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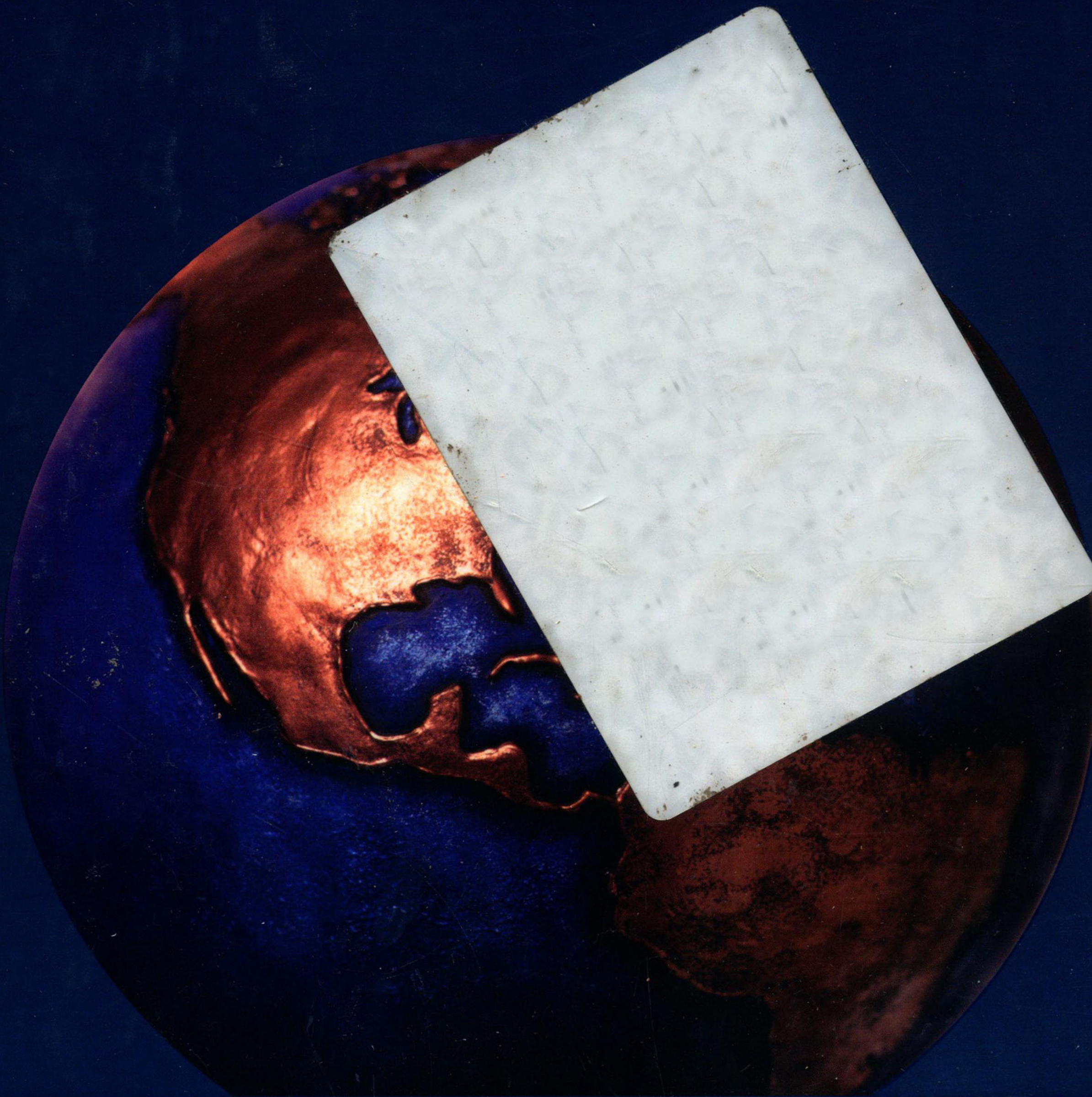
# BREALEY MYERS

## PRINCIPLES OF CORPORATE FINANCE



# PRINCIPLES OF CORPORATE FINANCE

SEVENTH EDITION

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# PRINCIPLES OF CORPORATE FINANCE

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To Our Parents

# ABOUT THE AUTHORS

## RICHARD A. BREALEY

Emeritus Professor of Finance at the London Business School. He is the former president of the European Finance Association and a former director of the American Finance Association. He is a fellow of the British Academy and has served as a special advisor to the Governor of the Bank of England and director of a number of financial institutions. Other books written by Professor Brealey include *Introduction to Risk and Return from Common Stocks.*

## STEWART C. MYERS

Gordon Y Billard Professor of Finance at MIT's Sloan School of Management. He is past president of the American Finance Association and a research associate of the National Bureau of Economic Research. His research has focused on financing decisions, valuation methods, the cost of capital, and financial aspects of government regulation of business. Dr. Myers is a director of The Brattle Group, Inc., and is active as a financial consultant.

# WALK-THROUGH

## "FINANCE IN THE NEWS" BOXES

Timely, relevant news articles from financial publications appear in several chapters throughout the text. Aimed at bringing real life to the classroom, these boxes provide insight into the business world today.

FINANCE IN THE NEWS

### THE DIVIDEND CUT HEARD 'ROUND THE WORLD

On May 9, 1994, FPL Group, the parent company of Florida Power & Light Company, announced a 32 percent reduction in its quarterly dividend payout, from 62 cents per share to 42 cents. In its announcement, FPL did its best to spell out to investors why it had taken such an unusual step. It stressed that it had studied the situation carefully and that, given the prospect of increased competition in the electric utility industry, the company's

FPL's substitution of stock repurchases for dividends was also designed to increase the company's financial flexibility in preparation for a new era of heightened competition among utilities. Although much of the cash savings from the dividend cut would be returned to shareholders in the form of stock repurchases, the rest would be used to retire debt and so reduce the company's leverage ratio. This deleveraging was intended to pre-

## PART INTRODUCTIONS

New introductions have been added to each part explaining links between different concepts. They include real-world examples that provide motivation for the chapters that follow.

PART ONE

VALUE

**IN 2001, DUPONT** announced plans to build a new production line at its plant in Richmond, Virginia. The $50 mi... ...uld increase DuPont's...

thought that the new plant would be worth more than it cost. But that raises an obvious question. How can firms ... what an investment...

**NEW AND ENHANCED PEDAGOGY**

In this edition of *Principles of Corporate Finance,* we've included several more features to help students succeed in learning the fundamental concepts of financial management.

## STANDARD & POOR'S INTEGRATION

Now included in the end-of-chapter material are problems directly incorporating the Educational Version of Market Insight, a service based on Standard & Poor's renowned Compustat database. These problems provide you with an easy method of including current real-world data into your course.

assump...

STANDARD & POOR'S

16. Look up Hawaiian Electric Co. (HE) on the Standard & Poor's Market Insight website (**www.mhhe.com/edumarketinsight**). Hawaiian Electric was one of the companies in Table 4.2. That table was constructed in 2001.
    a. What is the company's dividend yield? How has it changed since 2001?
    b. Table 4.2 projected growth of 2.6 percent. How fast have the company's dividends and EPS actually grown since 2001?
    c. Calculate a sustainable growth rate for the company based on its five-year average return on equity (ROE) and plowback ratio.
    d. Given this updated information, would you modify the cost-of-equity estimate given in Table 4.2? Explain.

STANDARD & POOR'S

17. Browse through the companies in the Standard & Poor's Market Insight website (**www.mhhe.com/edumarketinsight**). Find three or four companies for which the earnings-price ratio reported on the website drastically *under*states the market capitalization rate...

## EXCEL SPREADSHEET EXERCISES

New to this edition, each chapter includes several problems, noted by an icon EXCEL, that are tied to a financial analysis spreadsheet found on the Student CD that is packaged with the text. This feature allows students to enhance their knowledge and use of spreadsheets.

CHAPTER 5 Why Net Present Value Leads to Better Investment Decisions Than Other Criteria 115

13. Borghia Pharmaceuticals has $1 million allocated for capital expenditures. Which of the following projects should the company accept to stay within the $1 million budget? How much does the budget limit cost the company in terms of its market value? The opportunity cost of capital for each project is 11 percent. EXCEL

| Project | Investment ($ thousands) | NPV ($ thousands) | IRR (%) |
|---|---|---|---|
| 1 | 300 | 66 | 17.2 |
| 2 | 200 | –4 | 10.7 |
| 3 | 250 | 43 | 16.6 |
| 4 | 100 | 14 | 12.1 |
| 5 | 100 | 7 | 11.8 |
| | 350 | 63 | 18.0 |

## MINI-CASES

To enhance the concepts discussed within a chapter, several mini-cases are included so students can apply their knowledge to typical real-world scenarios.

### MINI-CASE

**Vegetron's CFO Calls Again**

*(The first episode of this story was presented in Section 5.1.)*

Later that afternoon, Vegetron's CFO bursts into your office in a state of anxious confusion. The problem, he explains, is a last-minute proposal for a change in the design of the fermentation tanks that Vegetron will build to extract hydrated zirconium from a stockpile of powdered ore. The CFO has brought a printout (Table 5.1) of the forecasted revenues, costs, income, and book rates of return for the standard, low-temperature design. Vegetron's engineers have just proposed an alternative high-temperature design that will extract most of the hydrated zirconium over a shorter period, five instead of seven years. The forecasts for the high-temperature method are given in Table 5.2.[16]

www.mhhe.com/bm7e

**TABLE 5.1**

Income statement and book rates of return for high-temperature ext...

| | Year 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1. Revenue | 180 | 180 | 180 | 180 | 180 |

## PART WEBSITES

In today's world the Internet provides students and instructors with a useful and powerful tool. Relevant websites are provided at the end of each part for ease in referencing the best sites for financial data and information.

### PART SIX RELATED WEBSITES

*The Chicago Board site contains explanations of options markets and lots of data:*

www.cboe.com

*There are a number of good options sites, many of which provide data and calculators for Black–Scholes values and implied standard deviations:*

www.cfo.com

www.fintools.net/options/optcalc.html *(very good calculators)*

www.numa.com

www.schaffersresearch.com/stock/calculator.asp

*Two sites devoted to real options are:*

www.real-options.com

www.puc-rio.br/marco.ind

*Examples of journals specializing in options and other derivatives include:*

www.appliederivatives.com

www.erivativesreview.com

www.futuresmag.com

## GLOBAL INDEX

Because many concepts in financial management are relevant around the world, the international coverage in the text has been enhanced and updated. To make this information easier to access, a Global Index was created for this edition.

### GLOBAL INDEX

# PREFACE

This book describes the theory and practice of corporate finance. We hardly need to explain why financial managers should master the practical aspects of their job, but we should spell out why down-to-earth, red-blooded managers need to bother with theory.

Managers learn from experience how to cope with routine problems. But the best managers are also able to respond to change. To do this you need more than time-honored rules of thumb; you must understand *why* companies and financial markets behave the way they do. In other words, you need a *theory* of finance.

Does that sound intimidating? It shouldn't. Good theory helps you grasp what is going on in the world around you. It helps you to ask the right questions when times change and new problems must be analyzed. It also tells you what things you do *not* need to worry about. Throughout this book we show how managers use financial theory to solve practical problems.

Of course, the theory presented in this book is not perfect and complete—no theory is. There are some famous controversies in which financial economists cannot agree on what firms ought to do. We have not glossed over these controversies. We set out the main arguments for each side and tell you where we stand.

Once understood, good theory is common sense. Therefore we have tried to present it at a common-sense level, and we have avoided proofs and heavy mathematics. There are no ironclad prerequisites for reading this book except algebra and the English language. An elementary knowledge of accounting, statistics, and microeconomics is helpful, however.

## CHANGES IN THE SEVENTH EDITION

This book is written for students of financial management. For many readers, it is their first look at the world of finance. Therefore in each edition we strive to make the book simpler, clearer, and more fun to read. But the book is also used as a reference and guide by practicing managers around the world. Therefore we also strive to make each new edition more comprehensive and authoritative.

We believe this edition is better for both the student and the practicing manager. Here are some of the major changes:

We have streamlined and simplified the exposition of major concepts, with special attention to Chapters 1 through 12, where the fundamental concepts of valuation, risk and return, and capital budgeting are introduced. In these chapters we cover only the most basic institutional material. At the same time we have rewritten Chapter 14 as a free-standing introduction to the nature of the corporation, to the major sources of corporate financing, and to financial markets and institutions. Some readers will turn first to Chapter 14 to see the contexts in which financial decisions are made.

We have also expanded coverage of important topics. For example, real options are now introduced in Chapter 10—you don't have to master option-pricing theory in order to grasp what real options are and why they are important. Later in the book, after Chapter 20 (Understanding Options) and Chapter 21 (Valuing Options), there is a brand-new Chapter 22 on real options, which covers valuation methods and a range of practical applications.

Other examples of expanded coverage include behavioral finance (Chapter 13) and new international evidence on the market-risk premium (Chapter 7). We have also reorganized the chapters on financial planning and working capital management. In fact we have revised and updated every chapter in the book.

This edition's international coverage is expanded and woven into the rest of the text. For example, international investment decisions are now introduced in Chapter 6, right alongside domestic investment decisions. Likewise the cost of capital for international investments is discussed in Chapter 9, and international differences in security issue procedures are reviewed in Chapter 15. Chapter 34 looks at some of the international differences in financial architecture and ownership. There is, however, a separate chapter on international risk management, which covers foreign exchange rates and markets, political risk, and the valuation of capital investments in different currencies. There is also a new international index.

The seventh edition is much more Web-friendly than the sixth. Web references are highlighted in the text, and an annotated list of useful websites has been added to each part of the book.

Of course, as every first-grader knows, it is easier to add than to subtract, but we have pruned judiciously. Some readers of the sixth edition may miss a favorite example or special topic. But new readers should find that the main themes of corporate finance come through with less clutter.

## MAKING LEARNING EASIER

Each chapter of the book includes an introductory preview, a summary, and an annotated list of suggestions for further reading. There is a quick and easy quiz, a number of practice questions, and a few challenge questions. Many questions use financial data on actual companies accessible by the reader through Standard & Poor's Educational Version of Market Insight. In total there are now over a thousand end-of-chapter questions. All the questions refer to material in the same order as it occurs in the chapter. Answers to the quiz questions may be found at the end of the book, along with a glossary and tables for calculating present values and pricing options.

We have expanded and revised the mini-cases and added specific questions for each mini-case to guide the case analysis. Answers to the mini-cases are available to instructors on this book's website (**www.mhhe.com/bm7e**).

Parts 1 to 3 of the book are concerned with valuation and the investment decision, Parts 4 to 8 with long-term financing and risk management. Part 9 focuses on financial planning and short-term financial decisions. Part 10 looks at mergers and corporate control and Part 11 concludes. We realize that many teachers will prefer a different sequence of topics. Therefore, we have ensured that the text is modular, so that topics can be introduced in a variety of orders. For example, there will be no difficulty in reading the material on financial statement analysis and short-term decisions before the chapters on valuation and capital investment.

We should mention two matters of style now to prevent confusion later. First, the most important financial terms are set out in boldface type the first time they appear; less important but useful terms are given in italics. Second, most algebraic symbols representing dollar values are shown as capital letters. Other symbols are generally lowercase letters. Thus the symbol for a dividend payment is "DIV," and the symbol for a percentage rate of return is "*r*."

## SUPPLEMENTS

In this edition, we have gone to great lengths to ensure that our supplements are equal in quality and authority to the text itself.

### Instructor's Manual

ISBN 0072467886

The Instructor's Manual was extensively revised and updated by C. R. Krishnaswamy of Western Michigan University. It contains an overview of each chapter, teaching tips, learning objectives, challenge areas, key terms, and an annotated outline that provides references to the PowerPoint slides.

### Test Bank

ISBN 0072468025

The Test Bank was also updated by C. R. Krishnaswamy, who included well over 1,000 new multiple-choice and short answer/discussion questions based on the revisions of the authors. The level of difficulty is varied throughout, using a label of easy, medium, or difficult.

### PowerPoint Presentation System

Matt Will of the University of Indianapolis prepared the PowerPoint Presentation System, which contains exhibits, outlines, key points, and summaries in a visually stimulating collection of slides. Found on the Student CD-ROM, the Instructor's CD-ROM, and our website, the slides can be edited, printed, or rearranged in any way to fit the needs of your course.

### Financial Analysis Spreadsheet Templates (F.A.S.T.)

Mike Griffin of KMT Software created the templates in Excel. They correlate with specific concepts in the text and allow students to work through financial problems and gain experience using spreadsheets. Each template is tied to a specific problem in the text.

### Solutions Manual

ISBN 0072468009

The Solutions Manual, prepared by Bruce Swensen, Adelphi University, contains solutions to all practice questions and challenge questions found at the end of each chapter. Thoroughly checked for accuracy, this supplement is available to be purchased by your students.

### Study Guide

ISBN 0072468017

The new Study Guide was carefully revised by V. Sivarama Krishnan of Cameron University and contains useful and interesting keys to learning. It includes an introduction to each chapter, key concepts, examples, exercises and solutions, and a complete chapter summary.

### Videos

ISBN 0072467967

The McGraw-Hill/Irwin Finance Video Series is a complete video library designed to bring added points of discussion to your class. Within this professionally developed series, you will find examples of how real businesses face today's hottest topics, like mergers and acquisitions, going public, and careers in finance.

### Student CD-ROM

Packaged with each text is a CD-ROM for students that contains many features designed to enhance the classroom experience. Three learning modules from the new Finance Tutor Series are included on the CD: Time Value of Money Tutor, Stock and Bond Valuation

Tutor, and Capital Budgeting Tutor. In each module, students answer questions and solve problems that not only assess their general understanding of the subject but also their ability to apply that understanding in real-world business contexts. In "Practice Mode," students learn as they go by receiving in-depth feedback on each response before proceeding to the next question. Even better, the program anticipates common misunderstandings, such as incorrect calculations or assumptions, and then provides feedback only to the student making that specific mistake. Students who want to assess their current knowledge may select "Test Mode," where they read an extensive evaluation report after they have completed the test.

Also included are the PowerPoint presentation system, Financial Analysis Spreadsheet Templates (F.A.S.T.), video clips from our Finance Video Series, and many useful Web links.

### Instructor's CD-ROM

ISBN 0072467959

We have compiled many of our instructor supplements in electronic format on a CD-ROM designed to assist with class preparation. The CD-ROM includes the Instructor's Manual, the Solutions Manual, a computerized Test Bank, PowerPoint slides, video clips, and Web links.

### Online Learning Center

(www.mhhe.com/bm7e)

This site contains information about the book and the authors, as well as teaching and learning materials for the instructor and the student, including:

### PageOut: The Course Website Development Center and PageOut Lite

www.pageout.net

This Web page generation software, free to adopters, is designed for professors just beginning to explore website options. In just a few minutes, even the most 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 home page 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 their students can exchange questions and post announcements.

## ACKNOWLEDGMENTS

We have a long list of people to thank for their helpful criticism of earlier editions and for assistance in preparing this one. They include Aleijda de Cazenove Balsan, John Cox, Kedrum Garrison, Robert Pindyck, and Gretchen Slemmons at MIT; Stefania Uccheddu at London Business School; Lynda Borucki, Marjorie Fischer, Larry Kolbe, James A. Read, Jr., and Bente Villadsen at The Brattle Group, Inc.; John Stonier at Airbus Industries; and Alex Triantis at the University of Maryland. We would also like to thank all those at McGraw-Hill/Irwin who worked on the book, including Steve Patterson, Publisher; Rhonda Seelinger, Executive Marketing Manager; Sarah Ebel, Senior Developmental Editor; Jean Lou Hess, Senior Project Manager; Keith McPherson, Design Director; Joyce Chappetto, Supplement Coordinator; and Michael McCormick, Senior Production Supervisor.

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**Richard A. Brealey**
**Stewart C. Myers**

# PART ONE

# VALUE

**IN 2001, DUPONT** announced plans to build a new production line at its plant in Richmond, Virginia. The $50 million investment would increase DuPont's output of Kevlar high-strength fiber by 15 percent. Meanwhile, in New Orleans Procter & Gamble had started work on a 100,000 square foot facility to produce Folger's coffee. This was expected to open in 2002 at a cost of $100 million.

What was special about these two developments? The answer is "nothing." We cite them because they are typical of the investments in new products and equipment that U.S. companies are making every day.

Presumably, DuPont and Procter & Gamble decided to undertake the investments because they thought that the new plant would be worth more than it cost. But that raises an obvious question. How can firms calculate what an investment is worth when its returns may stretch 10, 20, or more years into the future?

This is the topic of Part One. Chapter 1 sets the scene by showing how businesses are organized and the role that the financial manager plays in evaluating investments and finding money to pay for them. Chapter 2 starts to build a theory of value. By the end of Chapter 6, you should be able to tackle a standard investment decision such as those faced by DuPont or Procter & Gamble.

CHAPTER ONE

# FINANCE AND THE FINANCIAL MANAGER

**THIS BOOK IS** about financial decisions made by corporations. We should start by saying what these decisions are and why they are important.

Corporations face two broad financial questions: What investments should the firm make? and How should it pay for those investments? The first question involves spending money; the second involves raising it.

The secret of success in financial management is to increase value. That is a simple statement, but not very helpful. It is like advising an investor in the stock market to "Buy low, sell high." The problem is how to do it.

There may be a few activities in which one can read a textbook and then do it, but financial management is not one of them. That is why finance is worth studying. Who wants to work in a field where there is no room for judgment, experience, creativity, and a pinch of luck? Although this book cannot supply any of these items, it does present the concepts and information on which good financial decisions are based, and it shows you how to use the tools of the trade of finance.

We start in this chapter by explaining what a corporation is and introducing you to the responsibilities of its financial managers. We will distinguish *real assets* from *financial assets* and *capital investment decisions* from *financing decisions*. We stress the importance of financial markets, both national and international, to the financial manager.

Finance is about money and markets, but it is also about people. The success of a corporation depends on how well it harnesses everyone to work to a common end. The financial manager must appreciate the conflicting objectives often encountered in financial management. Resolving conflicts is particularly difficult when people have different information. This is an important theme which runs through to the last chapter of this book. In this chapter we will start with some definitions and examples.

## 1.1 WHAT IS A CORPORATION?

Not all businesses are corporations. Small ventures can be owned and managed by a single individual. These are called *sole proprietorships.* In other cases several people may join to own and manage a *partnership.*[1] However, this book is about *corporate* finance. So we need to explain what a **corporation** is.

Almost all large and medium-sized businesses are organized as corporations. For example, General Motors, Bank of America, Microsoft, and General Electric are corporations. So are overseas businesses, such as British Petroleum, Unilever, Nestlé, Volkswagen, and Sony. In each case the firm is owned by stockholders who hold shares in the business.

When a corporation is first established, its shares may all be held by a small group of investors, perhaps the company's managers and a few backers. In this case the shares are not publicly traded and the company is *closely held.* Eventually, when the firm grows and new shares are issued to raise additional capital, its shares will be widely traded. Such corporations are known as *public companies.*

[1]Many professional businesses, such as accounting and legal firms, are partnerships. Most large investment banks started as partnerships, but eventually these companies and their financing needs grew too large for them to continue in this form. Goldman Sachs, the last of the leading investment-bank partnerships, issued shares and became a public corporation in 1998.