

Fundamentals of Corporate Finance

THIRD EDITION

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FUNDAMENTALS OF CORPORATE FINANCE

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Preface

This book is about corporate finance. It focuses on how companies invest in real assets and how they raise the money to pay for these investments.

Financial management is important, interesting, and challenging. It is *important* because today's capital investment decisions may determine the businesses that the firm is in 10, 20, or more years ahead. Also, a firm's success or failure depends in large part on its ability to find the capital that it needs.

Finance is *interesting* for several reasons. Financial decisions often involve huge sums of money. Large investment projects or acquisitions may involve billions of dollars. Also, the financial community is international and fast moving, with colorful heroes and a sprinkling of unpleasant villains.

Finance is *challenging*. Financial decisions are rarely cut and dried, and the financial markets in which companies operate are changing rapidly. Good managers can cope with routine problems, but only the best managers can respond to change. To handle new problems, you need more than rules of thumb; you need to understand why companies and financial markets behave as they do and when common practice may not be best practice. Once you have a consistent framework for making financial decisions, complex problems become more manageable.

This book provides that framework. It is not an encyclopedia of finance. It focuses instead on setting out the basic *principles* of financial management and applying them to the main decisions faced by the financial manager. It explains why the firm's owners would like the manager to increase firm value and shows how managers value investments that may pay off at different points of time or have different degrees of risk. It also describes the main features of financial markets and discusses why companies may prefer a particular source of finance.

Some texts shy away from modern finance, sticking instead with more traditional, procedural, or institutional approaches. These are supposed to be easier or more practical. We disagree emphatically. The concepts of modern finance, properly explained, make the subject simpler, not more difficult. They are also more practical. The tools of financial management are easier to grasp and use effectively when presented in a consistent conceptual framework. Modern finance provides that framework.

Modern financial management is not "rocket science." It is a set of ideas that can be made clear by words, graphs, and numerical examples. The ideas provide the "why" behind the tools that good financial managers use to make investment and financing decisions.

We wrote this book to make financial management clear, useful, interesting and fun for the beginning student. We set out to show that modern finance and good financial practice go together, even for the financial novice.

Fundamentals and Principles of Corporate Finance

This book is derived in part from its sister text *Principles of Corporate Finance*. The spirit of the two books is similar. Both apply modern finance to give students a working ability to make financial decisions. However, there are also substantial differences between the two books.

First, we provide much more detailed discussion of the principles and mechanics of the time value of money. This material underlies almost all of this text, and we spend a lengthy chapter providing extensive practice with this key concept.

Second, we use numerical examples in this text to a greater degree than in *Principles*. Each chapter presents several detailed numerical examples to help the reader become familiar and comfortable with the material.

Third, we have streamlined the treatment of most topics. Whereas *Principles* has 35 chapters, *Fundamentals* has only 26. The relative brevity of *Fundamentals* necessitates a broader-brush coverage of some topics, but we feel that this is an advantage for a beginning audience.

Fourth, we assume little in the way of background knowledge. While most users will have had an introductory accounting course, we review the concepts of accounting that are important to the financial manager in Chapter 2.

Principles is known for its relaxed and informal writing style, and we continue this tradition in *Fundamentals*. In addition, we use as little mathematical notation as possible. Even when we present an equation, we usually write it in words rather than symbols. This approach has two advantages. It is less intimidating, and it focuses attention on the underlying concept rather than the formula.

ORGANIZATIONAL DESIGN

Fundamentals is organized in nine parts.

Part I (Introduction) provides essential background material. In the first chapter we discuss how businesses are organized, the role of the financial manager and the financial markets in which the manager operates. We explain how shareholders want managers to take actions that increase the value of their investment and we describe some of the mechanisms that help to align the interests of managers and shareholders. Of course the task of increasing shareholder value does not justify corrupt and unscrupulous behavior. We therefore discuss some of the ethical issues that confront managers.

A large corporation is a team effort, and so companies produce financial statements to help the players monitor their progress. Chapter 2 provides a brief overview of these financial statements and introduces two key distinctions—between market and book values and between cash flows and profits. The chapter concludes with a summary of federal taxes.

Part II (Value) is concerned with valuation. In Chapter 3 we introduce the concept of the time value of money, and, since most readers will be more familiar with their own financial affairs than with the big leagues of finance, we motivate our discussion by looking first at some personal financial decisions. We show how to value long-lived streams of cash flows and work through the valuation of perpetuities and annuities. Chapter 3 also contains a short concluding section on inflation and the distinction between real and nominal returns.

Chapters 4 and 5 introduce the basic features of bonds and stocks and give students a chance to apply the ideas of Chapter 3 to the valuation of these securities. We show how to find the value of a bond given its yield and we show how prices of bonds fluctuate as interest rates change. We look at what determines stock prices and how stock valuation formulas can be used to infer the return that investors expect. Finally, we see how investment opportunities are reflected in the stock price and why analysts focus on the price-earnings multiple.

The remaining chapters of Part II are concerned with the company's investment decision. In Chapter 6 we introduce the concept of net present value and show how to calculate the NPV of a simple investment project. We also look at other measures of an investment's attractiveness—the internal rate of return rule, payback, and the return on book. We then turn to more complex investment proposals, including choices between alternative projects, machine replacement decisions, and decisions of when to invest. Finally, we show how the profitability index can be used to choose between investment projects when capital is scarce.

The first step in any NPV calculation is to decide what to discount. Therefore, in Chapter 7 we work through a realistic example of a capital budgeting analysis, showing how the manager needs to recognize the investment in working capital and how taxes and depreciation affect cash flows.

We start Chapter 8 by looking at how companies organize the investment process and ensure everyone works toward a common goal. We then go on to look at various techniques to help managers identify the key assumptions in their estimates, such as sensitivity analysis, scenario analysis, and break-even analysis. We conclude the chapter by describing how managers try to build future flexibility into projects so that they can capitalize on good luck and mitigate the consequences of bad luck.

Part III (Risk) is concerned with the cost of capital. Chapter 9 starts with a historical survey of returns on bonds and stocks and goes on to distinguish between the unique risk and market risk of individual stocks. Chapter 10 shows how to measure market risk and discusses the relationship between risk and expected return. Chapter 11 introduces the weighted-average cost of capital and provides a practical illustration of how to estimate it.

Part IV (Financing) begins our discussion of the financing decision. In Chapter 12 we introduce the notion of market efficiency. Few other introductory texts include a chapter on this topic. We believe that without a solid understanding of market efficiency it is difficult to think through the issues that arise when firms issue securities or make capital structure and dividend decisions. Chapter 13 looks at the role of shareholders in large corporations and compares corporate governance in the USA and elsewhere. It also provides an overview of the securities that firms issue and their relative importance as sources of finance. In Chapter 14 we look at how firms issue securities and we follow a firm from its first need for venture capital, through its initial public offering to its continuing need to raise debt or equity.

Part V (Capital Structure and Dividend Policy) focuses on the two classic long-term financing decisions. How much the firm should borrow is addressed in Chapter 15, and how it should set its dividend policy is addressed in Chapter 16. In each case we start with Modigliani and Miller's (MM's) observation that in well-functioning markets the decision should not matter, but we use this observation to help the reader understand why financial managers in practice do pay attention to these decisions.

Part VI (Financial Planning) starts with financial statement analysis in Chapter 17 and shows how analysts summarize the large volume of accounting information by calculating some key financial ratios. Long-term financial planning is discussed in Chapter 18, where we look at how the financial manager considers the combined effects of investment and financing decisions on the firm as a whole. We also show how measures of internal and sustainable growth help managers check that the firm's planned growth is consistent with its financing plans. Chapter 19 is an introduction to working capital management. It also shows how managers ensure that the firm will have enough cash to pay its bills over the coming year and describes the principal sources of short-term borrowing.

Part VII (Short-Term Financial Decisions) is concerned with two important short-term problems. Chapter 20 explains the mechanics of cash collection and disbursement and shows how firms invest idle cash. It also looks at the general problem of managing inventories and shows how the decision to stock up on cash is similar to the decision to stock up on inventories of raw materials or finished goods. The parallel between the task of inventory management and cash management enables us to cover these topics with less repetition than in most other texts. In Chapter 21 we describe the basic steps of credit management and we summarize bankruptcy procedures when customers cannot pay their bills.

Part VIII (Special Topics) covers several important but somewhat more advanced topics—mergers (Chapter 22), international financial management (Chapter 23), options (Chapter 24), and risk management (Chapter 25). Some of these topics are touched on in earlier chapters. For example, we introduce the idea of options in Chapter 8, when we show how companies build flexibility into capital projects. However, Chapter 24 generalizes this material, explains at an elementary level how options are valued, and provides some examples of why the financial manager needs to be concerned about options. International finance is also not confined to Chapter 23. As one might expect from a book that is written by an international group of authors, examples from different countries and financial systems are scattered throughout the book. However, Chapter 23 tackles the specific problems that arise when a corporation is confronted by different currencies.

Part IX (Conclusion) contains a concluding chapter (Chapter 26), in which we review the most important ideas covered in the text. We also introduce some interesting questions that either were unanswered in the text or are still puzzles to the finance profession. Thus the last chapter is an introduction to future finance courses as well as a conclusion to this one.

ROUTES THROUGH THE BOOK

There are about as many effective ways to organize a course in corporate finance as there are teachers. For this reason, we have ensured that the text is modular, so that topics can be introduced in different sequences.

We like to discuss the principles of valuation before plunging into detailed financial statement analysis or issues of financial planning. Nevertheless, we recognize that many instructors will prefer to move directly from Chapter 2 (Accounting and Finance) to Chapter 17 (Financial Statement Analysis) in order to provide a gentler transition from the typical prerequisite accounting course. We have made sure that Part VI (Financial Planning) can easily follow Part I.

Similarly, we like to discuss working capital after the student is familiar with the

basic principles of valuation and financing, but we recognize that here also many instructors prefer to reverse our order. There should be no difficulty in taking Part VII out of order.

When we discuss project valuation in Part II, we stress that the opportunity cost of capital depends on project risk. But we do not discuss how to measure risk or how return and risk are linked until Part III. This ordering can easily be modified. For example, the chapters on risk and return can be introduced before, after, or midway through the material on project valuation.

Changes in the Third Edition

This third edition of *Fundamentals* includes many changes. After thoroughly researching the market, we have rewritten and rearranged material to improve readability, and we have expanded the treatment of some topics and introduced others for the first time. Here are some examples of the changes that we have made.

Chapter 1 includes a wholly new section on careers in finance. The overview of the finance profession introduces students to different possible career paths and also conveys a richer sense of the various roles of financial managers. The chapter also has an expanded discussion of financial markets and institutions.

In response to user requests, we have slightly reorganized Chapter 3, placing the material on effective annual rates and compounding periods at the end of the chapter.

The previous chapter on stocks and bonds has been split into two stand-alone chapters. Chapter 4 is now devoted solely to bonds, and includes the discussion of credit risk that formerly was part of a later chapter. Chapter 5 covers the stock market and stock valuation. This division into two chapters allows a clearer focus on each topic, and somewhat expanded coverage.

Chapter 7 on Discounted Cash Flow Analysis has been extensively rewritten with careful attention to improving and clarifying the computation of project cash flows. This material has been expanded and enhanced with several worked examples. We also provide a simple spreadsheet model that shows students how spreadsheets can enhance and simplify cash flow analysis and capital budgeting decisions.

The material on Risk and Return in Part III has been revised. Chapter 10 on the capital asset pricing model contains new material on firms' use of the CAPM in capital budgeting. The treatment of taxes in measuring cost of capital (Chapter 11) has been simplified.

Part IV on Financing also has been revised. Chapter 13 (An Overview of Corporate Financing) has been updated with new material on asset-backed and index bonds as well as more recent data on trends in corporate financing. Chapter 14 contains additional material on IPOs. The material on capital structure in Chapter 15 has been considerably rewritten and simplified.

Part VI on Financial Planning contains significant new material. Chapter 17 on Financial Statement Analysis now discusses the measurement and interpretation of economic value added. An Excel spreadsheet with a long-term financial plan has been integrated into Chapter 18. Chapter 19 on Working Capital Management and Short-Term Planning similarly contains a cash management spreadsheet.

Part VIII has been updated. In Chapter 22, we illustrate the issues surrounding mergers with new examples. Chapter 23 on International Financial Management reflects European Monetary Union and the creation of the euro. Chapter 24 on Options contains actual applications of real options analysis.

Walk-Through

New and Enhanced Pedagogy

A great deal of effort has gone into expanding and enhancing the features in *Fundamentals*.

3.4

ANNUITY Equally Frequently, you may spaced level stream of cash mortgage might re

PERPETUITY Stream of level cash payments that never ends.



Level Cash Flows: Perpetuities and Annuities

Frequently, you may need to value a stream of equal cash flows. For example, a mortgage might require the homeowner to make equal monthly payments for th of the loan. For a 30-year loan, this would result in 360 equal payments. A 4-ye loan might require 48 equal monthly payments. Any such sequence of equally splevel cash flows is called an **annuity**. If the payment stream lasts forever, it is ca **perpetuity**.

HOW TO VALUE PERPETUITIES

Some time ago the British government borrowed by issuing perpetuities. Instead paying these loans, the British government pays the investors holding these secur fixed annual payment in perpetuity (forever).

The rate of interest on a perpetuity is equal to the promised annual paym divided by the present value. For example, if a perpetuity pays \$10 per year an can buy it for \$100, you will earn 10 percent interest each year on your investme general.

Interest rate on a perpetuity = $\frac{\text{cash payment}}{\text{present value}}$

 $r = \frac{C}{PV}$

INTERNATIONAL ICON

An international icon now appears where the authors discuss global issues.

SELF-TEST 3.5

In order to avoid estate taxes, your rich aunt Frederica will pay you \$10,000 pe 4 years, starting I year from now. What is the present value of your benefactor's gifts? The interest rate is 7 percent. How much will you have 4 years from no invest each gift at 7 percent?

SELF-TEST QUESTION

Self-Test Questions provided in each chapter, which enable students to check their understanding as they read. Answers are worked out at the end of each chapter.

QUIZ

- Trade Credit Rates. Company X sells on a 1/20, net 60, basis. Customer Y buys goods with an invoice of \$1,000.
- a. How much can Company Y deduct from the bill if it pays on Day 20?
- b. How many extra days of credit can Company Y receive if it passes up the cash discount?

PRACTICE PROBLEMS

- Compensating Balances. Suppose that Dynamic Sofa (a subsidiary of Dynamic Mattr has a line of credit with a stated interest rate of 10 percent and a compensating balance 25 percent. The compensating balance earns no interest.
 - a. If the firm needs \$10,000, how much will it need to borrow?
 - b. Suppose that Dynamic's bank offers to forget about the compensating balance req ment if the firm pays interest at a rate of 12 percent. Should the firm accept this o Why or why not?

CHALLENGE PROBLEMS

- 17. Credit Analysis. This is a bit harder. Use the data in Example 21.3. Now suppose, however that 10 percent of Cast Iron's customers are slow payers, and that slow payers have a probitity of 30 percent of defaulting on their bills. If it costs \$5 to determine whether a custom has been a prompt or slow payer in the past, should Cast Iron undertake such a check? His What is the expected savings from the credit check? It will depend on both the probabil of uncovering a slow payer and the savings from denying these payers credit.
- Credit Analysis, Look | South State of State of

QUIZ, CHALLENGE, AND PRACTICE PROBLEMS

New end-of-chapter problems are included for even more hands-on practice. Each question is labeled by topic and is separated by level of difficulty.



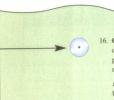
Throughout each chapter, key terms appear in bold type with margin definitions and are listed in the end of chapter material for easy reference.

RELATED WEB LINKS

Web citations listed at the end of each chapter immediately direct students to the best sources of financial information on the Internet. While the authors have listed only relatively stable websites, some change in Web addresses is inevitable. Therefore, a current list is maintained at the text's Online Learning Center (www.mhhe.com/bmm3e).

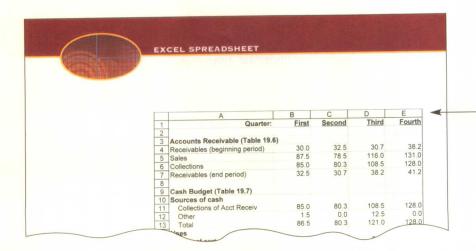
DISK ICON

To better understand important spreadsheet based problems, disk icons indicate problems specially linked to Excel based software for further practice.



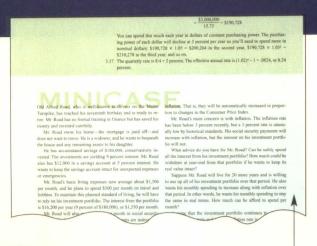
of the next 6 months? Similarly, customers which pay cash also will g 6 months of repeat sales.

- 16. Credit Policy. A firm currently makes only cash sales. It estimates that all on terms of net 30 would increase monthly sales from 200 to 220 units pe per unit is \$101 and the cost (in present value terms) is \$80. The interest r month.
 - a. Should the firm change its credit policy?
 - b. Would your answer to (a) change if 5 percent of all customers will fa under the new oradic action?



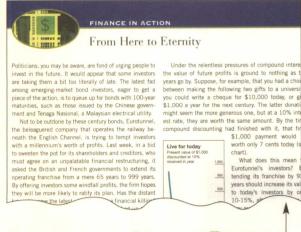
EXCEL SPREADSHEET

New Excel spreadsheet boxes provide the student with detailed examples of how to use spreadsheets when applying financial concepts.



MINICASES

Integrative minicases allow students to apply their knowledge to relatively complex, practical situations.



FINANCE IN ACTION BOXES

Almost every chapter includes at least one "Finance in Action" box. These are excerpts, usually from the financial press, providing reallife illustrations of the chapter's topics, such as ethical choices in finance, new views about stock valuation, Internet IPOs, and corporate takeover battles abroad.



FINANCIAL CALCULATOR

An Introduction to Financial Calculators

Financial calculators are designed with present value Future Values and future value formulas already programmed. Therefore, you can readily solve many problems simply by entering the inputs for the problem and punching a key for

The basic financial calculator uses five keys that correspond to the inputs for common problems involving the time value of money



Each key represents the following input:

• n is the number of periods. (We have been using t to denote the length of time or number of periods. Most calculators se n for the same concept.) · i is the interest rate per per

Recall Example 3.1, where we calculated the fu value of Peter Minuit's \$24 investment. Enter 24 the *PV* register. (You enter the value by typing 24 then pushing the *PV* key.) We assumed an interest rate 8 percent, so enter 8 into the i register. Because the had 374 years to compound, enter 374 into the n re ter. Enter 0 into the PMT register because there is r curring payment involved in the calculation. Now asl calculator to compute FV. On some calculators you ply press the FV key. On others you need to first press compute" key (which may be labeled COMP or C

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CALCULATOR BOXES AND EXERCISES

est rate is

In a continued effort to help students grasp the critical concept of Time Value of Money, many pedagogical tools have been added throughout the first section of the text. Financial Calculator boxes provide examples for solving a variety of problems with directions for the three most popular financial calculators.

KEY POINTS

Located every few pages throughout the text, these points underscore and summarize the importance of the immediately preceding material, at the same time helping students focus on the most relevant topics critical to their understanding.

to London in 50 years if the inflation rate is 5 percent (roughly its average over the past 25 years)? What if inflation is 10 percent? Economists sometimes talk about current or nominal dollars versus constant or real dollars. Current or nominal dollars refer to the actual number of dollars of the day; constant or real dollars refer to the amount of purchasing power. Some expenditures are fixed in nominal terms, and therefore decline in real terms Suppose you took out a 30-year house mortgage in 1988. The monthly payment was \$800. It was still \$800 in 1998, even though the CPI increased by a factor of 1.36 over What's the monthly payment for 1998 expressed in real 1988 dollars? The answ

Supplements

In addition to the overall refinement and improvement of the text material, considerable effort was put into developing a stellar supplement package to provide students and instructors with an abundance of teaching and learning resources.

THE WALL STREET JOURNAL EDITION (ISBN 0072380519)

Through a unique arrangement with Dow Jones, McGraw-Hill/Irwin is able to offer your students a 10-week subscription to *The Wall Street Journal* as part of the purchase price of the WSJ Edition text. The WSJ will keep students up to date on the world of finance.

INSTRUCTOR'S MANUAL (ISBN 0072380632)

Updated and enhanced by David Durst of the University of Akron, this supplement includes a descriptive preface containing alternative course formats and case teaching methods, a chapter overview and outline, key terms and concepts, a description of the PowerPoint slides, video teaching notes, related weblinks, and pedagogical ideas.

POWERPOINT PRESENTATION SYSTEM

Prepared by Matthew Will of Johns Hopkins University, these visually stimulating slides have been fully updated with colorful graphs, charts, and lists. Found only on the student and instructor CD-ROMs and the Online Learning Center, the slides can be edited or manipulated to fit the needs of a particular course.

SOLUTIONS MANUAL (ISBN 0072380659)

For easy reference, the authors have prepared this resource containing solutions to all end of chapter problems.

TEST BANK (ISBN 0072318333)

William Sackley of the University of North Carolina, Wilmington, has added over 50% new questions and problems to the Test Bank. Over 2,000 true/false, multiple-choice, and discussion questions and problems are available to the instructor at varying levels of difficulty and comprehension. Complete answers are provided for all test questions and problems, along with a reference to their location in the text.

BROWNSTONE DIPLOMA TESTING SYSTEM FOR WINDOWS (ISBN 0072395575)

Our *Brownstone Diploma Testing System* offers test items for *Fundamentals of Corporate Finance* on computer disk. This program makes it possible to create tests based on chapter, type of questions, and difficulty level. It allows instructors to combine their own questions with test items created by the Test Bank author. This system can be used to edit existing questions and create several different versions of each test. The program accepts graphics, allows password protection of saved tests, and may be used on a computer network.

F.A.S.T. (FINANCIAL ANALYSIS SPREADSHEET TEMPLATES)

These templates allow students to work with Excel spreadsheets and are tied to over 100 problems in the text. This supplement is available only on the student and instructor CD-ROMs and as a resource on the Online Learning Center.

INSTRUCTOR'S CD-ROM (ISBN 0072389591)

This CD contains the Instructor's Manual, Test Bank, video clips, weblinks, PowerPoint, and F.A.S.T. templates, providing the instructor with one resource for all supplementary material.

STUDENT CD-ROM (ISBN 0072389583)

Packaged free with every new book, this valuable learning tool contains Financial Steps Software—developed by FinQuest—an advanced financial tutorial software that generates an unlimited number of questions to test financial concepts. In addition, videos, F.A.S.T. templates, PowerPoint slides, weblinks, and practice quizzes are included to give the student ample study aids.

STUDY GUIDE (ISBN 0072337818)

Prepared by Matthew Will of Johns Hopkins University, the Study Guide contains a thorough list of activities for the student, including an introduction to the chapter, sources of business information, key concepts and terms, sample problems with solutions, integrated PowerPoint slides, and related weblinks.

VIDEOS (ISBN 0072380667)

Our professionally produced videos represent the newest topics in corporate finance, such as mergers and acquisitions. Preview clips are available on the Instructor and Student CD-ROMs and the Online Learning Center.

ON-LINE LEARNING CENTER (WWW.MHHE.COM/BMM3E)

The On-line Learning Center will feature a variety of interactive elements for instructors and students.

In addition to information on the book and its features, instructors will find fully downloadable supplements, videoclips, sample syllabi, sample course formats, teaching strategies for cases, weblinks, chapter outlines, lecture notes, and a bulletin board to ask questions or share ideas.

For students, the OLC will feature our new e-Learning Sessions, a fully interactive study session. Also available are video clips, downloadable supplements, articles on current topics in finance, and an Online Tutor who will help with concepts of particular difficulty to students.

PAGEOUT: THE COURSE WEBSITE DEVELOPMENT CENTER AND PAGEOUT LITE www.pageout.net

This web page generation software, free to adopters, is designed to help professors just beginning to explore Website options. In just a few minutes, even a novice computer user can have a course Website.

Simply type your material into the template provided and PageOut Lite instantly converts it to HTML—a universal Web language. Next, choose your favorite of three easy-to-navigate designs and your Web homepage is created, complete with online syllabus, lecture notes, and bookmarks. You can even include a separate instructor page and an assignment page.

PageOut offers enhanced point-and-click features including a Syllabus Page that applies real-world links to original text material, an automated grade book, and a discussion board where instructors and your students can exchange questions and post announcements.

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Contents in Brief

PART ONE	Introduction 1
	CHAPTER 1 The Firm and the Financial Manager 3
	CHAPTER 2 Accounting and Finance 33
PART TWO	Value 55
	CHAPTER 3 The Time Value of Money 57
	CHAPTER 4 Valuing Bonds 105
	CHAPTER 5 Valuing Stocks 131
	CHAPTER 6 Net Present Value and Other Investment Criteria 163
	CHAPTER 7 Using Discounted Cash-Flow Analysis to Make Investment Decisions 199
	CHAPTER 8 Project Analysis 229
PART THREE	Risk 257
	CHAPTER 9 Introduction to Risk, Return, and the Opportunity Cost of Capital 259
	CHAPTER 10 Risk, Return, and Capital Budgeting 289
	CHAPTER 11 The Cost of Capital 317
PART FOUR	Financing 345
	CHAPTER 12 Corporate Financing and the Lessons of Market Efficiency 347
	CHAPTER 13 An Overview of Corporate Financing 369
	CHAPTER 14 How Corporations Issue Securities 393
PART FIVE	Capital Structure and Dividend Policy 421
	CHAPTER 15 The Capital Structure Decision 423
	CHAPTER 16 Dividend Policy 459