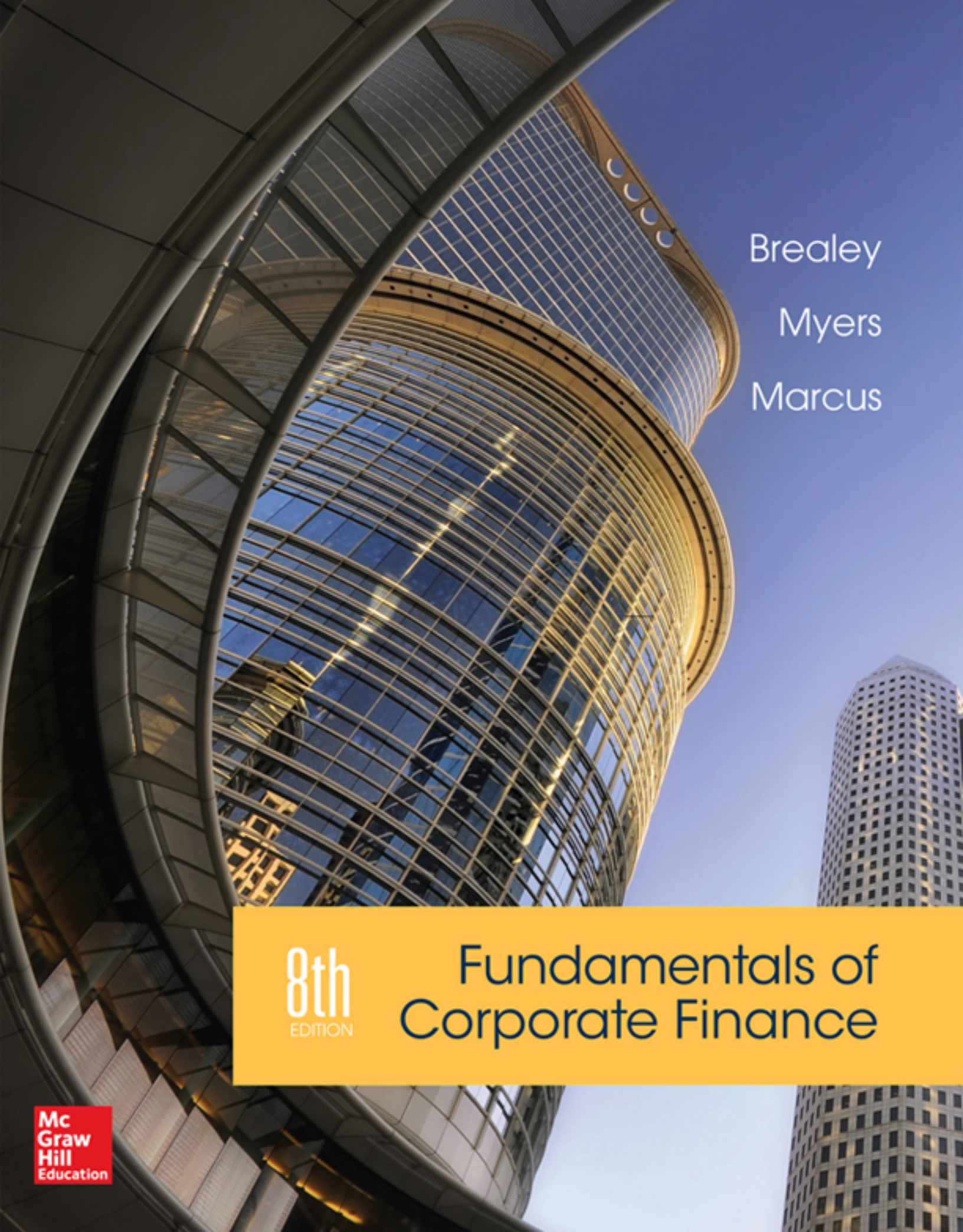

Brealey

Myers

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8th EDITION

Fundamentals of Corporate Finance

Mc Graw Hill Education

Fundamentals of Corporate Finance

Eighth EDITION

Fundamentals of Corporate Finance

Eighth EDITION

Richard A. Brealey
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Dedication

To Our Wives

FUNDAMENTALS OF CORPORATE FINANCE, EIGHTH EDITION

This book is printed on acid-free paper.

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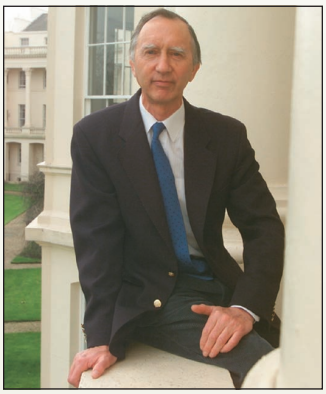

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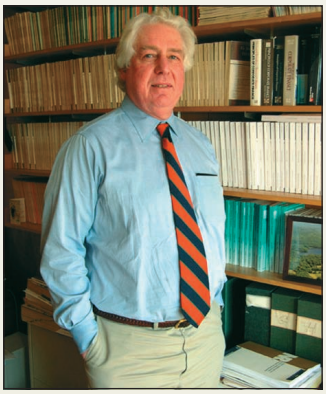

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Preface

This book is about corporate finance. It focuses on how companies invest in real assets, how they raise the money to pay for these investments, and how those assets ultimately affect the value of the firm. It also provides a broad introduction to the financial landscape, discussing, for example, the major players in financial markets, the role of financial institutions in the economy, and how securities are traded and valued by investors. The book offers a framework for systematically thinking about most of the important financial problems that both firms and individuals are likely to confront.

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 choose between 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.

We organize the book around the key concepts of modern finance. These concepts, properly explained, simplify the subject. They are also practical. The tools of financial management are easier to grasp and use effectively when presented in a consistent conceptual framework. This text 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 34 chapters, *Fundamentals* has only 25. 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 3.

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 eight parts.

Part 1 (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 introduce the concept of the opportunity cost of capital and the trade-off that the firm needs to make when assessing investment proposals. We also 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.

Chapter 2 surveys and sets out the functions of financial markets and institutions. This chapter also reviews the crisis of 2007–2009. The events of those years illustrate clearly why and how financial markets and institutions matter.

A large corporation is a team effort, and so the firm produces financial statements to help the players monitor its progress. Chapter 3 provides a brief overview of these financial statements and introduces two key distinctions—between market and book values and between cash flows and profits. This chapter also discusses some of the shortcomings in accounting practice. The chapter concludes with a summary of federal taxes.

Chapter 4 provides an overview of financial statement analysis. In contrast to most introductions to this topic, our discussion is motivated by considerations of valuation and the insight that financial ratios can provide about how management has added to the firm's value.

Part 2 (Value) is concerned with valuation. In Chapter 5 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 5 also contains a short concluding section on inflation and the distinction between real and nominal returns.

Chapters 6 and 7 introduce the basic features of bonds and stocks and give students a chance to apply the ideas of Chapter 5 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. Chapter 7 also introduces the concept of market

efficiency. This concept is crucial to interpreting a stock's valuation; it also provides a framework for the later treatment of the issues that arise when firms issue securities or make decisions concerning dividends or capital structure.

The remaining chapters of Part 2 are concerned with the company's investment decision. In Chapter 8 we introduce the concept of net present value and show how to calculate the NPV of a simple investment project. We then consider more complex investment proposals, including choices between alternative projects, machine replacement decisions, and decisions of when to invest. We also look at other measures of an investment's attractiveness—its internal rate of return, payback period, and profitability index. We show how the profitability index can be used to choose between investment projects when capital is scarce. The appendix to Chapter 8 shows how to sidestep some of the pitfalls of the IRR rule.

The first step in any NPV calculation is to decide what to discount. Therefore, in Chapter 9 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 10 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 explain the distinction between accounting break-even and NPV break-even. 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 3 (Risk) is concerned with the cost of capital. Chapter 11 starts with a historical survey of returns on bonds and stocks and goes on to distinguish between the specific risk and market risk of individual stocks. Chapter 12 shows how to measure market risk and discusses the relationship between risk and expected return. Chapter 13 introduces the weighted-average cost of capital and provides a practical illustration of how to estimate it.

Part 4 (Financing) begins our discussion of the financing decision. Chapter 14 provides an overview of the securities that firms issue and their relative importance as sources of finance. In Chapter 15 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 5 (Debt and Payout Policy) focuses on the two classic long-term financing decisions. In Chapter 16 we ask how much the firm should borrow, and we summarize bankruptcy procedures that occur when firms can't pay their debts. In Chapter 17 we study how firms should set dividend and payout policy. 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 6 (Financial Analysis and Planning) starts with long-term financial planning 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 short-term financial planning. It 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. Chapter 20 addresses working capital management. It describes the basic steps of credit management, the principles of inventory management, and how firms handle payments efficiently and put cash to work as quickly as possible.

Part 7 (Special Topics) covers several important but somewhat more advanced topics—mergers (Chapter 21), international financial management (Chapter 22), options (Chapter 23), and risk management (Chapter 24). Some of these topics are touched on in earlier chapters. For example, we introduce the idea of options in Chapter 10, when we show how companies build flexibility into capital projects. However, Chapter 23 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 22. 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 22 tackles the specific problems that arise when a corporation is confronted by different currencies.

Part 8 (Conclusion) contains a concluding chapter (Chapter 25), 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 financial planning. Nevertheless, we recognize that many instructors will prefer to move directly from Chapter 4 (Measuring Corporate Performance) to Chapter 18 (Long-Term Financial Planning) in order to provide a gentler transition from the typical prerequisite accounting course. We have made sure that Part 6 (Financial Analysis and Planning) can easily follow Part 1.

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 Chapter 20 out of order.

When we discuss project valuation in Part 2, 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 3. 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 Eighth Edition

Users of previous editions of this book will not find dramatic changes in either the material or the ordering of topics. But throughout we have made the book more up to date and easier to read. Here are some of the ways that we have done this.

Beyond the Page The biggest change in this edition is the introduction of Beyond the Page digital extensions and applications. These digital extensions are not, as they may sound, false fingernails; they are additional examples, spreadsheet programs, and opportunities to explore topics in more depth. This material is very easily accessed on the web. For example, it is seamlessly available with a click on the e-versions of the book, but it is also readily accessible in the traditional hard copy of the text using either QR codes from a smartphone or shortcut URLs, both provided in the margins of relevant pages.

Improving the Flow A major part of our effort in revising this text was spent on improving the flow. Often this has meant a word change here or a redrawn diagram there, but sometimes we have made more substantial changes. Consider, for example, Chapter 1, where we have made three significant changes. First, we have included a completely rewritten section on corporate governance and agency issues. We emphasize that you need a good system of corporate governance to ensure that managers maximize value. Second, discussions of ethical issues often focus on the egregiously improper and illegal actions, but for honest financial managers the important problems are the gray areas. We have therefore addressed three topics for which there are no easy answers—the role of corporate raiders, short-selling, and tax avoidance. Finally, students tackling finance for the first time need some broad understanding of what the subject is all about. We therefore conclude Chapter 1 with a review of the big themes.

Updating Of course, in each new edition we try to ensure that any statistics are as up to date as possible. For example, since the previous edition, we have available an extra 3 years of data on security returns. These show up in the figures in Chapter 11 of the long-run returns on stocks, bonds, and bills. Measures of EVA, data on security ownership, dividend payments, and stock repurchases are just a few of the other cases where data have been brought up to date.

Recent Events We discussed the financial crisis of 2007–2009 in the previous edition, but we have now been able to expand the discussion to include the spillover to the crisis in the eurozone and to introduce the Dodd-Frank Act. The eurozone crisis was also a reminder that government debt is not risk-free. We come back to that issue in Chapter 6 when we discuss default risk.

Concepts There are several places where we have introduced new conceptual material. For example, students who have learned about the dividend discount model are often confused about how to value the many companies that also repurchase their stock. We introduce the issue in Chapter 13, and in Chapter 17 we explain how to value these companies. The growth in repurchases has also changed the way that we think about the dividend controversy. We have therefore substantially rewritten Chapter 17 to focus on the trade-off between dividends and repurchases. We have also added a final section that discusses how the payout decision changes over the life cycle of the firm.

New Illustrative Boxes The text contains a number of boxes with illustrative real-world examples. Many of these are new. Look, for example, at the box in Chapter 15 that discusses the Facebook IPO or the box about how WobbleWorks used crowdfunding to finance its 3Doodler project.

More Worked Examples We have added more worked examples in the text, many of them taken from real companies. For instance, when we discuss company valuation in Chapter 7, we show how to value the Cape Wind power project in Nantucket Sound.

New Calculator and Spreadsheet Boxes We have reworked the explanations of how to use calculators or spreadsheets to solve financial problems. We now have separate subsections that show how they can be used to solve single-cash-flow and multiple-cash-flow problems. We think that this better integrates the material into the rest of the chapter and is easier for the student to follow.

Specific Chapter Changes in the Eighth Edition

Chapter 1 contains an expanded discussion of agency issues, including additions on corporate raiders, creative accounting, tax avoidance, and "say on pay."

Chapter 2 includes an additional discussion of the financial crisis and its spillover to the sovereign debt crisis in the eurozone.
Chapter 3 introduces free cash flow in the discussion of accounting and finance and includes updated discussions of accounting malfeasance and the convergence of GAAP and IFRS accounting standards.
Chapter 5 has a reorganized and integrated discussion of calculators and spreadsheets.
Chapter 6 now includes an overview of the determinants of bond default risk in the discussion of credit spreads.
Chapter 7 contains an integrated discussion of sustainable growth in the development of the dividend growth model, includes a new box on Facebook's IPO, and explains how to best deal with stock repurchases when using the dividend discount model.
Chapter 8 features an enhanced explanation of why mutually exclusive investments are central to almost all real-life investment decisions and how that affects the capital budgeting decision.
Chapter 10 includes updated examples of real options and explains how those options are integrated into a firm's longer-term strategic considerations.
Chapter 11 introduces a simple derivation of the investment opportunity frontier and demonstrates the role of correlation in assessing the potential for an investment to reduce risk through portfolio diversification.
Chapter 12 contains a new discussion of how the index model can be used to measure and distinguish between systematic and diversifiable risks using an extended example comparing the risks of mutual funds and individual stocks. The discussion also introduces key issues in performance evaluation, for example, the appropriate way to trade off average return versus risk.
Chapter 13 includes clarifications on real-world procedures used when computing the weighted-average cost of capital.
Chapter 14 features an extended treatment of corporate governance, particularly the composition of the board of directors.
Chapter 15 introduces alternative fundraising methods for start-ups, such as crowdsourcing.
Chapter 16 clarifies the practical implications of Miller and Modigliani for debt policy and introduces new material on assessing the present value of tax shields associated with debt.
Chapter 17 contains a fully revamped treatment of the information content of dividends as well the trade-offs governing the use of dividends versus repurchases.
Chapter 19 includes a closer integration of the analysis of sources and uses of funds with the firm's statement of cash flows.
Chapter 21 features numerous updates to reflect mergers that have taken place in recent years.
Chapter 23 presents a new treatment of the VIX contract and its use as a "fear index."
Chapter 24 includes a new discussion of a practical issue in risk management—banks that have lost hundreds of millions after "rogue traders" made large but unauthorized trades.

Assurance of Learning

Assurance of learning is an important element of many accreditation standards. *Fundamentals of Corporate Finance,* Eighth Edition, is designed specifically to support your assurance-of-learning initiatives. Each chapter in the book begins with a list of numbered learning objectives, which are referred to in the end-of-chapter problems and exercises. Every test bank question is also linked to one of these objectives, in addition to level of difficulty, topic area, Bloom's Taxonomy level, and AACSB skill area. *Connect,* McGraw-Hill's online homework solution, and *EZ Test,* McGraw-Hill's

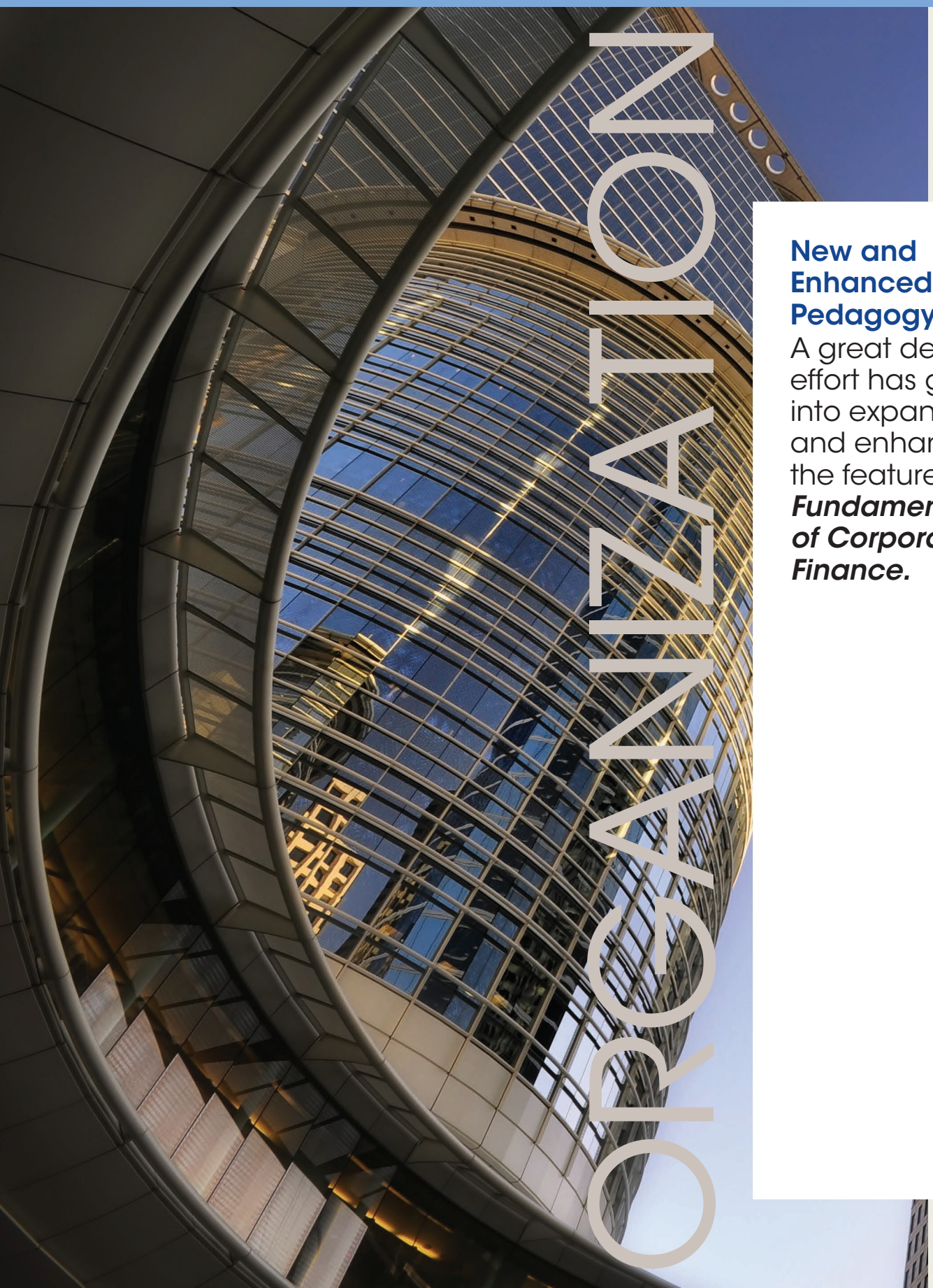
easy-to-use test bank software, can search the test bank by these and other categories, providing an engine for targeted assurance-of-learning analysis and assessment.

AACSB Statement

McGraw-Hill Education is a proud corporate member of AACSB International. Understanding the importance and value of AACSB accreditation, *Fundamentals of Corporate Finance,* Eighth Edition, has sought to recognize the curricula guidelines detailed in the AACSB standards for business accreditation by connecting selected questions in the test bank to the general knowledge and skill guidelines found in the AACSB standards.

The statements contained in *Fundamentals of Corporate Finance,* Eighth Edition, are provided only as a guide for the users of this text. The AACSB leaves content coverage and assessment within the purview of individual schools, the mission of the school, and the faculty. While *Fundamentals of Corporate Finance,* Eighth Edition, and the teaching package make no claim of any specific AACSB qualification or evaluation, we have, within the test bank, labeled selected questions according to the six general knowledge and skills areas.

Key Features



ORGANIZATION

New and Enhanced Pedagogy

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

Brealey / Myers / Marcus

Your guide through the challenging landscape of corporate finance

Chapter Opener

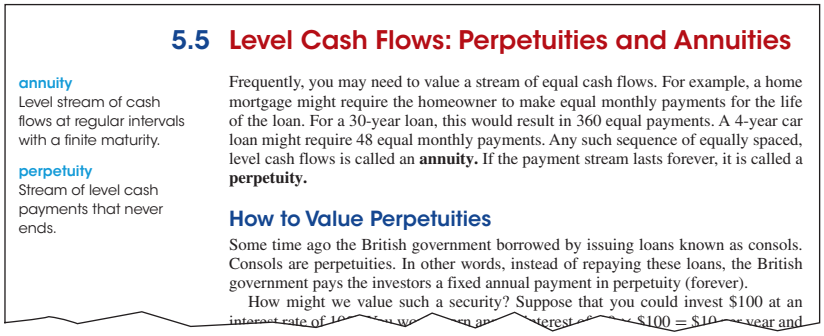
Each chapter begins with a chapter narrative to help set the tone for the material that follows. Learning Objectives are also included to provide a quick introduction to the material students will learn and should understand fully before moving to the next chapter.


CHAPTER 5

The Time Value of Money

Key Terms in the Margin

Key terms are presented in bold and defined in the margin as they are introduced. A glossary is also available at the back of the book.


5.5 Level Cash Flows: Perpetuities and Annuities

annuity
Level stream of cash flows at regular intervals with a finite maturity.

perpetuity
Stream of level cash payments that never ends.

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

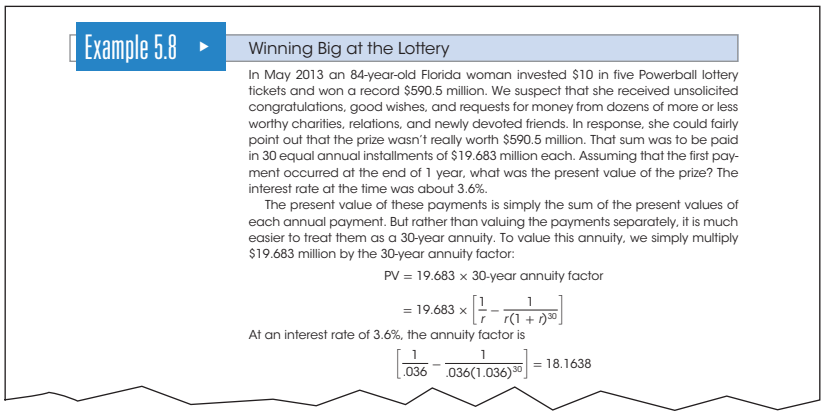
How to Value Perpetuities

Some time ago the British government borrowed by issuing loans known as consols. Consols are perpetuities. In other words, instead of repaying these loans, the British government pays the investors a fixed annual payment in perpetuity (forever).

How might we value such a security? Suppose that you could invest $100 at an

Numbered Examples

Numbered and titled examples are integrated in each chapter. Students can learn how to solve specific problems step-by-step as well as gain insight into general principles by seeing how they are applied to answer concrete questions and scenarios.


Example 5.8 ▸ Winning Big at the Lottery

In May 2013 an 84-year-old Florida woman invested $10 in five Powerball lottery tickets and won a record $590.5 million. We suspect that she received unsolicited congratulations, good wishes, and requests for money from dozens of more or less worthy charities, relations, and newly devoted friends. In response, she could fairly point out that the prize wasn't really worth $590.5 million. That sum was to be paid in 30 equal annual installments of $19.683 million each. Assuming that the first payment occurred at the end of 1 year, what was the present value of the prize? The interest rate at the time was about 3.6%.

The present value of these payments is simply the sum of the present values of each annual payment. But rather than valuing the payments separately, it is much easier to treat them as a 30-year annuity. To value this annuity, we simply multiply $19.683 million by the 30-year annuity factor:

$$\text{PV} = 19.683 \times \text{30-year annuity factor}$$

$$= 19.683 \times \left[\frac{1}{r} - \frac{1}{r(1+r)^{30}}\right]$$

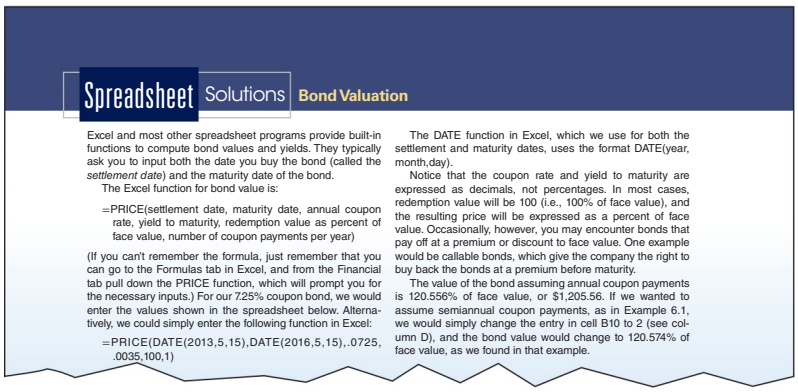
At an interest rate of 3.6%, the annuity factor is

$$\left[\frac{1}{.036} - \frac{1}{.036(1.036)^{30}}\right] = 18.1638$$

What makes *Fundamentals of Corporate Finance* such a powerful learning tool?

Spreadsheet Solutions Boxes

These boxes provide the student with detailed examples of how to use Excel spreadsheets when applying financial concepts. The boxes include questions that apply to the spreadsheet, and their solutions are given at the end of the applicable chapter. Denoted by an icon, these spreadsheets are available in Connect.



Spreadsheet Solutions **Bond Valuation**

Excel and most other spreadsheet programs provide built-in functions to compute bond values and yields. They typically ask you to input both the date you buy the bond (called the *settlement date*) and the maturity date of the bond.

The Excel function for bond value is:

=PRICE(settlement date, maturity date, annual coupon rate, yield to maturity, redemption value as percent of face value, number of coupon payments per year)

(If you can't remember the formula, just remember that you can go to the Formulas tab in Excel, and from the Financial tab pull down the PRICE function, which will prompt you for the necessary inputs.) For our 7.25% coupon bond, we would enter the values shown in the spreadsheet below. Alternatively, we could simply enter the following function in Excel:

=PRICE(DATE(2013,5,15),DATE(2016,5,15),.0725, .0035,100,1)

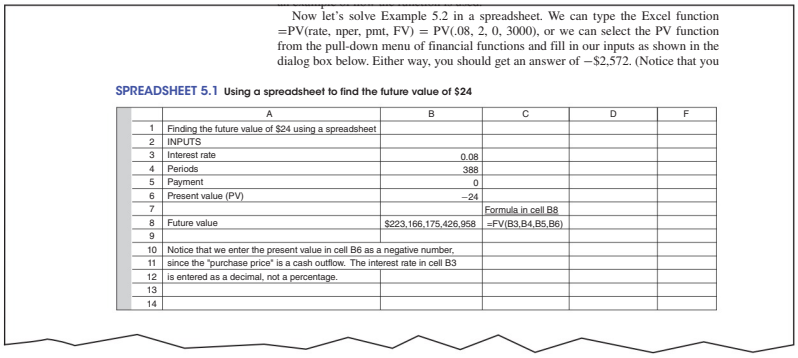
The DATE function in Excel, which we use for both the settlement and maturity dates, uses the format DATE(year, month,day).

Notice that the coupon rate and yield to maturity are expressed as decimals, not percentages. In most cases, redemption value will be 100 (i.e., 100% of face value), and the resulting price will be expressed as a percent of face value. Occasionally, however, you may encounter bonds that pay off at a premium or discount to face value. One example would be callable bonds, which give the company the right to buy back the bonds at a premium before maturity.

The value of the bond assuming annual coupon payments is 120.556% of face value, or $1,205.56. If we wanted to assume semiannual coupon payments, as in Example 6.1, we would simply change the entry in cell B10 to 2 (see column D), and the bond value would change to 120.574% of face value, as we found in that example.

Excel Exhibits

Selected exhibits are set as Excel spreadsheets. They are also available in Connect.



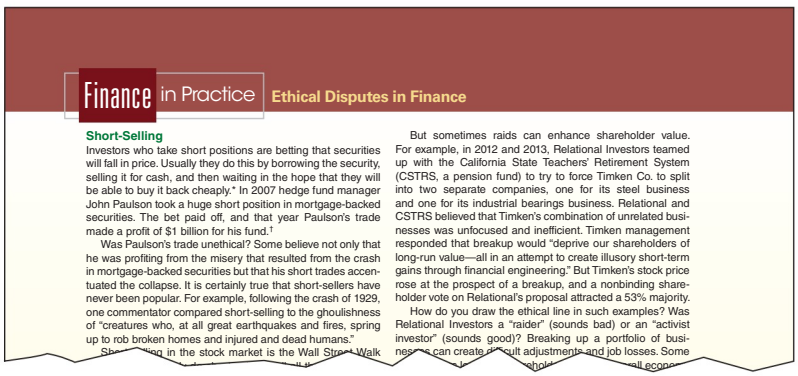
Now let's solve Example 5.2 in a spreadsheet. We can type the Excel function =PV(rate, nper, pmt, FV) = PV(.08, 2, 0, 3000), or we can select the PV function from the pull-down menu of financial functions and fill in our inputs as shown in the dialog box below. Either way, you should get an answer of −$2,572. (Notice that you

SPREADSHEET 5.1 Using a spreadsheet to find the future value of $24

	A	B	C	D	F
1	Finding the future value of $24 using a spreadsheet				
2	INPUTS				
3	Interest rate	0.08			
4	Periods	388			
5	Payment	0			
6	Present value (PV)	−24			
7			Formula in cell B8		
8	Future value	$223,166,175,426,958	=FV(B3,B4,B5,B6)		
9					
10	Notice that we enter the present value in cell B6 as a negative number,				
11	since the "purchase price" is a cash outflow. The interest rate in cell B3				
12	is entered as a decimal, not a percentage.				
13					
14					

Finance in Practice Boxes

These are excerpts that appear in most chapters, usually from the financial press, providing real-life illustrations of the chapter's topics, such as ethical choices in finance, disputes about stock valuation, financial planning, and credit analysis.



Finance in Practice **Ethical Disputes in Finance**

Short-Selling

Investors who take short positions are betting that securities will fall in price. Usually they do this by borrowing the security, selling it for cash, and then waiting in the hope that they will be able to buy it back cheaply.* In 2007 hedge fund manager John Paulson took a huge short position in mortgage-backed securities. The bet paid off, and that year Paulson's trade made a profit of $1 billion for his fund.†

Was Paulson's trade unethical? Some believe not only that he was profiting from the misery that resulted from the crash in mortgage-backed securities but that his short trades accentuated the collapse. It is certainly true that short-sellers have never been popular. For example, following the crash of 1929, one commentator compared short-selling to the ghoulishness of "creatures who, at all great earthquakes and fires, spring up to rob broken homes and injured and dead humans."

She[illegible]ing in the stock market is the Wall Street Walk

But sometimes raids can enhance shareholder value. For example, in 2012 and 2013, Relational Investors teamed up with the California State Teachers' Retirement System (CSTRS, a pension fund) to try to force Timken Co. to split into two separate companies, one for its steel business and one for its industrial bearings business. Relational and CSTRS believed that Timken's combination of unrelated businesses was unfocused and inefficient. Timken management responded that breakup would "deprive our shareholders of long-run value—all in an attempt to create illusory short-term gains through financial engineering." But Timken's stock price rose at the prospect of a breakup, and a nonbinding shareholder vote on Relational's proposal attracted a 53% majority.

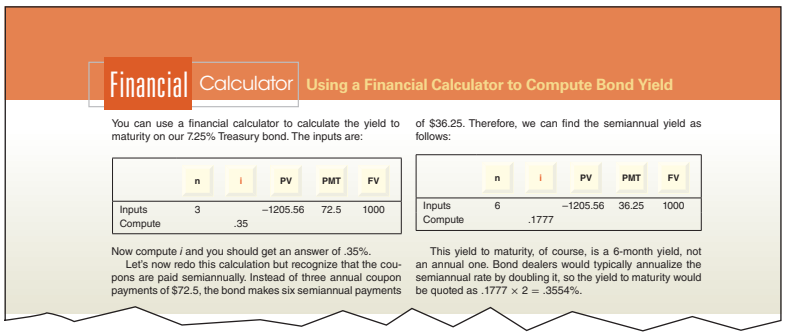
How do you draw the ethical line in such examples? Was Relational Investors a "raider" (sounds bad) or an "activist investor" (sounds good)? Breaking up a portfolio of busi-

ness[illegible] can create difficult adjustments and job losses. Some

[illegible]holders [illegible]all econo-

Calculator Boxes and Exercises

In a continued effort to help students grasp the critical concept of the 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.



Financial Calculator Using a Financial Calculator to Compute Bond Yield

You can use a financial calculator to calculate the yield to maturity on our 7.25% Treasury bond. The inputs are:

	n	i	PV	PMT	FV
Inputs	3		−1205.56	72.5	1000
Compute		.35			

Now compute *i* and you should get an answer of .35%.

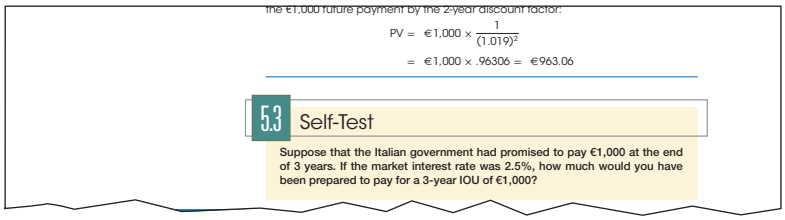
Let's now redo this calculation but recognize that the coupons are paid semiannually. Instead of three annual coupon payments of $72.5, the bond makes six semiannual payments of $36.25. Therefore, we can find the semiannual yield as follows:

	n	i	PV	PMT	FV
Inputs	6		−1205.56	36.25	1000
Compute		.1777			

This yield to maturity, of course, is a 6-month yield, not an annual one. Bond dealers would typically annualize the semiannual rate by doubling it, so the yield to maturity would be quoted as .1777 × 2 = .3554%.

Self-Test Questions

Provided in each chapter, these helpful questions enable students to check their understanding as they read. Answers are worked out at the end of each chapter.



the €1,000 future payment by the 2-year discount factor:

$$PV = €1{,}000 \times \frac{1}{(1.019)^2}$$

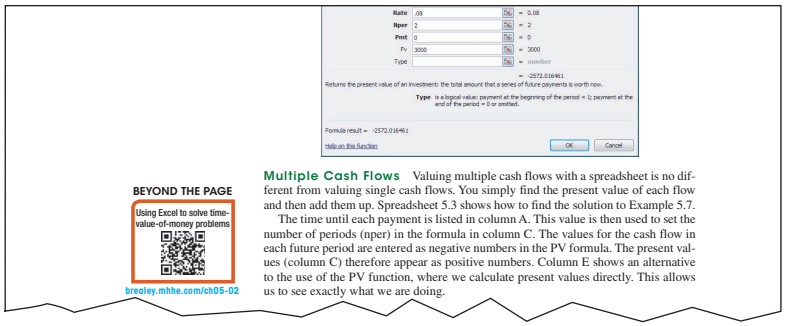
$$= €1{,}000 \times .96306 = €963.06$$

5.3 Self-Test

Suppose that the Italian government had promised to pay €1,000 at the end of 3 years. If the market interest rate was 2.5%, how much would you have been prepared to pay for a 3-year IOU of €1,000?

"Beyond the Page" Interactive Content and Applications

New to this edition! Additional resources and hands-on applications are just a click away. Students can scan the in-text QR codes or use the direct web link to learn more about key concepts and try out calculations, tables, and figures when they go "Beyond the Page."



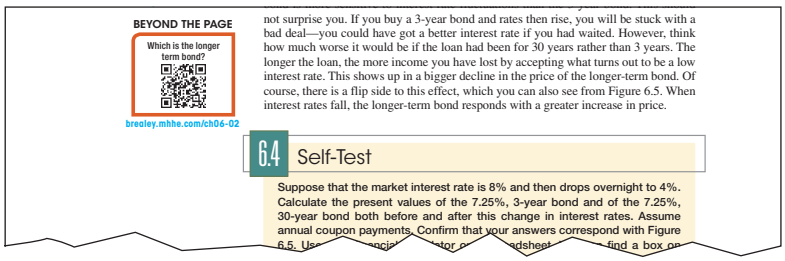
BEYOND THE PAGE

Using Excel to solve time-value-of-money problems

breakley.mhhe.com/ch05-02

Multiple Cash Flows Valuing multiple cash flows with a spreadsheet is no different from valuing single cash flows. You simply find the present value of each flow and then add them up. Spreadsheet 5.3 shows how to find the solution to Example 5.7.

The time until each payment is listed in column A. This value is then used to set the number of periods (nper) in the formula in column C. The values for the cash flow in each future period are entered as negative numbers in the PV formula. The present values (column C) therefore appear as positive numbers. Column E shows an alternative to the use of the PV function, where we calculate present values directly. This allows us to see exactly what we are doing.



BEYOND THE PAGE

Which is the longer term bond?

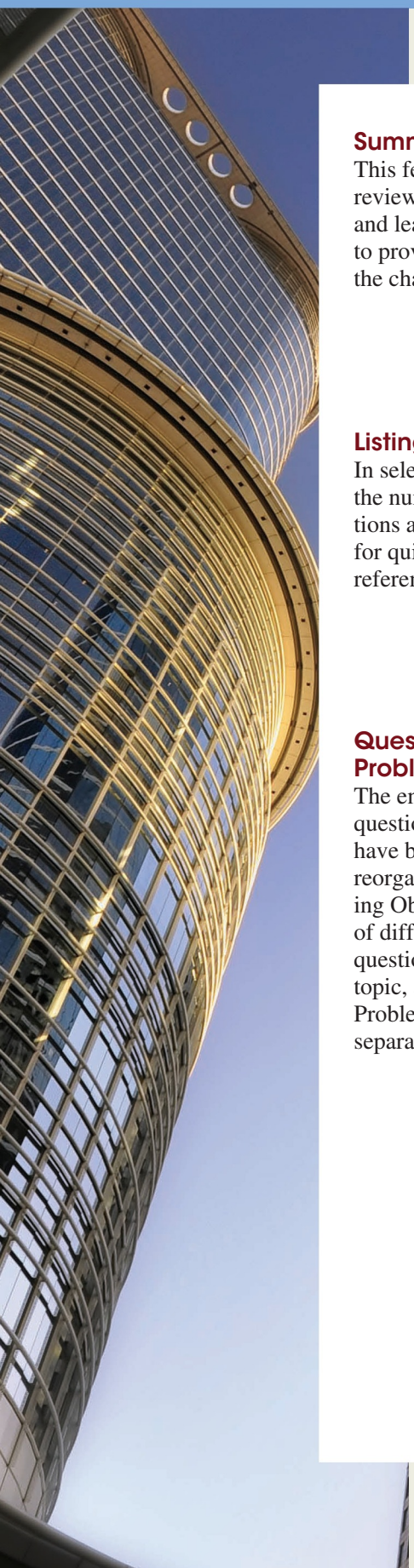
breakley.mhhe.com/ch06-02

not surprise you. If you buy a 3-year bond and rates then rise, you will be stuck with a bad deal—you could have got a better interest rate if you had waited. However, think how much worse it would be if the loan had been for 30 years rather than 3 years. The longer the loan, the more income you have lost by accepting what turns out to be a low interest rate. This shows up in a bigger decline in the price of the longer-term bond. Of course, there is a flip side to this effect, which you can also see from Figure 6.5. When interest rates fall, the longer-term bond responds with a greater increase in price.

6.4 Self-Test

Suppose that the market interest rate is 8% and then drops overnight to 4%. Calculate the present values of the 7.25%, 3-year bond and of the 7.25%, 30-year bond both before and after this change in interest rates. Assume annual coupon payments. Confirm that your answers correspond with Figure 6.5. Use [illegible] find a box on

End-of-Chapter Material



Summary

This feature helps review the key points and learning objectives to provide closure to the chapter.

SUMMARY

What information is contained in the balance sheet, income statement, and statement of cash flows? *(LO3-1)*

Investors and other stakeholders in the firm need regular financial information to help them monitor the firm's progress. Accountants summarize this information in a balance sheet, income statement, and statement of cash flows.

The **balance sheet** provides a snapshot of the firm's assets and liabilities. The assets consist of current assets that can be rapidly turned into cash and fixed assets such as plant and machinery. The liabilities consist of current liabilities that are due for payment within a year and long-term debts. The difference between the assets and the liabilities represents the amount of the shareholders' equity.

The **income statement** measures the profitability of the company during the year. It shows the difference between revenues and expenses.

The **statement of cash flows** measures the sources and uses of cash during the year. The change in the company's cash balance is the difference between sources and uses.

Listing of Equations

In selected chapters, the numbered equations are summarized for quick and easy reference.

LISTING OF EQUATIONS

5.1 Future value = present value $\times (1 + r)^t$

5.2 Present value $= \dfrac{\text{future value after } t \text{ periods}}{(1 + r)^t}$

5.3 PV of perpetuity $= \dfrac{C}{r} = \dfrac{\text{cash payment}}{\text{interest rate}}$

5.4 Present value of t-year annuity $= C\left[\dfrac{1}{r} - \dfrac{1}{r(1 + r)^t}\right]$

5.5 Future value (FV) of annuity of \$1 a year = present value of annuity of \$1 a year $\times (1 + r)^t$

Questions and Problems

The end-of-chapter questions and problems have been updated and reorganized by Learning Objective and level of difficulty. Each question is labeled by topic, and Challenge Problems are listed in a separate section.

QUESTIONS AND PROBLEMS

connect finance

1. **Compound Interest.** Old Time Savings Bank pays 4% interest on its savings accounts. If you deposit \$1,000 in the bank and leave it there: *(LO5-1)*
   a. How much interest will you earn in the first year?
   b. How much interest will you earn in the second year?
   c. How much interest will you earn in the tenth year?
2. **Compound Interest.** New Savings Bank pays 4% interest on its deposits. If you deposit \$1,000 in the bank and leave it there, will it take more or less than 25 years for your money to double? You should be able to answer this without a calculator or interest rate tables. *(LO5-1)*
3. **Compound Interest.** Investments in the stock market have increased at an average compound rate of about 5% since 1900. It is now 2013. *(LO5-1)*
   a. If you invested \$1,000 in the stock market in 1900, how much would that investment be worth today?
   b. If your investment in 1900 has grown to \$1 million, how much did you invest in 1900?

CHALLENGE PROBLEMS

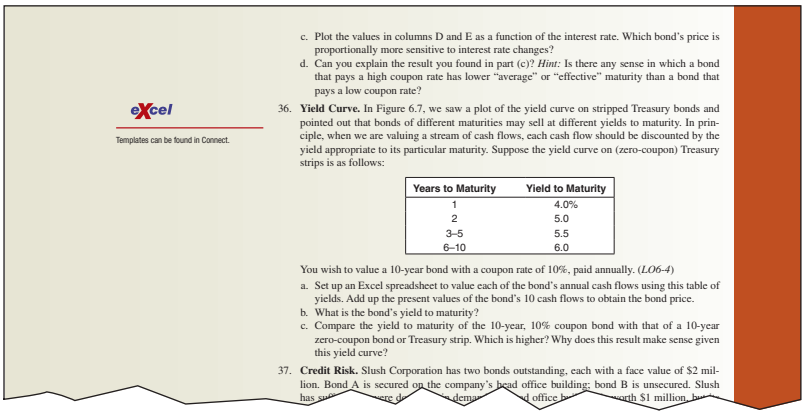
66. **Future Values.** Your wealthy uncle established a \$1,000 bank account for you when you were born. For the first 8 years of your life, the interest rate earned on the account was 6%. Since then, rates have been only 4%. Now you are 21 years old and ready to cash in. How much is in your account? *(LO5-1)*
67. **Present Values.** If the interest rate this year is 8% and the interest rate next year will be 10%, what is the future value of \$1 after 2 years? What is the present value of a payment of \$1 to be received in 2 years? *(LO5-2)*
68. **Perpetuities and Effective Interest Rate.** What is the value of a perpetuity that pays \$100 every 3 months forever? The interest rate quoted on an APR basis is 6%. *(LO5-3)*
69. **Amortizing Loans and Inflation.** Suppose you take out a \$100,000, 20-year mortgage loan to buy a condo. The interest rate on the loan is 6%, and to keep things simple, we will assume you make payments on the loan annually at the end of each year. *(LO5-3)*
    a. What is your annual payment on the loan?

Excel

Templates can be found in Connect.

Excel Problems

Most chapters contain problems, denoted by an icon, specifically linked to Excel templates that are available in Connect.



eXcel

Templates can be found in Connect.

c. Plot the values in columns D and E as a function of the interest rate. Which bond's price is proportionally more sensitive to interest rate changes?
d. Can you explain the result you found in part (c)? *Hint:* Is there any sense in which a bond that pays a high coupon rate has lower "average" or "effective" maturity than a bond that pays a low coupon rate?

36. **Yield Curve.** In Figure 6.7, we saw a plot of the yield curve on stripped Treasury bonds and pointed out that bonds of different maturities may sell at different yields to maturity. In principle, when we are valuing a stream of cash flows, each cash flow should be discounted by the yield appropriate to its particular maturity. Suppose the yield curve on (zero-coupon) Treasury strips is as follows:

Years to Maturity	Yield to Maturity
1	4.0%
2	5.0
3–5	5.5
6–10	6.0

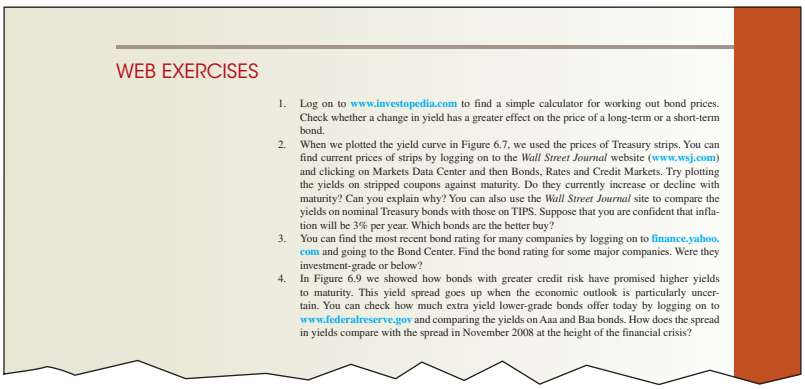
You wish to value a 10-year bond with a coupon rate of 10%, paid annually. (*LO6-4*)

a. Set up an Excel spreadsheet to value each of the bond's annual cash flows using this table of yields. Add up the present values of the bond's 10 cash flows to obtain the bond price.
b. What is the bond's yield to maturity?
c. Compare the yield to maturity of the 10-year, 10% coupon bond with that of a 10-year zero-coupon bond or Treasury strip. Which is higher? Why does this result make sense given this yield curve?

37. **Credit Risk.** Slush Corporation has two bonds outstanding, each with a face value of $2 million. Bond A is secured on the company's head office building; bond B is unsecured. Slush has [illegible] worth $1 million, but [illegible]

Web Exercises

Select chapters include Web Exercises that allow students to utilize the Internet to apply their knowledge and skills with real-world companies.

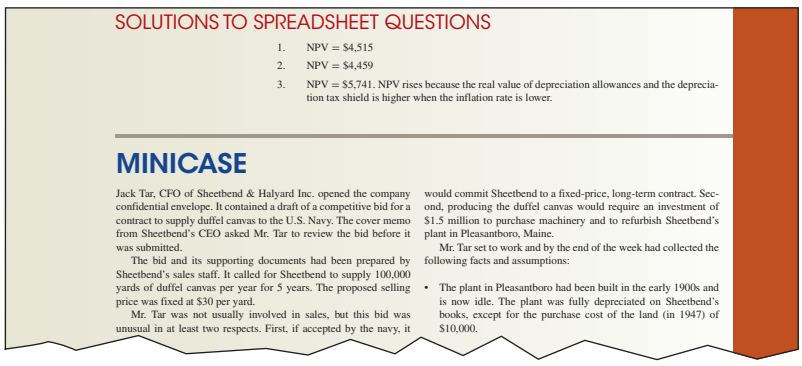


WEB EXERCISES

1. Log on to www.investopedia.com to find a simple calculator for working out bond prices. Check whether a change in yield has a greater effect on the price of a long-term or a short-term bond.
2. When we plotted the yield curve in Figure 6.7, we used the prices of Treasury strips. You can find current prices of strips by logging on to the *Wall Street Journal* website (www.wsj.com) and clicking on Markets Data Center and then Bonds, Rates and Credit Markets. Try plotting the yields on stripped coupons against maturity. Do they currently increase or decline with maturity? Can you explain why? You can also use the *Wall Street Journal* site to compare the yields on nominal Treasury bonds with those on TIPS. Suppose that you are confident that inflation will be 3% per year. Which bonds are the better buy?
3. You can find the most recent bond rating for many companies by logging on to finance.yahoo.com and going to the Bond Center. Find the bond rating for some major companies. Were they investment-grade or below?
4. In Figure 6.9 we showed how bonds with greater credit risk have promised higher yields to maturity. This yield spread goes up when the economic outlook is particularly uncertain. You can check how much extra yield lower-grade bonds offer today by logging on to www.federalreserve.gov and comparing the yields on Aaa and Baa bonds. How does the spread in yields compare with the spread in November 2008 at the height of the financial crisis?

Minicases

Integrated minicases allow students to apply their knowledge to relatively complex, practical problems and typical real-world scenarios.



SOLUTIONS TO SPREADSHEET QUESTIONS

1. NPV = $4,515
2. NPV = $4,459
3. NPV = $5,741. NPV rises because the real value of depreciation allowances and the depreciation tax shield is higher when the inflation rate is lower.

MINICASE

Jack Tar, CFO of Sheetbend & Halyard Inc. opened the company confidential envelope. It contained a draft of a competitive bid for a contract to supply duffel canvas to the U.S. Navy. The cover memo from Sheetbend's CEO asked Mr. Tar to review the bid before it was submitted.

The bid and its supporting documents had been prepared by Sheetbend's sales staff. It called for Sheetbend to supply 100,000 yards of duffel canvas per year for 5 years. The proposed selling price was fixed at $30 per yard.

Mr. Tar was not usually involved in sales, but this bid was unusual in at least two respects. First, if accepted by the navy, it would commit Sheetbend to a fixed-price, long-term contract. Second, producing the duffel canvas would require an investment of $1.5 million to purchase machinery and to refurbish Sheetbend's plant in Pleasantboro, Maine.

Mr. Tar set to work and by the end of the week had collected the following facts and assumptions:

- The plant in Pleasantboro had been built in the early 1900s and is now idle. The plant was fully depreciated on Sheetbend's books, except for the purchase cost of the land (in 1947) of $10,000.

Supplements

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

For the Instructor

Instructor's Manual

This updated and enhanced manual 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 web links, and pedagogical ideas.

PowerPoint Presentations

These visually stimulating slides have been fully updated by Matthew Will, University of Indianapolis, with colorful graphs, charts, and lists. The slides can be edited or manipulated to fit the needs of a particular course.

Print and Online Test Bank

Kay Johnson has revised the test bank and added new questions and problems. Over 2,000 true/false, multiple-choice, and discussion questions/problems are available to the instructor at varying levels of difficulty and comprehension. All questions are tagged by learning objective, topic, AACSB category, and Bloom's Taxonomy level. Complete answers are provided for all test questions and problems, and creating computerized tests is easy with EZ Test Online!

Solutions Manual

Matthew Will, University of Indianapolis, worked with the authors to prepare this resource containing detailed and thoughtful solutions to all the end-of-chapter problems.

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Connect Finance offers a number of powerful tools and features to make managing assignments easier, so faculty can spend more time teaching. With *Connect Finance,* students can engage with their coursework anytime and anywhere, making the learning process more accessible and efficient.

Simple Assignment Management With *Connect Finance,* creating assignments is easier than ever, so you can spend more time teaching and less time managing. The assignment management function enables you to:

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Smart Grading When it comes to studying, time is precious. *Connect Finance* helps students learn more efficiently by providing feedback and practice material when they need it, where they need it. When it comes to teaching, your time also is precious. The grading function enables you to:

- Have assignments scored automatically, giving students immediate feedback on their work and side-by-side comparisons with correct answers.
- Access and review each response and manually change grades or leave comments for students to review.
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Instructor Library The *Connect Finance* Instructor Library is your repository for additional resources to improve student engagement in and out of class. You can select and use any asset that enhances your lecture. The *Connect Finance* Instructor Library includes all of the instructor supplements for this text.

Student Study Center The *Connect Finance* Student Study Center is the place for students to access additional resources. The Student Study Center:

- Offers students quick access to lectures, eBooks, and more.
- Provides instant practice material and study questions, easily accessible on the go.

Diagnostic and Adaptive Learning of Concepts: LearnSmart

Students want to make the best use of their study time. The LearnSmart adaptive self-study technology within *Connect Finance* provides students with a seamless combination of practice, assessment, and remediation for every concept in the textbook. LearnSmart's intelligent software adapts to every student response and automatically delivers concepts that advance students' understanding while reducing time devoted to the concepts already mastered. The result for every student is the fastest path to mastery of the chapter concepts. LearnSmart:

- Applies an intelligent concept engine to identify the relationships between concepts and to serve new concepts to each student only when he or she is ready.
- Adapts automatically to each student, so students spend less time on the topics they understand and practice more on those they have yet to master.
- Provides continual reinforcement and remediation, but gives only as much guidance as students need.
- Integrates diagnostics as part of the learning experience.
- Enables you to assess which concepts students have efficiently learned on their own, thus freeing class time for more applications and discussion.

Student Progress Tracking

Connect Finance keeps instructors informed about how each student, section, and class is performing, allowing for more productive use of lecture and office hours. The progress-tracking function enables you to:

- View scored work immediately and track individual or group performance with assignment and grade reports.
- Access an instant view of student or class performance relative to learning objectives.
- Collect data and generate reports required by many accreditation organizations, such as AACSB and AICPA.

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Smartbook

Smartbook is an extension of LearnSmart—an adaptive eBook that helps students focus their study time more effectively. As students read, Smartbook assesses comprehension and dynamically highlights where they need to study more.

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Educators know that the more students can see, hear, and experience class resources, the better they learn. In fact, studies prove it. With Tegrity Campus, students quickly recall key moments by using Tegrity Campus's unique search feature. This search helps students efficiently find what they need, when they need it, across an entire semester of class recordings. Help turn all your students' study time into learning moments immediately supported by your lecture.

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2. **Deep integration of content and tools.** Not only do you get single sign-on with *Connect* and *Create;* you also get deep integration of McGraw-Hill content and content engines right in Blackboard. Whether you're choosing a book for your course or building *Connect* assignments, all the tools you need are right where you want them—inside Blackboard.
3. **Seamless Gradebooks.** Are you tired of keeping multiple gradebooks and manually synchronizing grades into Blackboard? We thought so. When a student completes an integrated *Connect* assignment, the grade for that assignment automatically (and instantly) feeds your Blackboard grade center.
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Acknowledgments

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