is and how it works; what a financial institution is and why we need it; and what a central bank is and how it operates. More important, it means showing students how to apply the five core principles of money and banking to the evolving financial and economic arrangements that they inevitably will confront during their lifetimes.

### Part I: Money and the Financial System.

Chapter 1 introduces the core principles of money and banking, which serve as touchstones throughout the book. It also presents FRED, the free online

database of the Federal Reserve Bank of St. Louis. The book often uses FRED data for figures and tables, and every chapter calls on students to use FRED to solve end-of-chapter problems. Chapter 2 examines money both in theory and in practice. Chapter 3 follows with a bird's-eye view of financial instruments, financial markets, and financial institutions. (Instructors who prefer to discuss the financial system first can cover Chapters 2 and 3 in reverse order.)

### Part II: Interest Rates, Financial Instruments, and Financial Markets.

Part II contains a detailed description of financial instruments and the financial theory required to understand them. It begins with an explanation of present value and risk, followed by specific discussions of bonds, stocks, derivatives, and foreign exchange. Students benefit from concrete examples of these concepts. In Chapter 7 (The Risk and Term Structure of Interest Rates), for example, students learn how the information contained in the risk and term structure of interest rates can be useful in forecasting. In Chapter 8 (Stocks, Stock Markets, and Market Efficiency), they learn about stock bubbles and how those anomalies influence the economy. And in Chapter 10 (Foreign Exchange), they study the Big Mac index and learn to understand the concepts of purchasing power parity and interest rate parity. Throughout this section, two ideas are emphasized: that financial instruments transfer resources from savers to investors, and that in doing so, they transfer risk to those best equipped to bear it.

### Part III: Financial Institutions.

In Part III, the focus shifts to financial institutions. Chapter 11 introduces the economic theory that is the basis for our understanding of the role of financial intermediaries. Through a series of examples, students see the problems created by asymmetric information as well as how financial intermediaries can mitigate those problems. The remaining chapters in Part III put theory into practice. Chapter 12 presents a detailed discussion of banking, the bank balance sheet, and the risks that banks must manage. Chapter 13 provides a brief overview of the financial industry's structure, and Chapter 14 explains financial regulation, including a discussion of regulation to limit threats to the financial system as a whole and of efforts to limit the increased regulatory burden.

### Part IV: Central Banks, Monetary Policy, and Financial Stability.

Chapters 15 through 19 survey what central banks do and how they do it. This part of the book begins with a discussion of the role and objectives of central banks, which leads naturally to the principles that guide central bank design. Chapter 16 applies those principles to the Federal Reserve and the European Central Bank, highlighting the strategic importance of their numerical inflation objectives and their communications. Chapter 17 presents the central bank balance sheet, the process of multiple deposit creation, and the money supply. Chapters 18 and 19 cover operational policy, based on control of both the interest rate and the exchange rate. Chapter 18 also introduces the monetary transmission mechanism and presents a variety of unconventional monetary policy tools, including negative interest rates and the concept of the effective lower bound, that have become so prominent in recent years. The goal of Part IV is to give students the knowledge they will need to cope with the inevitable changes that will occur in central bank structure.

### Part V: Modern Monetary Economics.

The last part of the book covers modern monetary economics. While most books cover this topic in six or more chapters, this one does it in four. This streamlined approach concentrates on what is important, presenting only the essential lessons that students truly need. Chapter 20 sets the stage by exploring the relationship between inflation and money growth. Starting with inflation keeps the presentation simple and powerful, and emphasizes the way monetary policymakers think about what they do. A discussion of aggregate demand, aggregate supply, and the determinants of inflation and output follows. Consistent with the presentation in recent editions of leading macroeconomic textbooks, Chapter 21 presents a complete macroeconomic model with a dynamic aggregate demand curve that integrates monetary policy directly into the presentation, along with short- and long-run aggregate supply curves. In Chapter 22 the model is used to help understand the sources of business cycles, as well as a number of important applications that face monetary policymakers in the world today. Each application stands on its own, and the applications are ordered in increasing difficulty to allow maximum flexibility in their use. Finally, Chapter 23 explores the monetary

transmission mechanism in some detail and addresses key challenges facing central banks, such as asset price bubbles, the effective lower bound for nominal rates, and the evolving structure of the financial system.

For those instructors who have the time, we recommend closing the course with a rereading of the first chapter and a review of the core principles. What is the future likely to hold for the six parts of the financial system: money, financial instruments, financial markets, financial institutions, regulatory agencies, and central banks? How do students envision each of these parts of the system 20 or even 50 years from now?

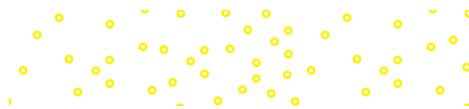
## What's New in the Sixth Edition?

Many things have happened since the last edition. For that reason, all of the figures and data have been updated to reflect the most recent available information. In addition, the authors have made many changes to enhance the sixth edition of *Money, Banking, and Financial Markets*. What follows is only a sample of these changes.

### New Topics in the Integrated Global Perspective

The sixth edition reflects the wide range of monetary and regulatory developments that have taken place since 2018. New topics introduced or discussed in much greater detail include:

- The role of paper money and virtual currencies
- Mobile banking and financial inclusion
- Modernizing the payments system
- Bond market liquidity
- The distribution of wealth
- Replacing LIBOR
- Private versus public equity
- Intangible capital
- Fiscal sustainability
- Stress testing banks to ensure resilience
- Cyber risk
- Negative interest rates
- Chinese exchange rate policy
- The threat to Fed independence



- Measuring tail risk
- Big data and the macroeconomy
- Secular stagnation
- Balance of payments crises

The most extensive changes are in Chapter 12, which includes a new section on cyber risk; in Chapter 14, which includes a discussion of continued reforms to financial regulation in the aftermath of the financial crisis; and in Chapter 18, which includes a full treatment of the Federal Reserve's evolving operational policy regime.

## Changes at the Federal Reserve and the ECB

The discussion of the Federal Reserve and the ECB now considers their evolving communications strategy (Chapter 16); the use of unconventional policy tools, including negative interest rates and the dramatic growth in central bank balance sheets, aimed at addressing first the financial crisis and then the weak economic recoveries that followed (Chapter 18); the interactions between monetary policy and financial stability (Chapter 18); and the impairment of the monetary transmission process during the crisis (Chapter 23). It also reflects the sharply increased threat to Fed independence under President Trump (Chapter 15).

## Updated Coverage of Current Events

Overall, nearly 30 of the 140 inserts in the previous edition have been replaced or altered substantially. These changes capture new developments in the key areas of technological change, the financial crisis, inequality, regulatory reform, and monetary policy.

Here is a partial list of the new or revised features:

### Money and Banking Blog

Virtual Frenzies: Bitcoin and Blockchain  
(Chapter 2)

Banking the Masses: 2018 Edition (Chapter 3)

Investing in College (Chapter 4)

On the Distribution of Wealth (Chapter 5)

Bond Market Liquidity: Should We Be Worried?  
(Chapter 6)

The Cloudy Future of Peer-to-Peer Lending  
(Chapter 12)

Fiscal Sustainability (Chapter 15)

Is 2 Percent Still the Right Inflation Target?  
(Chapter 18)

Sudden Stops: Understanding Balance-of-  
Payments Crises (Chapter 19)

The Phillips Curve (Chapter 21)

Secular Stagnation (Chapter 22)

GDP at Risk (Chapter 23)

### Applying the Concept

Modernizing U.S. Payments: Faster, Cheaper and  
More Secure (Chapter 2)

Raising Equity: Public versus Private (Chapter 8)

Financing Intangible Capital (Chapter 11)

Eclipsing LIBOR (Chapter 13)

Better Capitalized Banks Lend *More* and Lend  
*Better* (Chapter 14)

The Threat to Fed Independence (Chapter 15)

Time Consistency (Chapter 15)

Central Bank Digital Currency (Chapter 16)

What Should the Fed Own? (Chapter 17)

GDP: One Size No Longer Fits All (Chapter 18)

China's Changing Exchange Rate Regime  
(Chapter 19)

GDP-Linked Bonds (Chapter 22)

### Lessons from the Crisis

Central Counterparties and Systemic Risk  
(Chapter 9)

The Three Phases of the Financial Crisis of  
2007–2009 (Chapter 14)

## Supplements for Instructors

The following ancillaries are available for quick download and convenient access via the Instructor Resource material available through McGraw-Hill Connect®.

### Solutions Manual

Prepared by James Fackler (University of Kentucky) and Roisin O'Sullivan (Smith College), this manual contains detailed solutions to the end-of-chapter questions—Conceptual and Analytical problems and Data Exploration questions.

## Test Bank

The revised test bank includes more than 2,500 multiple-choice and 600 short-answer and essay questions. The test bank can be used both as a study guide and as a source for exam questions. It has been computerized to allow for both selective and random generation of test questions.

## Test Builder

Available within Connect, Test Builder is a cloud-based tool that enables instructors to format tests that can be printed or administered within an LMS. Test Builder offers a modern, streamlined interface for easy content configuration that matches course needs, without requiring a download.

Test Builder allows you to:

- access all test bank content from a particular title.
- easily pinpoint the most relevant content through robust filtering options.
- manipulate the order of questions or scramble questions and/or answers.
- pin questions to a specific location within a test.
- determine your preferred treatment of algorithmic questions.
- choose the layout and spacing.
- add instructions and configure default settings.

Test Builder provides a secure interface for better protection of content and allows for just-in-time updates to flow directly into assessments.

## PowerPoint Slides

Updated presentation slides outline the main points in each chapter and reproduce major graphs and charts. This handy, colorful supplement can be edited, printed, or rearranged to fit the needs of your course.

## Assurance of Learning Ready

Many educational institutions today are focused on the notion of *assurance of learning*, an important element of some accreditation standards. *Money, Banking, and Financial Markets* is designed specifically to

support your assurance of learning initiatives with a simple, yet powerful solution.

Instructors can use Connect to easily query for learning outcomes/objectives that directly relate to the learning objectives of your course. You can then use the reporting features of Connect to aggregate student results in similar fashion, making the collection and presentation of assurance of learning data simple and easy.

## AACSB Statement

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# Learning Tools Walkthrough

## Learning Objectives

The learning objectives (LOs) introduced at the start of each chapter highlight the material and concepts to be mastered. Every end-of-chapter problem is denoted by the LO to which it relates for reinforcement.

### Learning Objectives

After reading this chapter, you should be able to:

- LO1** Define money and describe its functions.
- LO2** Discuss the different methods of payment and the future of money.
- LO3** Explain how the money supply is measured and how it is linked to economic growth and inflation.

### Debit Cards versus Credit Cards

#### YOUR FINANCIAL WORLD

When you go shopping, should you pay with a credit card or a debit card? To decide, you need to understand the difference between the two. First make sure you know which one of your cards is which. Usually an ATM card (the one that you got from the bank when you opened your checking account) is a debit card. But check to make sure.

What's the real difference, from the shopper's point of view? A debit card works just like a check, only faster. When you write a paper check, it usually takes a day or two to go through the system. A debit card transaction goes through right away. The electronic message gets to your bank on the same day, and your account is debited immediately. So, if you want to use your debit card, your account balance has to be higher than the payment you want to make. During and after the financial crisis that began in 2007, debit card use sharply outpaced credit card activity, as lenders and borrowers sought to slow the expansion (or even reduce the outstanding level) of household debt.

A credit card creates a deferred payment. The issuer agrees to make the payment for you, and you repay the debt later. That sounds good, but there's a catch. If you're late paying, there's a late fee. And if you don't pay the entire debt every month, you pay interest on the balance—at what is usually a very high interest rate. If you do pay your entire credit card debt every month, however, there is no late fee and no interest charge. Hence, you get an interest-free loan from the time you make the purchase to the time you pay the balance. If you can pay off your credit cards in full and on time, it's to your advantage to use them.

Credit cards have another advantage over debit cards. They help you build a credit history, which you'll need when the time comes to buy a car or a house. Because debit cards are just extensions of your bank account, they don't show potential lenders that you are creditworthy. In fact, some businesses, like car rental companies, require their customers to use credit cards for this reason.

## Your Financial World

These boxes show students that the concepts taught in the text are relevant to their everyday lives. Among the topics covered are the importance of saving for retirement, the risk in taking on a variable-rate mortgage, the desirability of owning a diversified portfolio, and techniques for getting the most out of the financial news.

## Core Principle Icons

The entire text discussion is organized around the following five core principles: *Time* has value; *risk* requires compensation; *information* is the basis for decisions; *markets* set prices and allocate resources; and *stability* improves welfare. Exploring these principles is the basis for learning what the financial system does, how it is organized, and how it is linked to the real economy. They are discussed in detail in Chapter 1; throughout the rest of the text, marginal icons remind students of the principles that underlie particular discussions.

you agree to make a \$225 loan, and the borrower offers to repay you either \$100 a year for three years or \$125 a year for two years. Which offer should you take? Answering this question means figuring out the current value of the promised payments on the dates when they will be made. To do that, we'll use the concept of present value, sometimes referred to as *present discounted value*.



**The Definition** In our discussion of future value, we used the term *present value* to mean the initial amount invested or deposited. The way we used the term suggests its technical definition: *Present value is the value today (in the present) of a payment that is promised to be made in the future.* Put another way, present value is the amount that must be invested today in order to realize a specific amount on a given future date. Financial instruments promise future cash payments, so we need to know how to value

## Lessons from the Crisis

These boxes explain concepts or issues that are both integral to the chapter and central to understanding how the financial crisis of 2007–2009 and the subsequent crisis in the euro area transformed the world of money, banking, and financial markets. The topics range from specific aspects of the crisis such as shadow banks and central bank policy responses to broad concepts like liquidity, leverage, sovereign default, and systemic risk.



### Leverage

#### LESSONS FROM THE CRISIS

Households and firms often borrow to make investments. Obtaining a mortgage for a new home or selling a corporate bond to build a new plant are common examples. The use of borrowing to finance part of an investment is called *leverage*.<sup>\*</sup> Leverage played a key role in the financial crisis of 2007–2009, so it is worth understanding how leverage relates to risk and how it can make the financial system vulnerable.

Modern economies rely heavily on borrowing to make investments. They are all leveraged. Yet, the more leverage, the greater the risk that an adverse surprise will lead to bankruptcy. If two households own houses of the same value, the one that has borrowed more—the one that is more highly leveraged and has less net worth—is the more likely to default during a temporary slump in income. This example could apply equally well to firms, financial institutions, or even countries.

Financial institutions are much more highly leveraged than households or firms, typically owning assets of about 10 times their net worth. During the crisis, some important financial firms leveraged more than 30 times their net worth.<sup>\*</sup>

When highly leveraged financial institutions experience a loss, they usually try to reduce their leverage—that is, to *deleverage*—by selling assets and issuing securities that raise their net worth (see accompanying figure). However, everyone in the financial system cannot deleverage at once. When too many institutions try to sell assets simultaneously, their efforts will almost surely prove counterproductive: falling prices will mean more losses, diminishing their net worth further, raising leverage, and making the assets they hold seem riskier, thereby compelling further sales.

This "paradox of leverage" reinforces the destabilizing liquidity spiral discussed in Chapter 2 (see Lessons from the Crisis: Market Liquidity, Funding Liquidity, and Making Markets). Both spirals feed a vicious cycle of falling prices and widespread deleveraging that was a hallmark of the financial crisis of 2007–2009. The financial system steadied only after massive government interventions in response to the plunge of many asset prices.

<sup>\*</sup>For a technical definition of leverage, see the Tools of the Trade



## Virtual Frenzies: Bitcoin and Blockchain

### MONEY AND BANKING BLOG

Bitcoin is the oldest and most prominent of more than 2,500 cryptocurrencies—sometimes called “virtual currencies”—that have come into existence since 2008. Devotees hope these “tokens” will revolutionize many aspects of finance, including everyday payments. Cryptocurrencies like Bitcoin are a type of digital currency based on a peer-to-peer network designed to allow for the verification of transfers without the need for a government authority or any trusted third party. The technology used to record ownership—blockchain—is an ever-growing, encrypted public ledger of transactions spread over a network of

Let’s have a closer look at Bitcoin itself. Some countries classify Bitcoin as a commodity, subjecting it to capital gains taxation, or severely restricting its use. In no country can Bitcoin be widely exchanged for goods and services. As a result, in early 2019 Bitcoin accounted for less than 200 *thousand* daily transactions globally, compared with more than 500 *million* dollar transactions in the United States alone.

Bitcoin’s value is extremely unstable: The dollar value of a single Bitcoin surged from just pennies in 2010 to nearly \$20,000 at the peak in December 2017, before plunging

### Money and Banking Blog

One article per chapter is featured from the authors’ blog at [www.moneyandbanking.com](http://www.moneyandbanking.com). These readings show how concepts introduced in the chapter are applied to contemporary issues in money and banking, including changes in technology, regulation, and the mechanisms of monetary policy.

**How Much Is Our Distant Future Worth?**  
APPLYING THE CONCEPT

Many people worry about the challenges their descendants will face. There are plenty of things to fret about, ranging from the threat of rising sea levels in this century to the long-range challenge of managing radioactive waste, which can be toxic for many thousands of years. Physicist Stephen Hawking has argued that human beings “won’t survive another 1,000 years without escaping our fragile planet.”

How much ought we be willing to spend now to avoid damage 100 years from now that will cost \$1 at that time? The answer depends on many factors, including the relative affluence of our descendants, the degree of uncertainty about the future, and the possibility of existential threats.

To simplify the question, suppose that the only thing we care about is the present value of the expected losses associated with a preventable future disaster. In that case, the discount rate we use is critical for determining what we should do today. For example, for a disaster that is 100 years away, the value today of a \$1 future loss at an annual discount rate of 1 percent is \$0.37. But at a discount rate of

What discount rate should we use to value things in the distant future? For questions like this, economists usually look at market prices.

Various measures suggest that the appropriate rate is in the range of 1 to 2½ percent. For example, in recent years the long-term U.S. Treasury inflation-indexed bond yield has averaged around 1 percent. At the upper end of the range, research examining land leases with several hundred years of maturity points to a rate close to 2½ percent.

Policy disagreements among serious analysts of climate change are closely related to their views on the appropriate discount rate. One well-known report applied a relatively low discount rate of 1.4 percent and called for a large tax on carbon emissions to limit future losses from climate change. A different analysis used a relatively high 4.3 percent discount rate and called for a carbon tax only about one-tenth the level implied by the 1.4 percent rate analysis. Why? The low discount rate puts a great deal more weight on losses that are predicted to occur hundreds of years in the future.

Of course, it’s not just about discount rates. It’s about the scale of future losses, too. If policy actions today can prevent a

### Applying the Concept

These sections showcase history and examine issues relevant to the public policy debate to illustrate how ideas introduced in the chapter can be applied to the world around us. Subjects include central bank digital currency, the replacement of LIBOR, and the heightened threat to Fed independence.

**The Consumer Price Index**  
TOOLS OF THE TRADE

Understanding how to measure inflation is central to understanding economics and finance. Most of us keep a close eye on measures like the consumer price index (CPI) to help gauge the value of our salary increases or the purchasing power of the money we hold. And adjusting interest rates for inflation is critical for making investment decisions. (See Chapter 4.)

The CPI is designed to answer the following question: How much more would it cost for people to purchase today the same basket of goods and services that they actually bought at some fixed time in the past?

To calculate the CPI, every few years statisticians at the Bureau of Labor Statistics (BLS) survey people to find out what they bought. This gives us the basket of goods and services bought by the typical consumer. Next, every month the BLS collects information on the prices of thousands of goods and services—everything from breakfast cereal to gasoline to washing machines to the cost of cable television. Combining the expenditure and price surveys allows statisticians to compute the current cost of the basket. Finally, this current cost is compared to a benchmark to yield an index. And the percentage change in this index is a measure of inflation.

To see how this works, let’s look at an example. Assume people spend 25 percent of their income on food, 50 percent on housing, and 25 percent on transportation. That’s the survey information. Examples of the prices are in Table 2.2. Importantly, these are the prices of exactly the same bundle of food, the same size and quality of housing, and the same transportation for each year.

Using the numbers in Table 2.2 we can compute the cost of the basket of goods in each year:

**Cost of the basket in 2020**  
 = 0.25 × Price of food + 0.5 × Price of housing  
 + 0.25 × Price of transportation  
 = 0.25 × \$100 + 0.5 × \$200 + 0.25 × \$100  
 = \$150

And for 2021, we get \$165. Choosing 2020 as the base year, the index level in each year equals

**CPI =  $\frac{\text{Cost of the basket in current year}}{\text{Cost of the basket in base year}} \times 100$**

The result of this computation is the fifth column of the table. Finally, we can use the index number to compute the inflation rate from the previous year. From 2020 to 2021, this means that

**Inflation rate 2021 =  $\frac{\text{CPI in 2021} - \text{CPI in 2020}}{\text{CPI in 2020}} \times 100$**

Using the numbers from Table 2.2 to compute the inflation rate in 2021, we get that

$\frac{110 - 100}{100} \times 100 = 10\%$

and for 2022 the result is

$\frac{120 - 110}{110} \times 100 = 9.1\%$

(These numbers are just for illustration. The U.S. inflation rate is closer to 2 percent.)

Inflation measured using the CPI tells us how much more money we need to give people to restore the purchasing power they had in the earlier period when the survey was done. But adjustments in wages based on fixed-expenditure-weight index like the CPI are known to overcompensate people in an unintended way. This overstatement of inflation comes from what is known as substitution bias. Because inflation is not uniform, the prices of some products will increase by more than the prices of others. People can escape some of the inflation by substituting goods and services that have sustained less inflation for those that have sustained more. By assuming that any substitution makes people worse off, the index overstates the impact of price changes. To address this problem, and take into account changes in spending patterns, the Bureau of Labor Statistics in 2002 began changing the weights every two years. Nevertheless, many economists believe that the CPI still overstates inflation.

Year	Price of Food	Price of Housing	Price of Transportation	Cost of the Basket	Consumer Price Index
2020	\$100	\$200	\$100	\$150	100
2021	110	205	140	165	110
2022	120	210	180	180	120

### Tools of the Trade

These boxes teach useful skills, including how to read bond and stock tables, how to read charts, and how to do some simple algebraic calculations. Some provide brief reviews of material from the principles of economics course, such as the relationship between the current account and the capital account in the balance of payments.

# End-of-Chapter Features

## Using FRED: Codes for Data in This Chapter

Data Series	FRED Data Code
1-year Treasury bill rate	TB1YR
3-month Treasury bill rate	TB3MS
Consumer price index	CPIAUCSL
1-year inflation expectations (Michigan survey)	MICH
Brazil Treasury bill rate	INTGSTBRM193N
Brazil consumer price index	BRACPIALLMINMEI
China discount rate	INTDSRCNM193N
China consumer price index	CHNCPIALLMINMEI
10-year Treasury constant maturity rate	GS10
10-year Treasury inflation-indexed yield	FI10
5-year Treasury constant maturity rate	GS5
5-year Treasury inflation-indexed yield	FI5

## FRED Data Codes

The FRED table lists key economic and financial indicators relevant to the chapter and the codes by which they are accessed in FRED, the free online database provided by the Federal Reserve Bank of St. Louis. With the data codes, students can use FRED to analyze key economic patterns and illuminate the ideas in the chapter. See Appendix B to Chapter 1 for help using FRED and refer to [www.mhhe.com/moneyandbanking6e](http://www.mhhe.com/moneyandbanking6e).

## Data Exploration

Detailed end-of-chapter questions ask students to use FRED to analyze economic and financial data relevant to the chapter. Appendix B to Chapter 1 provides information on using FRED and sets the stage for its use thereafter. The Data Exploration questions have now been integrated into Connect as assignable content to help you incorporate real-time data into your course!

## Data Exploration



For detailed instructions on using Federal Reserve Economic Data (FRED) online to answer each of the following problems, visit [www.mhhe.com/moneyandbanking6e](http://www.mhhe.com/moneyandbanking6e) and refer to the FRED Resources and Data Exploration Hints.

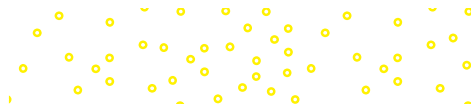
1. Find the most recent level of M2 (FRED code: M2SL) and of the U.S. population (FRED code: POP). Compute the quantity of money divided by the population. (Note that M2 is measured in billions of dollars and population is in thousands of individuals.) Do you think your answer is large? Why? (LO1)
2. Reproduce Figure 2.3 from 1960 to the present, showing the percent change from a year ago of M1 (FRED code: M1SL) and M2 (FRED code: M2SL). Comment on the pattern over the last five years. Would it matter which of the two monetary aggregates you looked at? (LO3)
3. Which usually grows faster: M1 or M2? Produce a graph showing M2 divided by M1. When this ratio rises, M2 outpaces M1 and vice versa. What is the long-run pattern? Is the pattern stable? (LO3)
4. To complete payments, do you think people need more or less currency per dollar of transactions than they did 30 years ago? After stating your hypothesis, plot currency in

## Conceptual and Analytical Problems

1. Describe four ways you could pay for your morning cup of coffee. What are the advantages and disadvantages of each? (LO2)
2. You are the owner of a small sandwich shop. A buyer may offer one of several payment methods: cash, a check drawn on a bank, a credit card, or a debit card. Which of these is the least costly for you? Explain why the others are more expensive. (LO2)
3. Explain how money encourages specialization, and how specialization improves everyone's standard of living. (LO3)
- 4.\* Could the dollar still function as the unit of account in a totally cashless society? (LO2)
5. Give four examples of ACH transactions you might make. (LO2)
6. A subset of European Union countries have adopted the euro, while the remaining member countries have retained their own currencies. What are the advantages of a common currency for someone who is traveling through Europe? (LO1)
7. Why might each of the following commodities not serve well as money? (LO2)
  - a. Tomatoes
  - b. Bricks
  - c. Cattle

## Conceptual and Analytical Problems

Each chapter contains at least 18 conceptual and analytical problems at varying levels of difficulty, which reinforce the lessons in the chapter. All of the problems are available as assignable content within Connect, McGraw-Hill's homework management platform, organized around learning objectives to make it easier to plan, track, and analyze student performance across different learning outcomes.



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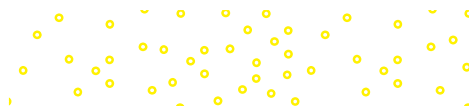
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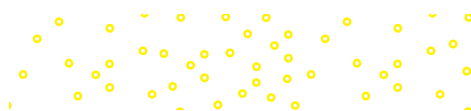
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# Brief Contents

## Part I

### Money and the Financial System

chapter 1	An Introduction to Money and the Financial System	1
chapter 2	Money and the Payments System	22
chapter 3	Financial Instruments, Financial Markets, and Financial Institutions	44

## Part II

### Interest Rates, Financial Instruments, and Financial Markets

chapter 4	Future Value, Present Value, and Interest Rates	73
chapter 5	Understanding Risk	101
chapter 6	Bonds, Bond Prices, and the Determination of Interest Rates	129
chapter 7	The Risk and Term Structure of Interest Rates	158
chapter 8	Stocks, Stock Markets, and Market Efficiency	184
chapter 9	Derivatives: Futures, Options, and Swaps	211
chapter 10	Foreign Exchange	238

## Part III

### Financial Institutions

chapter 11	The Economics of Financial Intermediation	266
chapter 12	Depository Institutions: Banks and Bank Management	294
chapter 13	Financial Industry Structure	326
chapter 14	Regulating the Financial System	357

## Part IV

### Central Banks, Monetary Policy, and Financial Stability

chapter 15	Central Banks in the World Today	393
chapter 16	The Structure of Central Banks: The Federal Reserve and the European Central Bank	421
chapter 17	The Central Bank Balance Sheet and the Money Supply Process	448
chapter 18	Monetary Policy: Stabilizing the Domestic Economy	479
chapter 19	Exchange Rate Policy and the Central Bank	521

## Part V

### Modern Monetary Economics

chapter 20	Money Growth, Money Demand, and Modern Monetary Policy	553
chapter 21	Output, Inflation, and Monetary Policy	577
chapter 22	Understanding Business Cycle Fluctuations	615
chapter 23	Modern Monetary Policy and the Challenges Facing Central Bankers	647





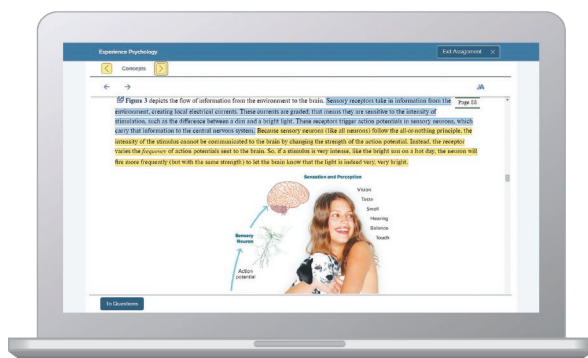
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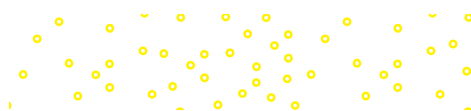
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# Contents

*About the Authors* iv

*Preface* v

*Learning Tools Walkthrough* xii

*Acknowledgments* xv

## **Part I** Money and the Financial System

### CHAPTER 1 AN INTRODUCTION TO MONEY AND THE FINANCIAL SYSTEM 1

The Six Parts of the Financial System 2

The Five Core Principles of Money and Banking 4

*Core Principle 1: Time Has Value* 4

*Core Principle 2: Risk Requires  
Compensation* 5

*Core Principle 3: Information Is the Basis for  
Decisions* 5

*Core Principle 4: Markets Determine Prices  
and Allocate Resources* 6

*Core Principle 5: Stability Improves Welfare* 7

Special Features of This Book 8

*Your Financial World* 8

*Applying the Concept* 9

*Lessons from the Crisis* 9

*Money and Banking Blog* 10

*Tools of the Trade* 10

*End-of-Chapter Sections* 12

The Organization of This Book 12

Key Terms 13

Using FRED: Codes for Data in This Chapter 13

Chapter Lessons 14

Conceptual and Analytical Problems 14

Data Exploration 16

**APPENDIX A TO CHAPTER 1: Measuring Economic  
Activity, Prices, and the Inflation Rate** 17

**APPENDIX B TO CHAPTER 1: Using FRED** 20

### CHAPTER 2 MONEY AND THE PAYMENTS SYSTEM 22

Money and How We Use It 23

*Means of Payment* 23

*Unit of Account* 23

*Store of Value* 24

The Payments System 25

*Commodity and Fiat Monies* 25

*Checks* 27

*Electronic Payments* 29

The Future of Money 32

Measuring Money 32

Key Terms 40

Using FRED: Codes for Data in This Chapter 40

Chapter Lessons 40

Conceptual and Analytical Problems 41

Data Exploration 43

### CHAPTER 3 FINANCIAL INSTRUMENTS, FINANCIAL MARKETS, AND FINANCIAL INSTITUTIONS 44

Financial Instruments 46

*Uses of Financial Instruments* 47

*Characteristics of Financial Instruments:  
Standardization and Information* 48

*Underlying versus Derivative  
Instruments* 50

*A Primer for Valuing Financial  
Instruments* 50

*Examples of Financial Instruments* 51

Financial Markets 53

*The Role of Financial Markets* 54

*The Structure of Financial Markets* 55

*Characteristics of a Well-Run Financial  
Market* 62

Financial Institutions	63	Reducing Risk through Diversification	116		
<i>The Role of Financial Institutions</i>	64	<i>Hedging Risk</i>	117		
<i>The Structure of the Financial Industry</i>	64	<i>Spreading Risk</i>	118		
Key Terms	68	Key Terms	122		
Using FRED: Codes for Data in This Chapter	68	Using FRED: Codes for Data in This Chapter	122		
Chapter Lessons	69	Chapter Lessons	122		
Conceptual and Analytical Problems	70	Conceptual and Analytical Problems	123		
Data Exploration	72	Data Exploration	126		
<b>Part II</b>	<b>Interest Rates, Financial Instruments, and Financial Markets</b>	APPENDIX TO CHAPTER 5: The Mathematics of Diversification	127		
CHAPTER 4	FUTURE VALUE, PRESENT VALUE, AND INTEREST RATES	73	CHAPTER 6	BONDS, BOND PRICES, AND THE DETERMINATION OF INTEREST RATES	129
Valuing Monetary Payments Now and in the Future	74	Bond Prices	130	<i>Zero-Coupon Bonds</i>	130
<i>Future Value and Compound Interest</i>	74	<i>Fixed-Payment Loans</i>	131	<i>Coupon Bonds</i>	132
<i>Present Value</i>	78	<i>Consols</i>	132	Bond Yields	133
Applying Present Value	82	<i>Yield to Maturity</i>	133	<i>Current Yield</i>	134
<i>Internal Rate of Return</i>	83	<i>Holding Period Returns</i>	135	The Bond Market and the Determination of Interest Rates	137
<i>Bonds: The Basics</i>	85	<i>Bond Supply, Bond Demand, and Equilibrium in the Bond Market</i>	137	<i>Factors That Shift Bond Supply</i>	141
Real and Nominal Interest Rates	89	<i>Factors That Shift Bond Demand</i>	142	<i>Understanding Changes in Equilibrium Bond Prices and Interest Rates</i>	145
Key Terms	93	Why Bonds Are Risky	146	<i>Default Risk</i>	147
Using FRED: Codes for Data in This Chapter	93	<i>Inflation Risk</i>	151	<i>Interest Rate Risk</i>	152
Chapter Lessons	94	Key Terms	153	Using FRED: Codes for Data in This Chapter	153
Conceptual and Analytical Problems	94	Using FRED: Codes for Data in This Chapter	153	Chapter Lessons	154
Data Exploration	97	Chapter Lessons	154	Conceptual and Analytical Problems	154
APPENDIX TO CHAPTER 4: The Algebra of Present-Value Formulas	99	Conceptual and Analytical Problems	154	Data Exploration	157
CHAPTER 5	UNDERSTANDING RISK	101	Data Exploration	157	
Defining Risk	102	<i>Measures of Risk</i>	106		
Measuring Risk	103	Risk Aversion, the Risk Premium, and the Risk-Return Tradeoff	113		
<i>Possibilities, Probabilities, and Expected Value</i>	103	Sources of Risk:			
<i>Measures of Risk</i>	106	Idiosyncratic and Systematic Risk	115		



## CHAPTER 7 THE RISK AND TERM STRUCTURE OF INTEREST RATES 158

Ratings and the Risk Structure of Interest Rates	159
<i>Bond Ratings</i>	159
<i>Commercial Paper Ratings</i>	164
<i>The Impact of Ratings on Yields</i>	164
Differences in Tax Status and Municipal Bonds	167
The Term Structure of Interest Rates	169
<i>The Expectations Hypothesis</i>	170
<i>The Liquidity Premium Theory</i>	173
The Information Content of Interest Rates	174
<i>Information in the Risk Structure of     Interest Rates</i>	174
<i>Information in the Term Structure of     Interest Rates</i>	175
Key Terms	178
Using FRED: Codes for Data in This Chapter	179
Chapter Lessons	179
Conceptual and Analytical Problems	180
Data Exploration	182

## CHAPTER 8 STOCKS, STOCK MARKETS, AND MARKET EFFICIENCY 184

The Essential Characteristics of Common Stock	185
Measuring the Level of the Stock Market	188
<i>The Dow Jones Industrial Average</i>	189
<i>The Standard &amp; Poor's 500 Index</i>	189
<i>Other U.S. Stock Market Indexes</i>	191
<i>World Stock Indexes</i>	191
Valuing Stocks	193
<i>Fundamental Value and the     Dividend-Discount Model</i>	193
<i>Why Stocks Are Risky</i>	195
<i>Risk and the Value of Stocks</i>	196
<i>The Theory of Efficient Markets</i>	199
Investing in Stocks for the Long Run	200
The Stock Market's Role in the Economy	203

Key Terms	206
Using FRED: Codes for Data in This Chapter	206
Chapter Lessons	206
Conceptual and Analytical Problems	207
Data Exploration	209

## CHAPTER 9 DERIVATIVES: FUTURES, OPTIONS, AND SWAPS 211

The Basics: Defining Derivatives	212
Forwards and Futures	213
<i>Margin Accounts and Marking to Market</i>	215
<i>Hedging and Speculating with Futures</i>	216
<i>Arbitrage and the Determinants of     Futures Prices</i>	217
Options	219
<i>Calls, Puts, and All That: Definitions</i>	219
<i>Using Options</i>	220
<i>Pricing Options: Intrinsic Value and the     Time Value of the Option</i>	223
<i>The Value of Options: Some Examples</i>	226
Swaps	227
<i>Interest Rate Swaps</i>	228
<i>Credit Default Swaps</i>	232
Key Terms	233
Using FRED: Codes for Data in This Chapter	233
Chapter Lessons	233
Conceptual and Analytical Problems	235
Data Exploration	237

## CHAPTER 10 FOREIGN EXCHANGE 238

Foreign Exchange Basics	240
<i>The Nominal Exchange Rate</i>	240
<i>The Real Exchange Rate</i>	241
<i>Foreign Exchange Markets</i>	244
Exchange Rates in the Long Run	245
<i>The Law of One Price</i>	245
<i>Purchasing Power Parity</i>	246
Exchange Rates in the Short Run	250
<i>The Supply of Dollars</i>	250

<i>The Demand for Dollars</i>	251
<i>Equilibrium in the Market for Dollars</i>	252
<i>Shifts in the Supply of and Demand for Dollars</i>	252
<i>Explaining Exchange Rate Movements</i>	253
Government Policy and Foreign Exchange Intervention	255
Key Terms	257
Using FRED: Codes for Data in This Chapter	258
Chapter Lessons	258
Conceptual and Analytical Problems	259
Data Exploration	262
APPENDIX TO CHAPTER 10: Interest Rate Parity and Short-Run Exchange Rate Determination	263
<b>Part III Financial Institutions</b>	
CHAPTER 11 THE ECONOMICS OF FINANCIAL INTERMEDIATION	266
The Role of Financial Intermediaries	268
<i>Pooling Savings</i>	271
<i>Safekeeping, Payments System Access, and Accounting</i>	271
<i>Providing Liquidity</i>	273
<i>Diversifying Risk</i>	274
<i>Collecting and Processing Information</i>	274
Information Asymmetries and Information Costs	275
<i>Adverse Selection</i>	276
<i>Solving the Adverse Selection Problem</i>	278
<i>Moral Hazard: Problem and Solutions</i>	281
Financial Intermediaries and Information Costs	284
<i>Screening and Certifying to Reduce Adverse Selection</i>	285
<i>Monitoring to Reduce Moral Hazard</i>	286
Key Terms	288
Using FRED: Codes for Data in This Chapter	289
Chapter Lessons	289
Conceptual and Analytical Problems	290
Data Exploration	292
CHAPTER 12 DEPOSITORY INSTITUTIONS: BANKS AND BANK MANAGEMENT	294
The Balance Sheet of Commercial Banks	295
<i>Assets: Uses of Funds</i>	295
<i>Liabilities: Sources of Funds</i>	298
<i>Bank Capital and Profitability</i>	300
<i>Off-Balance-Sheet Activities</i>	305
Bank Risk: Where It Comes from and What to Do about It	306
<i>Liquidity Risk</i>	307
<i>Credit Risk</i>	310
<i>Interest Rate Risk</i>	311
<i>Trading Risk</i>	314
<i>Cyber Risk and Other Operational Risks</i>	316
<i>Other Risks</i>	317
Key Terms	319
Using FRED: Codes for Data in This Chapter	320
Chapter Lessons	320
Conceptual and Analytical Problems	321
Data Exploration	325
CHAPTER 13 FINANCIAL INDUSTRY STRUCTURE	326
Banking Industry Structure	328
<i>A Short History of U.S. Banking</i>	328
<i>Competition and Consolidation</i>	330
<i>The Globalization of Banking</i>	333
<i>The Future of Banks</i>	336
Nondepository Institutions	337
<i>Insurance Companies</i>	338
<i>Pension Funds</i>	344
<i>Securities Firms: Brokers, Mutual Funds, and Investment Banks</i>	346
<i>Finance Companies</i>	347
<i>Government-Sponsored Enterprises</i>	348
Key Terms	351
Using FRED: Codes for Data in This Chapter	352
Chapter Lessons	352
Conceptual and Analytical Problems	353
Data Exploration	355

## CHAPTER 14 REGULATING THE FINANCIAL SYSTEM 357

The Sources and Consequences of Runs, Panics, and Crises 359

The Government Safety Net 363

*The Unique Role of Banks and Shadow Banks* 364

*The Government as Lender of Last Resort* 365

*Government Deposit Insurance* 367

*Problems Created by the Government Safety Net* 368

Regulation and Supervision of the Financial System 370

*Restrictions on Competition* 373

*Asset Holding Restrictions and Minimum Capital Requirements* 374

*Disclosure Requirements* 375

*Supervision and Examination* 377

*Stress Tests* 377

*Evolving Challenges for Regulators and Supervisors* 381

*Micro-Prudential versus Macro-Prudential Regulation* 382

*Regulatory Reform: The Dodd-Frank Act of 2010* 385

Key Terms 388

Using FRED: Codes for Data in This Chapter 388

Chapter Lessons 389

Conceptual and Analytical Problems 390

Data Exploration 391

## Part IV Central Banks, Monetary Policy, and Financial Stability

### CHAPTER 15 CENTRAL BANKS IN THE WORLD TODAY 393

The Basics: How Central Banks Originated and Their Role Today 394

*The Government's Bank* 394

*The Bankers' Bank* 396

Stability: The Primary Objective of All Central Banks 398

*Low, Stable Inflation* 400

*High, Stable Real Growth* 401

*Financial System Stability* 402

*Interest Rate and Exchange Rate Stability* 403

Meeting the Challenge: Creating a Successful Central Bank 404

*The Need for Independence* 406

*The Need for Accountability and Transparency* 407

*The Policy Framework, Policy Tradeoffs, and Credibility* 409

*Decision Making by Committee* 411

Fitting Everything Together: Central Banks and Fiscal Policy 411

Key Terms 415

Using FRED: Codes for Data in This Chapter 416

Chapter Lessons 416

Conceptual and Analytical Problems 417

Data Exploration 419

### CHAPTER 16 THE STRUCTURE OF CENTRAL BANKS: THE FEDERAL RESERVE AND THE EUROPEAN CENTRAL BANK 421

The Structure of the Federal Reserve System 422

*The Federal Reserve Banks* 423

*The Board of Governors* 425

*The Federal Open Market Committee* 428

Assessing the Federal Reserve System's Structure 431

*Independence from Political Influence* 432

*Decision Making by Committee* 432

*Accountability and Transparency* 432

*Policy Framework* 434

The European Central Bank 434

*Organizational Structure* 436

*Accountability and Transparency* 439

*The Price Stability Objective and Monetary Policy Strategy* 439

Key Terms 444

Using FRED: Codes for Data in This Chapter 444

Chapter Lessons	444	
Conceptual and Analytical Problems	445	
Data Exploration	447	
<b>CHAPTER 17 THE CENTRAL BANK BALANCE SHEET AND THE MONEY SUPPLY PROCESS</b>	<b>448</b>	
The Central Bank's Balance Sheet	450	
<i>Assets</i>	451	
<i>Liabilities</i>	451	
<i>The Importance of Disclosure</i>	453	
<i>The Monetary Base</i>	454	
Changing the Size and Composition of the Balance Sheet	454	
<i>Open Market Operations</i>	455	
<i>Foreign Exchange Intervention</i>	456	
<i>Discount Loans</i>	458	
<i>Cash Withdrawal</i>	458	
The Deposit Expansion Multiplier	460	
<i>Deposit Creation in a Single Bank</i>	460	
<i>Deposit Expansion in a System of Banks</i>	462	
The Monetary Base and the Money Supply	465	
<i>Deposit Expansion with Excess Reserves and Cash Withdrawals</i>	465	
<i>The Arithmetic of the Money Multiplier</i>	467	
<i>The Limits of the Central Bank's Ability to Control the Quantity of Money</i>	472	
Key Terms	474	
Using FRED: Codes for Data in This Chapter	474	
Chapter Lessons	475	
Conceptual and Analytical Problems	475	
Data Exploration	477	
<b>CHAPTER 18 MONETARY POLICY: STABILIZING THE DOMESTIC ECONOMY</b>	<b>479</b>	
The Federal Reserve's Conventional Policy Toolbox	482	
<i>The Target Federal Funds Rate and the Interest on Excess Reserves</i>	484	
<i>Discount Lending, the Lender of Last Resort, and Crisis Management</i>	487	
<i>Reserve Requirements</i>	490	
Operational Policy at the European Central Bank	490	
<i>The ECB's Target Interest Rate and Open Market Operations</i>	491	
<i>The Marginal Lending Facility</i>	491	
<i>The Deposit Facility</i>	492	
<i>Reserve Requirements</i>	492	
Linking Tools to Objectives: Making Choices	493	
<i>Desirable Features of a Policy Instrument</i>	494	
<i>Inflation Targeting</i>	496	
A Guide to Central Bank Interest Rates: The Taylor Rule	497	
Unconventional Policy Tools	501	
<i>Forward Guidance</i>	505	
<i>Quantitative Easing</i>	506	
<i>Targeted Asset Purchases</i>	508	
<i>Making an Effective Exit</i>	509	
Concluding Remarks	513	
Key Terms	513	
Using FRED: Codes for Data in This Chapter	514	
Chapter Lessons	514	
Conceptual and Analytical Problems	516	
Data Exploration	518	
<b>APPENDIX TO CHAPTER 18: Monetary Policy Operations and the Reverse Repo Rate</b>	<b>519</b>	
<b>CHAPTER 19 EXCHANGE RATE POLICY AND THE CENTRAL BANK</b>	<b>521</b>	
Linking Exchange Rate Policy with Domestic Monetary Policy	523	
<i>Inflation and the Long-Run Implications of Purchasing Power Parity</i>	523	
<i>Interest Rates and the Short-Run Implications of Capital Market Arbitrage</i>	524	
<i>Capital Controls and the Policymakers' Choice</i>	526	

Mechanics of Exchange Rate Management	528	<i>Targeting Money Growth: The Fed and the ECB</i>	569
<i>The Central Bank's Balance Sheet</i>	528	Key Terms	573
<i>Sterilized Intervention</i>	531	Using FRED: Codes for Data in This Chapter	573
The Costs, Benefits, and Risks of Fixed Exchange Rates	532	Chapter Lessons	573
<i>Assessing the Costs and Benefits</i>	532	Conceptual and Analytical Problems	574
<i>The Danger of Speculative Attacks</i>	534	Data Exploration	576
<i>Summarizing the Case for a Fixed Exchange Rate</i>	536	<b>CHAPTER 21 OUTPUT, INFLATION, AND MONETARY POLICY</b>	577
Fixed Exchange Rate Regimes	537	Output and Inflation in the Long Run	578
<i>Exchange Rate Pegs and the Bretton Woods System</i>	537	<i>Potential Output</i>	578
<i>Hard Pegs: Currency Boards and Dollarization</i>	539	<i>Long-Run Inflation</i>	579
Key Terms	545	Monetary Policy and the Dynamic Aggregate Demand Curve	580
Using FRED: Codes for Data in This Chapter	545	<i>Aggregate Expenditure and the Real Interest Rate</i>	582
Chapter Lessons	546	<i>Inflation, the Real Interest Rate, and the Monetary Policy Reaction Curve</i>	586
Conceptual and Analytical Problems	547	<i>The Dynamic Aggregate Demand Curve</i>	591
Data Exploration	549	Aggregate Supply	595
<b>APPENDIX TO CHAPTER 19: What You Really Need to Know about the Balance of Payments</b>	550	<i>Short-Run Aggregate Supply</i>	595
<b>Part V Modern Monetary Economics</b>		<i>Shifts in the Short-Run Aggregate Supply Curve</i>	596
<b>CHAPTER 20 MONEY GROWTH, MONEY DEMAND, AND MODERN MONETARY POLICY</b>	553	<i>The Long-Run Aggregate Supply Curve</i>	597
Why We Care about Monetary Aggregates	554	Equilibrium and the Determination of Output and Inflation	601
The Quantity Theory and the Velocity of Money	556	<i>Short-Run Equilibrium</i>	601
<i>Velocity and the Equation of Exchange</i>	557	<i>Adjustment to Long-Run Equilibrium</i>	601
<i>The Quantity Theory of Money</i>	558	<i>The Sources of Fluctuations in Output and Inflation</i>	603
<i>The Facts about Velocity</i>	559	<i>What Causes Recessions?</i>	604
The Demand for Money	562	Key Terms	606
<i>The Transactions Demand for Money</i>	562	Using FRED: Codes for Data in This Chapter	607
<i>The Portfolio Demand for Money</i>	564	Chapter Lessons	607
Targeting Money Growth in a Low-Inflation Environment	566	Conceptual and Analytical Problems	608
<i>The Instability of U.S. Money Demand</i>	566		