
FUNDAMENTALS OF
CORPORATE FINANCE
FOURTH EDITION
Parrino
Bates
Gillan
Kidwell
WILEY

Fundamentals of Corporate Finance

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Fourth Edition

ROBERT PARRINO
Department Chair and Lamar Savings
Centennial Professor of Finance
University of Texas at Austin

THOMAS W. BATES
Department Chair and
Associate Professor of Finance
Arizona State University

STUART L. GILLAN
Associate Professor of Finance
University of Georgia

DAVID S. KIDWELL
Professor of Finance and Dean Emeritus
University of Minnesota

WILEY

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Dedication

ROBERT PARRINO

To my parents, whose life-long support and commitment to education inspired me to become an educator, and to my wife, Emily, for her unending support.

THOMAS BATES

To my wife, Emi, and our daughters, Abigail and Lillian. Your support, patience, fun, and friendship make me a better educator, scholar, and person.

STUART GILLAN

To the memory of my father, and to my family for their never-ending support and encouragement.

DAVID KIDWELL

To my parents, Dr. William and Margaret Kidwell, for their endless support of my endeavors; to my son, David Jr., of whom I am very proud; and to my wife, Jillinda, who is the joy of my life.

About the Authors

ROBERT PARRINO

Department Chair and Lamar Savings Centennial Professor of Finance
Director, Hicks, Muse, Tate & Furst Center for Private Equity Finance
McCombs School of Business, University of Texas at Austin

A member of the faculty at University of Texas since 1992, Dr. Parrino teaches courses in regular degree and executive education programs at the University of Texas, as well as in customized executive education courses for industrial, financial, and professional firms. He has also taught at the University of Chicago, University of Rochester, and IMADEC University in Vienna. Dr. Parrino has received numerous awards for teaching excellence at the University of Texas from students, faculty, and the Texas Exes (alumni association).

Dr. Parrino has been involved in advancing financial education outside of the classroom in a variety of ways. As a Chartered Financial Analyst (CFA) charterholder, he has been very active with the CFA Institute, having been a member of the candidate curriculum committee, served as a regular speaker at the annual Financial Analysts Seminar, spoken at over 20 Financial Analyst Society meetings, and served as a member of the planning committee for the CFA Institute's Annual Meeting. In addition, Dr. Parrino is the founding director of the Hicks, Muse, Tate & Furst Center for Private Equity Finance at the University of Texas. The center sponsors conferences and other educational activities in areas related to private equity finance. Dr. Parrino was Vice President for Financial Education of the Financial Management Association (FMA) from 2008 to 2010 and an academic director of the FMA from 2011 to 2013. In 2017 he was elected to be VP-Program for the 2019 FMA annual meeting.

Dr. Parrino also co-founded the Financial Research Association and is Associate Editor of the *Journal of Corporate Finance*. Dr. Parrino's research focus includes corporate governance, financial policies, restructuring, mergers and acquisitions, and private equity markets. He has published his research in a number of journals, including the *Journal of Finance*, *Journal of Financial Economics*, *Journal of Financial and Quantitative Analysis*, *Journal of Law and Economics*, *Journal of Portfolio Management*, and *Financial Management*. Dr. Parrino has won a number of awards for his research, including the 2013–2014 Career Award for Outstanding Research Contributions at the McCombs School of Business.

Dr. Parrino has experience in the application of corporate finance concepts in a variety of business situations. Since entering the academic profession, he has been retained as an advisor on valuation issues concerning businesses with enterprise values ranging to more than $1 billion and has consulted in areas such as corporate financing, compensation, and corporate governance. Dr. Parrino was previously President of Sprigg Lane Financial, Inc., a financial consulting firm with offices in Charlottesville, Virginia, and New York City. While at Sprigg Lane, he was on the executive, banking, and portfolio committees of the holding company that owns Sprigg Lane. Before joining Sprigg Lane, Dr. Parrino was on the Corporate Business Planning and Development staff at Marriott Corporation. At Marriott, he conducted fundamental business analyses and preliminary financial valuations of new business development opportunities and potential acquisitions. Dr. Parrino holds a B.S. in chemical engineering from Lehigh University, an MBA degree from The College of William and Mary, and M.S. and Ph.D. degrees in applied economics and finance, respectively, from the University of Rochester.

THOMAS W. BATES

Department Chair and Associate Professor of Finance W. P. Carey School of Business, Arizona State University

Dr. Bates is the Chair of the Department of Finance and Dean's Council of 100 Distinguished Scholar at the W. P. Carey School of Business, Arizona State University. He has also taught courses in finance at the University of Delaware, the Ivey School of Business at the University of Western Ontario, and the University of Arizona where he received the Scrivner teaching award. During his career as an educator, Professor Bates has taught corporate finance to students in undergraduate, MBA, executive MBA, and Ph.D. programs, as well as in custom corporate educational courses.

Professor Bates is a regular contributor to the academic finance literature in such journals as the *Journal of Finance*, *Journal of Financial Economics*, *Journal of Financial and Quantitative Analysis*, and *Financial Management*. His research addresses a variety of issues in corporate finance including the contracting environment in mergers and acquisitions, corporate liquidity decisions and cash holdings, and the governance of corporations. In practice, Dr. Bates has worked with companies and legal firms as an advisor on issues related to the valuation of companies and corporate governance. Dr. Bates received a B.A. in Economics from Guilford College and his doctorate in finance from the University of Pittsburgh.

STUART L. GILLAN

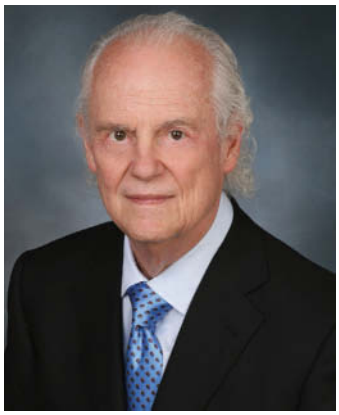
Associate Professor of Finance, Terry College of Business, University of Georgia

Dr. Gillan is Associate Professor of Finance in the Terry College of Business at the University of Georgia. His industry experience includes time as Associate Chief Economist at the United States Securities and Exchange Commission (SEC) and Senior Research Fellow with TIAA, a New York-based financial services company.

Before joining the University of Georgia, he held academic positions at Arizona State University, the University of Delaware, the University of Hong Kong, the University of Otago, and Texas Tech University. He has also been a visiting scholar at the Chinese University of Hong Kong, University of Canterbury, the Hong Kong Polytechnic University, and a William Evans Fellow at the University of Otago. In addition to teaching corporate finance classes to undergraduate, masters, MBA and Executive MBA students, Dr. Gillan has taught in several customized executive education and corporate programs. In recognition of his teaching, he also received a Terry College of Business Hugh O. Nourse Outstanding MBA Teacher Award.

Additionally, Dr. Gillan has served as Co-Editor of the *Journal of Corporate Finance*, Associate Editor at the *Review of Financial Studies*, Associate Editor at *Accounting and Finance*, and on the editorial advisory board of the *Journal of Applied Corporate Finance*. He has written and published extensively on corporate finance and corporate governance including topics such as corporate restructuring, executive compensation, shareholder activism, shareholder voting, and the structure and activity of corporate boards. His research has been published in the *Journal of Finance, Journal of Financial Economics, Review of Financial Studies, Journal of Corporate Finance, Journal of Risk and Insurance, Financial Management,* and the *Journal of Applied Corporate Finance*, amongst others. His has also received best paper awards from academic finance groups including the Financial Management Association International, the Indian School of Business Center for Analytical Finance, and the Western Finance Association.

Dr. Gillan received his Ph.D. from the Graduate School of Business at the University of Texas, Austin. His Bachelor of Commerce (Honors) and Masters of Commerce degrees are from the University of Otago, New Zealand.



DAVID S. KIDWELL

Professor of Finance and Dean Emeritus, Curtis L. Carlson School of Management, University of Minnesota

Dr. Kidwell has over 30 years experience in financial education, as a teacher, researcher, and administrator. He has served as Dean of the Carlson School at the University of Minnesota and of the School of Business Administration at the University of Connecticut. Prior to joining the University of Connecticut, Dr. Kidwell held endowed chairs in banking and finance at Tulane University, the University of Tennessee, and Texas Tech University. He was also on the faculty at the Krannert Graduate School of Management, Purdue University where he was twice voted the outstanding undergraduate teacher of the year.

An expert on the U.S. financial system, Dr. Kidwell is the author of more than 80 articles dealing with the U.S. financial system and capital markets. He has published his research in the leading journals, including *Journal of Finance, Journal of Financial Economics, Journal of Financial and Quantitative Analysis, Financial Management,* and *Journal of Money, Credit, and Banking*. Dr. Kidwell has also participated in a number of research grants funded by the National Science Foundation to study the efficiency of U.S. capital markets, and to study the impact of government regulations upon the delivery of consumer financial services.

Dr. Kidwell has been a management consultant for Coopers & Lybrand and a sales engineer for Bethlehem Steel Corporation. He served on the Board of Directors for the Schwan Food Company and was the Chairman of the Audit and Risk Committee. Dr. Kidwell is the past Secretary-Treasurer of the Board of Directors of AACSB, the International Association for Management Education and is a past member of the Boards of the Minnesota Council for Quality, the Stonier Graduate School of Banking, and Minnesota Center for Corporate Responsibility. Dr. Kidwell has also served as an Examiner for the 1995 Malcolm Baldrige National Quality Award, on the Board of Directors of the Juran Center for Leadership in Quality, and on the Board of the Minnesota Life Insurance Company.

Dr. Kidwell holds an undergraduate degree in mechanical engineering from California State University at San Diego, an MBA with a concentration in finance from California State University at San Francisco, and a Ph.D. in finance from the University of Oregon.

Preface

We have written *Fundamentals of Corporate Finance* for use in an introductory course in corporate finance at the undergraduate level. It is also suitable for advanced undergraduate, executive development, and traditional or executive MBA courses when supplemented with cases and outside readings. The main chapters in the book assume that students are well-versed in algebra and that they have taken courses in principles of economics and financial accounting. Optional chapters covering important economic and financial accounting concepts are included for students and instructors seeking such coverage.

Balance Between Conceptual Understanding and Computational Skills

We wrote this corporate finance text for one very important reason. We want to provide students and instructors with a book that strikes the best possible balance between helping students develop an intuitive understanding of key financial concepts and providing them with problem-solving and decision-making skills. In our experience, teaching students at all levels and across a range of business schools, we have found that students who understand the intuition underlying the basic concepts of finance are better able to develop the critical judgment necessary to apply financial tools to a broad range of real-world situations. An introductory corporate finance course should provide students with a strong understanding of both the concepts and tools that will help them in their subsequent business studies and their personal and professional lives.

Market research supports our view. Many faculty members who teach the introductory corporate finance course to undergraduates want a book that bridges the gap between conceptually-focused and computationally-focused books. This text is designed to bridge this gap. Specifically, it develops the fundamental concepts underlying corporate finance in an intuitive manner while maintaining a strong emphasis on developing computational skills. This text also takes the students one step further by emphasizing the use of intuition and analytical skills in decision making.

Our ultimate goal has been to write a book and develop associated learning tools that help our colleagues succeed in the classroom—materials that are genuinely helpful in the learning process. Our book offers a level of rigor that is appropriate for finance majors and yet presents the content in a manner that both finance and non-finance students find accessible and want to read. Writing a book that is both *rigorous* and *accessible* has been one of our key objectives, and both faculty and student reviews of the previous editions suggest that we have achieved this objective.

We have also tried to provide solutions to many of the challenges facing finance faculty in the current environment, who are asked to teach ever-increasing numbers of students with limited resources. Faculty members need a book and associated learning tools that help them effectively leverage their time. The organization of this book and the supplemental materials, along with the innovative *WileyPLUS* Web-based interface, which offers extensive problem solving opportunities and other resources for students, provides such leverage.

A Focus on Value Creation

This book is more than a collection of ideas, equations, and chapters. It has an important integrating theme—that of value creation. This theme, which is carried throughout the book, provides a framework that helps students understand the relations between the various concepts covered in the book and makes it easier for them to learn these concepts.

The concept of value creation is the most fundamental notion in corporate finance. It is in stockholders' best interests for value maximization to be at the heart of the financial decisions made within the firm. Thus, it is critical that students be able to analyze and make business decisions with a focus on value creation. The concept of value creation is introduced in the first chapter of the book and is further developed and applied throughout the remaining chapters.

The theme of value creation is operationalized through the net present value (NPV) concept. Once students grasp the fundamental idea that financial decision makers should only choose courses of action whose benefits exceed their costs, analysis and decision making using the NPV concept becomes second nature. By helping students better understand the economic rationale for a decision from the outset, rather than initially focusing on computational skills, our text keeps students focused on the true purpose of the calculations and the decision at hand.

Integrated Approach: Intuition, Analysis, and Decision Making

To support the focus on value creation, we have emphasized three things: (1) providing an intuitive framework for understanding fundamental finance concepts, (2) teaching students how to analyze and solve finance problems, and (3) helping students develop the ability to use the results from their analyses to make good financial decisions.

1. **An Intuitive Approach:** We believe that explaining finance concepts in an intuitive context helps students develop a richer understanding of those concepts and gain better insights into how finance problems can be approached. It is our experience that students who have a strong conceptual understanding of financial theory better

understand how things really work and are better problem solvers and decision makers than students who focus primarily on computational skills.

2. **Analysis and Problem Solving:** With a strong understanding of the basic principles of finance, students are equipped to tackle a wide range of financial problems. In addition to the many numerical examples that are solved in the text of each chapter, this book has 1,200 end-of-chapter homework and review problems that have been written with Bloom's Taxonomy in mind. Solutions for these problems are provided in the Instructor's Manual. We strive to help students acquire the ability to analyze and solve finance problems.
3. **Decision Making:** In the end, we want to prepare students to make sound financial decisions. To help students develop these skills, throughout the text we illustrate how the results from financial analyses are used in decision making.

Organization and Coverage

In order to help students develop the skills necessary to tackle investment and financing decisions, we have arranged the book's 21 chapters into five major building blocks, that collectively comprise the seven parts of the book, as illustrated in the accompanying exhibit and described below.

Introduction

Part 1, which consists of Chapter 1, provides an introduction to corporate finance. It describes the role of the financial manager, the types of fundamental decisions that financial mangers make, alternative forms of business organization, the goal of the firm, agency conflicts and how they arise, and the importance of ethics in financial decision-making. These discussions set the stage and provide a framework that students can use to think about key concepts as the course progresses.

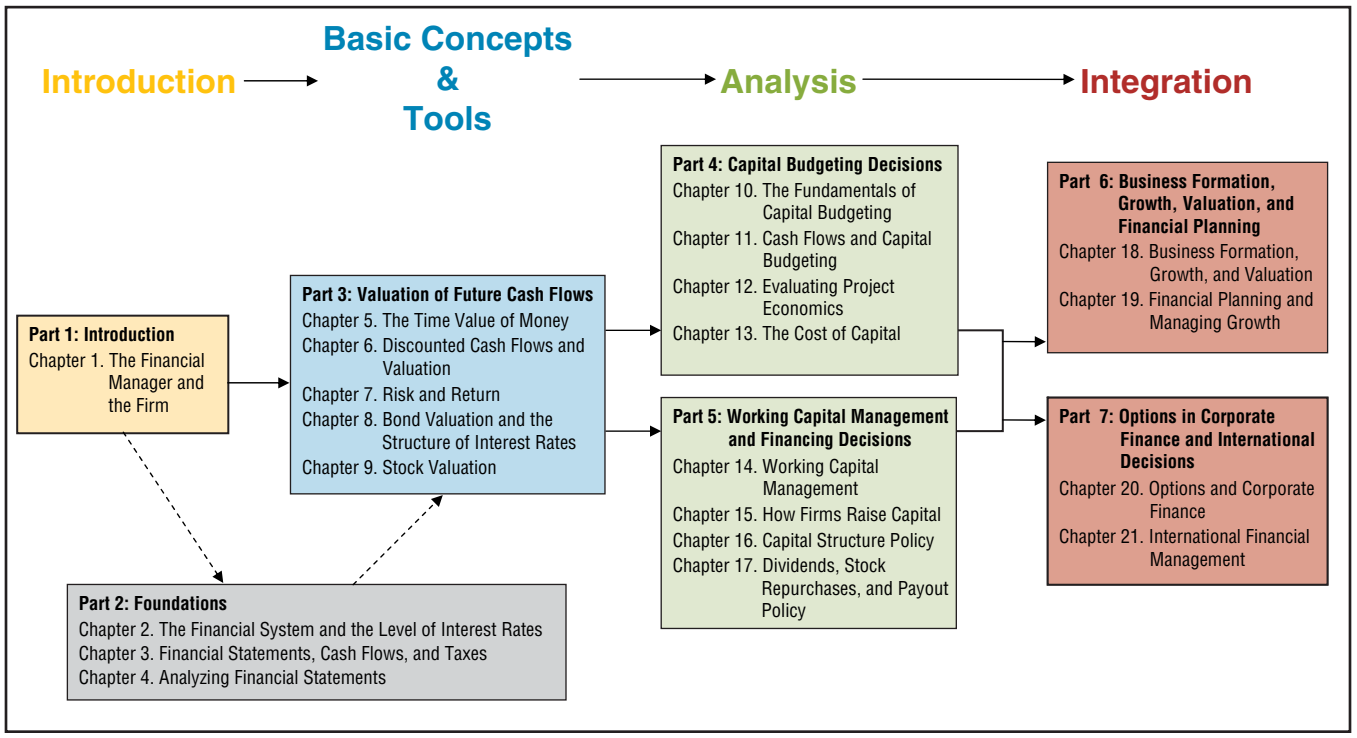
Foundations

Part 2 of the text consists of Chapters 2 through 4. These chapters present the basic institutional, economic, and accounting knowledge and tools that students should understand before they begin the study of financial concepts. Most of the material in these chapters is typically taught in other courses. Since students come to the corporate finance course with varying academic backgrounds, and because the time that has elapsed since students have taken particular prerequisite courses also varies, the chapters in Part 2 can help the instructor ensure that all students have the same base level of knowledge early in the course. Depending on the educational background of the students, the instructor might not find it necessary to cover all or any of the material in these chapters. Some or all of these chapters might, instead, be assigned as supplemental readings.

Chapter 2 describes the services financial institutions provide to businesses, how domestic and international financial markets work, the concept of market efficiency, how firms use financial markets, and how interest rates are determined in the economy. Chapter 3 describes the key financial statements and how they are related, as well as how these statements are related to cash flows to investors. Chapter 4 discusses ratio analysis and other tools used to evaluate financial statements. Throughout Part 2, we emphasize the importance of cash flows to get students thinking about cash flows as a critical component of all valuation calculations and financial decisions.

Basic Concepts and Tools

Part 3 presents basic financial concepts and tools and illustrates their application. This part of the text, which consists of Chapters 5 through 9, introduces time value of money and risk and return concepts and then applies these concepts to bond and stock valuation. These chapters provide students with basic financial intuitions and computational tools that will serve as the building blocks for analyzing investment and financing decisions in subsequent chapters.



Analysis

Parts 4 and 5 of the text focus on investment and financing decisions. Part 4 covers capital budgeting. Chapter 10 introduces the concept of net present value and illustrates its application as the principle tool for evaluating capital projects. It also discusses alternative capital budgeting decision rules, such as internal rate of return, payback period, and accounting rate of return, and compares them with the net present value criterion. Finally, Chapter 10 also discusses investment decisions with capital rationing. The discussions in Chapter 10 provide a framework that will help students in the rest of Part 4 as they learn the nuances of capital budgeting analysis in realistic settings.

Chapters 11 and 12 follow with in-depth discussions of how cash flows are calculated and forecast. The cash flow calculations are presented in Chapter 11 using a valuation framework that helps students think about valuation concepts in an intuitive way and that prepares them for the extension of these concepts to business valuation in Chapter 18. Chapter 12 covers analytical tools—such as breakeven, sensitivity, scenario, and simulation analysis—that give students a better appreciation for how they can deal with the uncertainties associated with cash flow forecasts.

Chapter 13 explains how the discount rates used in capital budgeting are estimated. This chapter uses an innovative concept—that of the finance balance sheet—to help students develop an intuitive understanding of the relations between the costs of the individual components of capital and the firm's overall weighted average cost of capital. It also provides a detailed discussion of methods used to estimate the costs of the individual components of capital that are used to finance a firm's investments and how these estimates are used in capital budgeting.

Part 5 covers working capital management and financing decisions. It begins, in Chapter 14, with an introduction to how firms manage their working capital and the implications of working capital management decisions for financing decisions and firm value. This is followed, in Chapters 15 and 16, with discussions of how firms raise capital to fund their real activities and the factors that affect how firms choose among the various sources of capital available to them. Chapter 16 also includes an extensive appendix on leasing concepts and buy vs. lease analysis. Chapter 17 rounds out the discussion of financing decisions with an introduction to dividends, stock repurchases, stock dividends and splits, and payout policy.

Integration

Part 6, which consists of Chapters 18 and 19, brings together many of the key concepts introduced in the earlier parts of the text. Chapter 18 covers financial aspects of business formation and growth and introduces students to business valuation concepts for both private and public firms. The discussions in this chapter integrate the investment and financing concepts discussed in Parts 4 and 5 to provide students with a more complete picture of how all the financial concepts fit together. Chapter 19 covers concepts related to financial planning, forecasting, and managing growth.

Part 7 introduces students to some important issues that managers must deal with in applying the concepts covered in the text to real-world problems. Chapter 20 introduces call and put options and discusses how they relate to investment and financing decisions. It describes options that are embedded in the securities that firms issue. It also explains, at an accessible level, the idea behind real options and why traditional NPV analysis does not take such options into account. In addition, the chapter discusses agency costs of debt and equity and the implications of these costs for investment and financing decisions. Finally, Chapter 20 illustrates the use of options in risk management. Instructors can cover the topics in Chapter 20 near the end of the course or insert them at the appropriate points in Parts 4 and 5. Chapter 21 examines how international considerations affect the application of concepts covered in the book.

Unique Chapters

Chapter on Business Formation, Growth, and Valuation

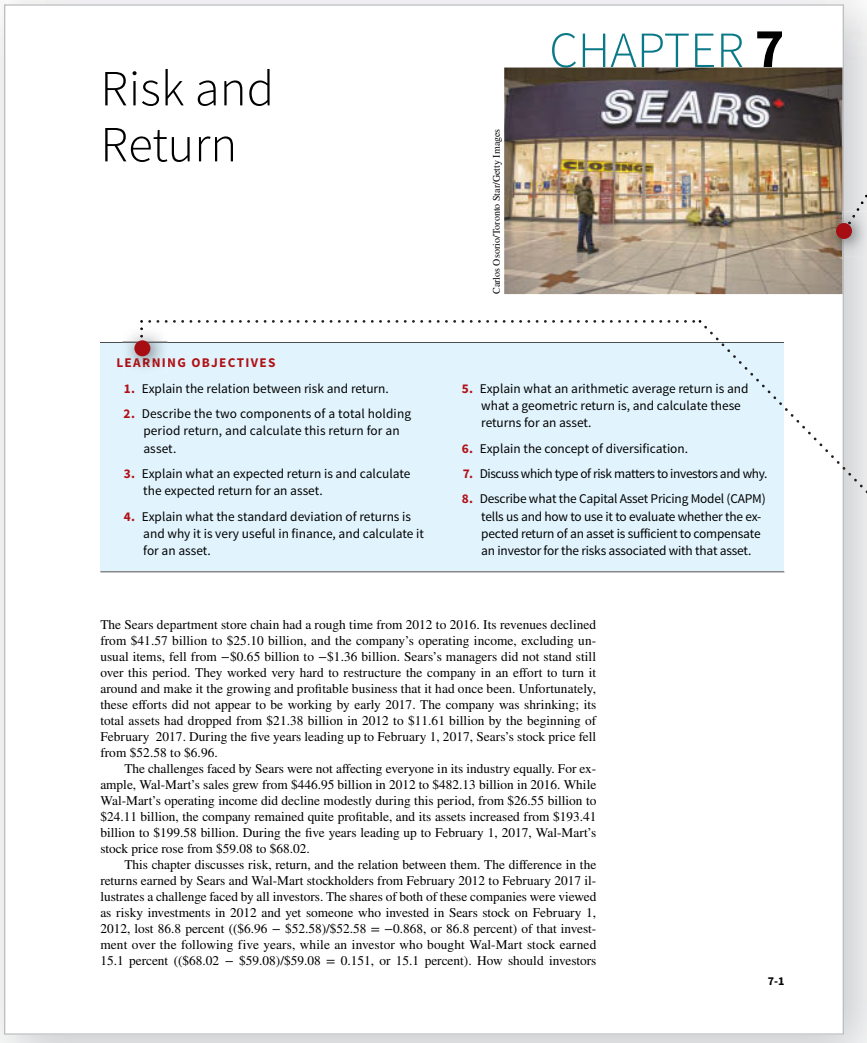
We wrote Chapter 18 in response to students' heightened interest in new business formation (entrepreneurship) and in order to draw together, in a comprehensive way, the key concepts from capital budgeting, working capital management, and financial policy. This capstone chapter provides an overview of practical finance issues associated with forecasting cash flows and capital requirements for a new business, preparing a business plan, and business valuation. The discussion of business valuation extends far beyond that found in other introductory corporate finance textbooks.

Chapter on Options and Corporate Finance

Many other corporate finance textbooks have a chapter that introduces students to financial options and how they are valued. This chapter goes further. It provides a focused discussion of the different types of financial and non-financial options that are of concern to financial managers, including options embedded in debt and equity securities, real options and their effect on project analysis, how option-like payoff functions faced by stockholders, bond holders, and managers affect agency relationships, and the use of options in risk management.

Proven Pedagogical Framework

We have developed several distinctive features throughout the book to aid student learning. The pedagogical features included in our text are as follows:



CHAPTER 7

Risk and Return

Carlos Osorio/Toronto Star/Getty Images

LEARNING OBJECTIVES

1. Explain the relation between risk and return.
2. Describe the two components of a total holding period return, and calculate this return for an asset.
3. Explain what an expected return is and calculate the expected return for an asset.
4. Explain what the standard deviation of returns is and why it is very useful in finance, and calculate it for an asset.
5. Explain what an arithmetic average return is and what a geometric return is, and calculate these returns for an asset.
6. Explain the concept of diversification.
7. Discuss which type of risk matters to investors and why.
8. Describe what the Capital Asset Pricing Model (CAPM) tells us and how to use it to evaluate whether the expected return of an asset is sufficient to compensate an investor for the risks associated with that asset.

The Sears department store chain had a rough time from 2012 to 2016. Its revenues declined from $41.57 billion to $25.10 billion, and the company's operating income, excluding unusual items, fell from −$0.65 billion to −$1.36 billion. Sears's managers did not stand still over this period. They worked very hard to restructure the company in an effort to turn it around and make it the growing and profitable business that it had once been. Unfortunately, these efforts did not appear to be working by early 2017. The company was shrinking; its total assets had dropped from $21.38 billion in 2012 to $11.61 billion by the beginning of February 2017. During the five years leading up to February 1, 2017, Sears's stock price fell from $52.58 to $6.96.

The challenges faced by Sears were not affecting everyone in its industry equally. For example, Wal-Mart's sales grew from $446.95 billion in 2012 to $482.13 billion in 2016. While Wal-Mart's operating income did decline modestly during this period, from $26.55 billion to $24.11 billion, the company remained quite profitable, and its assets increased from $193.41 billion to $199.58 billion. During the five years leading up to February 1, 2017, Wal-Mart's stock price rose from $59.08 to $68.02.

This chapter discusses risk, return, and the relation between them. The difference in the returns earned by Sears and Wal-Mart stockholders from February 2012 to February 2017 illustrates a challenge faced by all investors. The shares of both of these companies were viewed as risky investments in 2012 and yet someone who invested in Sears stock on February 1, 2012, lost 86.8 percent (($6.96 − $52.58)/$52.58 = −0.868, or 86.8 percent) of that investment over the following five years, while an investor who bought Wal-Mart stock earned 15.1 percent (($68.02 − $59.08)/$59.08 = 0.151, or 15.1 percent). How should investors

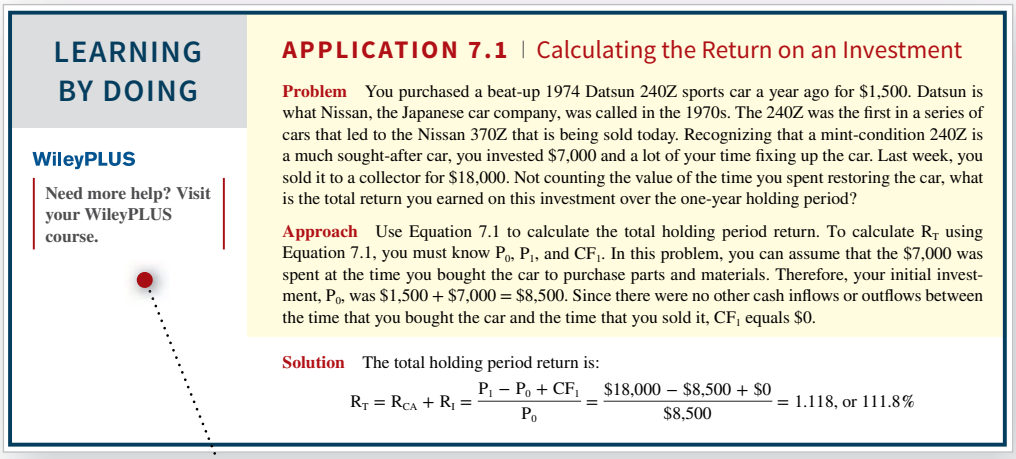
7-1

Chapter Opener Vignettes

Each chapter begins with a vignette that describes a real company or personal application. The vignettes illustrate concepts that will be presented in the chapter and are meant to heighten student interest, motivate learning, and demonstrate the real-life relevance of the material in the chapter.

Learning Objectives

The opening vignette is accompanied by learning objectives that identify the most important material for students to understand while reading the chapter. At the end of the chapter, the Summary of Learning Objectives summarizes the chapter content in the context of the learning objectives.

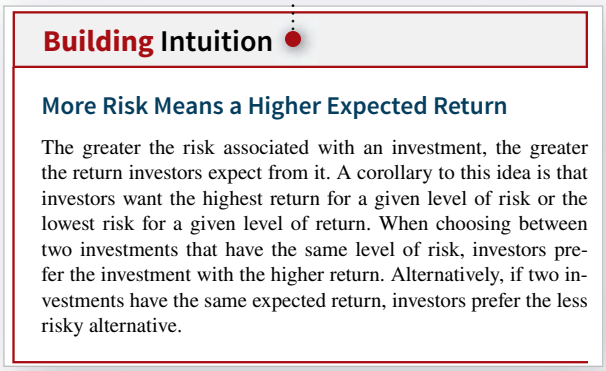


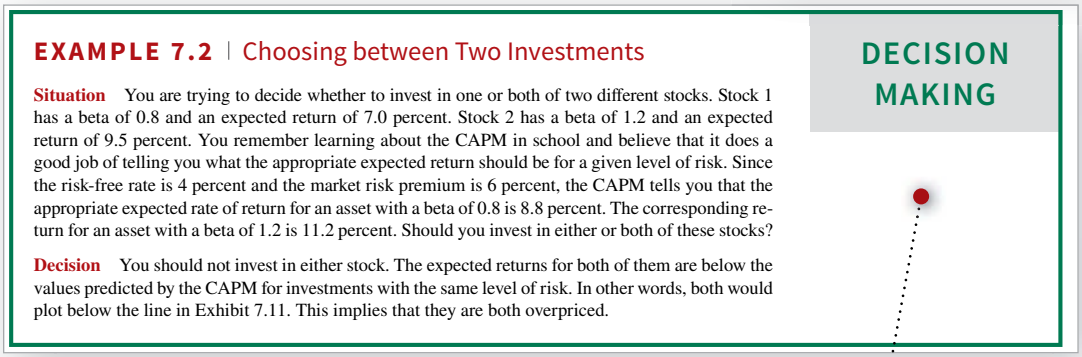
Learning by Doing Applications

Along with a generous number of in-text examples, most chapters include several Learning by Doing Applications. These applications contain quantitative problems with step-by-step solutions to help students better understand how to apply their intuition and analytical skills to solve important problems. By including these exercises, we provide students with additional practice in the application of the concepts, tools, and methods that are discussed in the text.

Building Intuition

Students must have an intuitive understanding of a number of important principles and concepts to successfully master the finance curriculum. Throughout the book, we emphasize these important concepts by presenting them in Building Intuition boxes. These boxes provide a statement of an important finance concept, such as the relation between risk and expected return, along with an intuitive example or explanation to help the student "get" the concept. These boxes help the students develop finance intuition. Collectively the Building Intuition boxes cover the most important concepts in corporate finance.





Decision-Making Examples

Throughout the book, we emphasize the role of the financial manager as a decision maker. To that end, twenty chapters include Decision-Making Examples. These examples, which emphasize the decision-making process rather than computation, provide students with experience in financial decision making. Each Decision-Making Example outlines a scenario and asks the student to make a decision based on the information presented.

End of Chapter Pedagogy

Summary of Learning Objectives and Key Equations

At the end of the chapter, you will find a summary of the key chapter content related to each of the learning objectives listed at the beginning of the chapter, as well as an exhibit listing the key equations in the chapter.

Summary of Learning Objectives

1 Explain the relation between risk and return.

Investors require higher returns for taking greater risk. They prefer the investment with the highest possible return for a given level of risk or the investment with the lowest risk for a given level of return.

2 Describe the two components of a total holding period return, and calculate this return for an asset.

The total holding period return on an investment consists of a capital appreciation component and an income component. This return is calculated using Equation 7.1. It is important to recognize that investors do not care whether they receive a dollar of return through capital appreciation or as a cash dividend. Investors value both sources of return equally.

3 Explain what an expected return is and calculate the expected return for an asset.

persion of returns. In other words, it tells us about the probability that a return will fall within a particular distance from the expected value or within a particular range. To calculate the standard deviation, the variance is first calculated using Equation 7.3. The standard deviation of returns is then calculated by taking the square root of the variance.

5 Explain what an arithmetic average return is and what a geometric return is, and calculate these returns for an asset.

The arithmetic average return is the return earned in an average period while the geometric average return is the average compounded return earned by an investor. Equations 7.4 and 7.5 are used to calculate these returns.

6 Explain the concept of diversification.

Diversification entails reducing risk by investing in two or more assets whose values do not always move in the same direction at the same time. Investing in a portfolio containing assets whose prices do

Summary of Key Equations

Equation	Description	Formula
7.1	Total holding period return	$R_T = R_{CA} + R_I = \frac{P_1 - P_0}{P_0} + \frac{CF_1}{P_0} = \frac{\Delta P + CF_1}{P_0}$
7.2	Expected return on an asset	$E(R_{Asset}) = \sum_{i=1}^{n} (p_i \times R_i)$
7.3	Variance of return on an asset	$Var(R) = \sigma_R^2 = \sum_{i=1}^{n} \{p_i \times [R_i - E(R)^2]\}$

Self-Study Problems

7.1 Kaaran made a friendly wager with a colleague that involves the result from flipping a coin. If heads comes up, Kaaran must pay her colleague $15; otherwise, her colleague will pay Kaaran $15. What is Kaaran's expected cash flow, and what is the variance of that cash flow if the coin has an equal probability of coming up heads or tails? Suppose Kaaran's colleague is willing to handicap the bet by paying her $20 if

Solutions to Self-Study Problems

7.1 Part 1: $E(\text{cash flow}) = (0.5 \times -\$15) + (0.5 \times \$15) = 0$

$$\sigma^2_{\text{Cash flow}} = [0.5 \times (-\$15 - \$0)^2] + [0.5 \times (\$15 - \$0)^2] = 225$$

Part 2: $E(\text{cash flow}) = (0.5 \times -\$15) + (0.5 \times \$20) = \$2.50$

$$\sigma^2_{\text{Cash flow}} = [0.5 \times (-\$15 - \$2.50)^2] + [0.5 \times (\$20 - \$2.50)^2] = 306.25$$

7.2 The expected return for CFI based on today's stock price is ($12 − $11)/$11 = 9.09 percent, which is lower than 20 percent. Since the stock price one year from today is fixed, the only way that you will generate a 20 percent return is if the price of the stock drops today. Consequently, the price of the stock today must drop to $10. It is found by solving the following: $0.2 = (\$12 - x)/x$, or $x = \$10$.

7.3 Since you know that 1.645 standard deviations around the expected return captures 90 percent of the distribution, you can set up either of the following equations:

$$\$40 = \$50 - 1.645\sigma \quad \text{or} \quad \$60 = \$50 + 1.645\sigma$$

and solve for σ. Doing this with either equation yields:

$$\sigma = \$6.079 \text{ and } \sigma^2 = 36.954$$

7.4 The value in 2015 is:

$$V_{2015} = \$1 \times (1 + -0.0326) \times (1 + 0.1823) \times (1 + 0.4507) \times (1 + 0.0292) \times (1 + -0.0360) = \$1.646$$

Substituting into Equation 7.4 and solving for the geometric average yields:

$$R_{\text{Geometric average}} = [(1 + R_1) \times (1 + R_2) \times \cdots \times (1 + R_n)]^{1/n} - 1 = [\$1.646]^{1/5} - 1 = 0.1048, \text{ or } 10.48 \text{ per year}$$

Self-Study Problems with Solutions

Five problems similar to the in-text Learning by Doing Applications follow the summary and provide additional examples with step-by-step solutions to help students further develop their problem-solving and computational skills.

Discussion Questions

At least ten qualitative questions, called Discussion Questions, require students to think through their understanding of key concepts and apply those concepts to a problem.

Discussion Questions

7.1 Suppose that you know the risk and the expected return for two stocks. Discuss the process you might utilize to determine which of the two stocks is a better buy. You may assume that the two stocks will be the only assets held in your portfolio.

7.2 What is the difference between the expected rate of return and the required rate of return? What does it mean if they are different for a particular asset at a particular point in time?

7.3 Suppose that the standard deviation of the returns on the shares of stock at two different companies is exactly the same. Does this mean that the required rate of return will be the same for these two stocks? How might the required rate of return on the stock of a third company be greater than the required rates of return on the stocks of the first two companies even if the standard deviation of the returns of the third company's stock is lower?

7.4 The correlation between Stocks A and B is 0.50, while the correlation between Stocks A and C is −0.5. You already own Stock A

7.6 Which investment category included in Exhibit 7.3 has shown the greatest degree of risk in the United States since 1926? Explain why that makes sense in a world where the value of an asset in this investment category is likely to be more sensitive to changes in market conditions than is the price of a corporate bond.

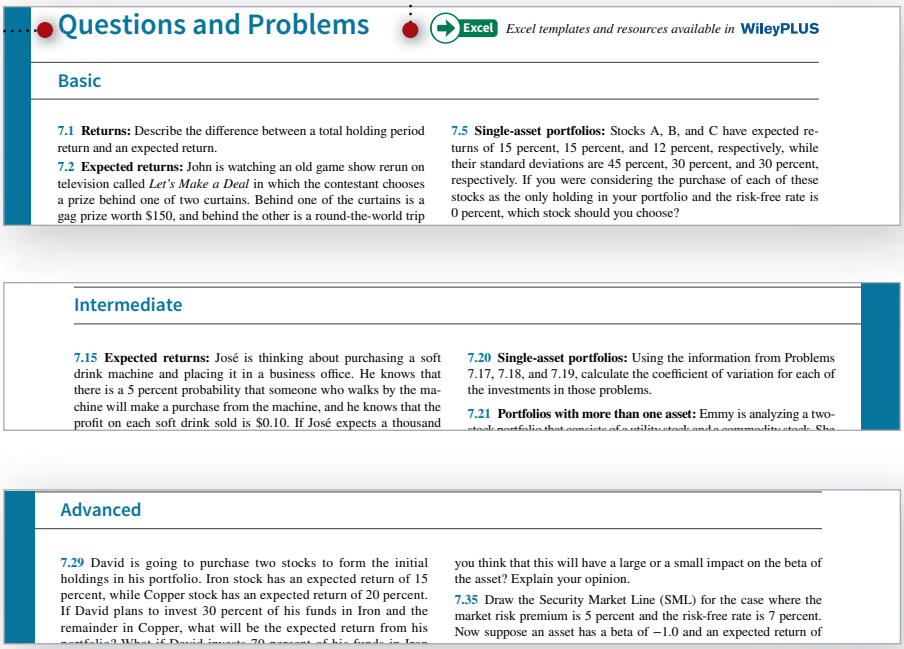
7.7 You are concerned about one of the investments in your fully diversified portfolio. You just have an uneasy feeling about the CFO, Iam Shifty, of that particular firm. You do believe, however, that the firm makes a good product and that it is appropriately priced by the market. Should you be concerned about the effect on your portfolio if Shifty embezzles a portion of the firm's cash?

7.8 The CAPM is used to price the risk (estimate the expected return) for any asset. Our examples have focused on stocks, but we could also use CAPM to estimate the expected rate of return for bonds. Explain why.

7.9 In recent years, investors have agreed that the market portfolio consists of more than just a group of U.S. stocks and bonds. If you are

Questions and Problems

The Questions and Problems, numbering 26 to 48 per chapter, are primarily quantitative and are classified as Basic, Intermediate, or Advanced.



Questions and Problems

Excel *Excel templates and resources available in* **WileyPLUS**

Basic

7.1 Returns: Describe the difference between a total holding period return and an expected return.

7.2 Expected returns: John is watching an old game show rerun on television called *Let's Make a Deal* in which the contestant chooses a prize behind one of two curtains. Behind one of the curtains is a gag prize worth $150, and behind the other is a round-the-world trip

7.5 Single-asset portfolios: Stocks A, B, and C have expected returns of 15 percent, 15 percent, and 12 percent, respectively, while their standard deviations are 45 percent, 30 percent, and 30 percent, respectively. If you were considering the purchase of each of these stocks as the only holding in your portfolio and the risk-free rate is 0 percent, which stock should you choose?

Intermediate

7.15 Expected returns: José is thinking about purchasing a soft drink machine and placing it in a business office. He knows that there is a 5 percent probability that someone who walks by the machine will make a purchase from the machine, and he knows that the profit on each soft drink sold is $0.10. If José expects a thousand

7.20 Single-asset portfolios: Using the information from Problems 7.17, 7.18, and 7.19, calculate the coefficient of variation for each of the investments in those problems.

7.21 Portfolios with more than one asset: Emmy is analyzing a two-

Advanced

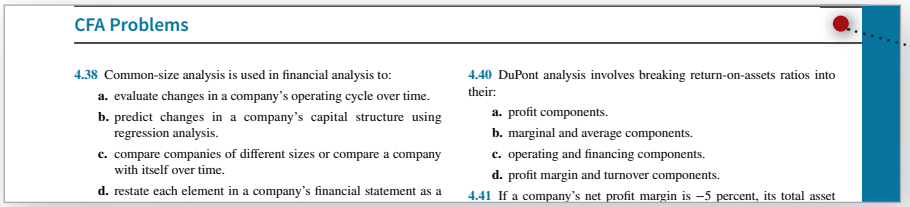
7.29 David is going to purchase two stocks to form the initial holdings in his portfolio. Iron stock has an expected return of 15 percent, while Copper stock has an expected return of 20 percent. If David plans to invest 30 percent of his funds in Iron and the remainder in Copper, what will be the expected return from his

you think that this will have a large or a small impact on the beta of the asset? Explain your opinion.

7.35 Draw the Security Market Line (SML) for the case where the market risk premium is 5 percent and the risk-free rate is 7 percent. Now suppose an asset has a beta of −1.0 and an expected return of

Excel Problems

Nearly all problems can be solved using Excel templates within *WileyPLUS*.



CFA Problems

4.38 Common-size analysis is used in financial analysis to:

a. evaluate changes in a company's operating cycle over time.

b. predict changes in a company's capital structure using regression analysis.

c. compare companies of different sizes or compare a company with itself over time.

d. restate each element in a company's financial statement as a

4.40 DuPont analysis involves breaking return-on-assets ratios into their:

a. profit components.

b. marginal and average components.

c. operating and financing components.

d. profit margin and turnover components.

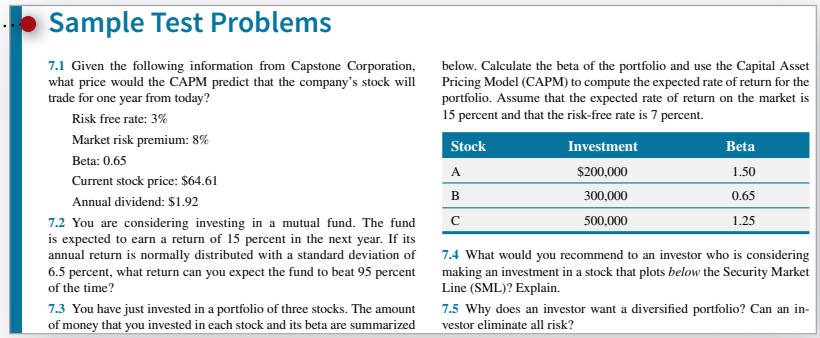
4.41 If a company's net profit margin is −5 percent, its total asset

CFA Problems

Problems from CFA readings are included in the Question and Problem section in appropriate chapters.

Sample Test Problems

Finally, five or more Sample Test Problems call for straightforward applications of the chapter concepts. These problems are intended to be representative of the kind of problems that may be used in a test, and instructors can encourage students to solve them as if they were taking a quiz. Solutions are provided in the Instructor's Manual.



Sample Test Problems

7.1 Given the following information from Capstone Corporation, what price would the CAPM predict that the company's stock will trade for one year from today?

Risk free rate: 3%

Market risk premium: 8%

Beta: 0.65

Current stock price: $64.61

Annual dividend: $1.92

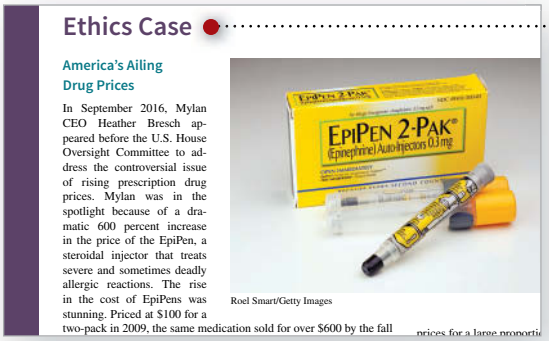
7.2 You are considering investing in a mutual fund. The fund is expected to earn a return of 15 percent in the next year. If its annual return is normally distributed with a standard deviation of 6.5 percent, what return can you expect the fund to beat 95 percent of the time?

7.3 You have just invested in a portfolio of three stocks. The amount of money that you invested in each stock and its beta are summarized below. Calculate the beta of the portfolio and use the Capital Asset Pricing Model (CAPM) to compute the expected rate of return for the portfolio. Assume that the expected rate of return on the market is 15 percent and that the risk-free rate is 7 percent.

Stock	Investment	Beta
A	$200,000	1.50
B	300,000	0.65
C	500,000	1.25

7.4 What would you recommend to an investor who is considering making an investment in a stock that plots *below* the Security Market Line (SML)? Explain.

7.5 Why does an investor want a diversified portfolio? Can an investor eliminate all risk?



Ethics Case

America's Ailing Drug Prices

In September 2016, Mylan CEO Heather Bresch appeared before the U.S. House Oversight Committee to address the controversial issue of rising prescription drug prices. Mylan was in the spotlight because of a dramatic 600 percent increase in the price of the EpiPen, a steroidal injector that treats severe and sometimes deadly allergic reactions. The rise in the cost of EpiPens was stunning. Priced at $100 for a two-pack in 2009, the same medication sold for over $600 by the fall

Roel Smart/Getty Images

prices for a large proporti

Ethics Cases

Ethics is an important topic in Finance. Key concepts are discussed in Chapter 1 and eight cases are included throughout this book to help students better understand how to analyze ethicals dilemmas. Real company examples are presented, including timeless cases about Arthur Anderson and Martha Stewart's scandal involving ImClone, and more timely topics such as the controversy surrounding drug price increases at firms like Mylan (EpiPen) and the cross-selling scandal at Wells Fargo. Each case includes questions for follow-up discussion in class or as an assignment.

New to This Edition

In revising Fundamentals of Corporate Finance we have improved the presentation and organization of key topics, added important new content, updated the text to reflect changes in market and business conditions since the third edition was written, improved key in-chapter pedagogical features, and added to the number and quality of the end-of-chapter problem sets.

Improved Content, Presentation, and Organization

In preparing this edition of *Fundamentals of Corporate Finance*, we extensively edited discussions throughout the text and added new content to improve the depth and effectiveness of the presentation. We also substantially modified the layout of the text to enhance the accessibility of the content in on line applications, such as WileyPLUS. The changes that we made to the content and writing are too numerous to discuss in detail here. However, examples include the addition of more in-text calculations related to cash flows associated with working capital and long term investments in Chapter 3, the addition of a new section on arithmetic versus geometric returns in Chapter 7, and streamlining of some of bond calculation discussions in Chapter 8. Throughout the text we added callouts for the Learning by Doing Applications and Decision Making Examples to improve the flow of the presentation. We also added two new ethics cases, one on pricing in the pharmaceutical industry and a second on the controversy at Wells Fargo regarding the establishment of new accounts without customer permission. These new cases, along with updated versions of six of the ethics cases from the previous edition, provide the instructor with a broad range ethical issues from which to choose.

Current Financial Market and Business Information

Throughout the text, all financial market and business information for which more current data are available have been updated. Not only have the exhibits been updated, but financial values such as interest rates, risk premia, and foreign currency exchange rates have been updated throughout the discussions in text, in-text examples, and end-of-chapter problems. In addition, all of the chapter opener vignettes have either been replaced or updated. Six of these examples are from 2016 and 15 are from 2017. All of the chapter openers provide timely examples of how the material covered in the chapter is relevant to financial decision-making.

In-Chapter Features

The **Learning Objectives** at the beginning of each chapter have been revised to more fully reflect the important content in the associated sections of the chapters.

New **Building Intuition Boxes** have been added where appropriate and existing Building Intuition Boxes have been edited to ensure clarity.

All **Learning by Doing Applications** have been reviewed and, where appropriate, updated or replaced.

All **Decision-Making Examples** have been reviewed and updated where necessary.

The **Summary of Learning Objectives** and **Key Equations** at the end of each chapter have been updated to reflect changes in the chapter text and to improve the pedagogical value of these features.

Refined and Extended Problem Sets

We have carefully edited the end-of-chapter questions and problems throughout the book to ensure that the examples are current and clearly presented. New Self-Study Problems, Discussion Questions, and Questions and Problems have been added to ensure appropriate coverage of key concepts at all levels of difficulty. The total number of end-of-chapter questions and problems, including self-study problems and self-test questions, for the entire text has increased to 1,200.

Engaging Digitally

Fundamentals of Corporate Finance, Fourth Edition, is completely integrated with WileyPLUS, featuring a suite of teaching and learning resources developed under the close review of the authors. Driven by the same basic beliefs as the textbook, WileyPLUS allows students to create a personalized study plan, assess their progress along the way, and access the content and resources needed to master the material. WileyPLUS provides immediate insight to student strengths and problem areas with visual reports that highlight what's most important for both the instructor and student.

Many dynamic resources are integrated into the course to help students build their knowledge and understanding, stay motivated, and prepare for decision making in a real-world context. WileyPLUS also includes **Orion**, an integrated adaptive practice that helps students build proficiency and use their study time most effectively. Additional features of the WileyPLUS course include:

Chapter 0 Math and Skills Review offering students adaptive review and practice for essential math topics necessary to master Corporate Finance. Built to serve as a refresher of remedial content, this chapter includes reading content, algorithmic practice, and **Figuring Finance Interactive Tutorials** built to improve student retention and help connect difficult math and finance concepts.

Learning by Doing Interactive Tutorials containing quantitative problems with step-by-step solutions to help students better understand how to apply their intuition and analytical skills to solve problems.

Solution Walkthrough Lightboard Videos featuring the authors working through a 1–3 of end of chapter problems per chapter, offering 24/7 just-in-time homework assistance and problem solving techniques.

Excel Templates and Excel Function Videos providing students with step-by-step examples of how to use specific Excel functions as it applies to Corporate Finance. Excel templates will be available for all applicable end of chapter question while videos feature select end-of-chapter problems to support Excel function examples.

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The nearly 400 colleagues listed below provided valuable feedback during the development process and added greatly to the content and pedagogy of the program. Their commitment to teaching and willingness to become involved in such a project was a source of inspiration to the authors. We would like to acknowledge the contribution made by the following professors whose thoughtful comments contributed to the quality, relevancy, and accuracy of the Parrino Corporate Finance program.

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Babu Baradwaj, Towson University
Charles Beauchamp, Middle Tennessee State University
Kristine Beck, California State University, Northridge
Michael Carter, University of North Texas, Dallas
James DeMello, Western Michigan University
James Dow, California State University, Northridge
James Hilliard, Northern Arizona University
James Keys, Florida International University
Patrick Lach, Eastern Illinois University
Pamela LaBorde, Western Washington University
Wendell Licon, Arizona State University
Steven Lifland, High Point University
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Dianne Morrison, University of Wisconsin, La Crosse
G. Michael Phillips, California State University, Northridge
Mary Lou Poloskey, The University of Texas at Austin
Andrew Prevost, University of Vermont
Timothy Sargent, California State University, Northridge
Mary Jane Sterling, Bradley University
Philip Thames, California State University, Long Beach
Susan White, University of Maryland
Devrim Yaman, Western Michigan University

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Brief Contents

Contents