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Principles of Corporate Finance

FOURTEENTH EDITION

Richard A. Brealey
Professor of Finance
London Business School

Stewart C. Myers
Robert C. Merton (1970) Professor of Finance
Sloan School of Management
Massachusetts Institute of Technology

Franklin Allen
Professor of Finance and Economics
Imperial College London

Alex Edmans
Professor of Finance
London Business School
Dedication

To our parents.
About the Authors

Richard A. Brealey
Emeritus Professor of Finance at 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 adviser 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
Emeritus Professor of Financial Economics at MIT’s Sloan School of Management. He is past president of the American Finance Association, a research associate at the National Bureau of Economic Research, a principal of the Brattle Group Inc., and a retired director of Entergy Corporation. His research is primarily concerned with the valuation of real and financial assets, corporate financial policy, and financial aspects of government regulation of business. He is the author of influential research papers on many topics, including adjusted present value, rate of return regulation, pricing and capital allocation in insurance, real options, and moral hazard and information issues in capital structure decisions.

Franklin Allen
Professor of Finance and Economics, Imperial College London, and Emeritus Nippon Life Professor of Finance at the Wharton School of the University of Pennsylvania. He is past president of the American Finance Association, Western Finance Association, Society for Financial Studies, Financial Intermediation Research Society, and Financial Management Association. His research has focused on financial innovation, asset price bubbles, comparing financial systems, and financial crises. He is Director of the Brevan Howard Centre for Financial Analysis at Imperial College Business School.

Alex Edmans
Professor of Finance at London Business School and Mercers School Memorial Professor of Business at Gresham College. He is also Managing Editor of the Review of Finance and was previously a tenured professor at Wharton, where he won 14 teaching awards in six years. His research focuses on corporate finance, responsible business, and behavioral finance. He has spoken at the World Economic Forum in Davos, given the TED talk “What to Trust in a Post-Truth World” and the TEDx talk “The Social Responsibility of Business”; he is also advisor to several investment management companies. He is the author of Grow the Pie: How Great Companies Deliver Both Purpose and Profit. Poets & Quants named him MBA Professor of the Year for 2021.
This book describes the theory and practice of corporate finance. We hardly need to explain why financial managers have to master the practical aspects of their job, but we should spell out why down-to-earth 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 so 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.

That should not sound intimidating. Good theory helps you to grasp what is going on in the world around you. It helps you to ask the right questions when times change and new problems need to be analyzed. It also tells you which 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 where financial economists cannot agree. We have not glossed over these disagreements. We set out the arguments for each side and tell you where we stand.

Much of this book is concerned with understanding what financial managers do and why. But we also say what financial managers should do to increase company value. Where theory suggests that financial managers are making mistakes, we say so, while admitting that there may be hidden reasons for their actions. In brief, we have tried to be fair but to pull no punches.

This book may be your first view of the world of modern finance. If so, you will read first for new ideas, and for an understanding of how finance theory translates into practice. But eventually you will be in a position to make financial decisions, not just study them. At that point, you can turn to this book as a reference and guide.

Changes in the Fourteenth Edition

What has changed in this edition? You will have seen the first change on the cover: Alex Edmans has joined the author team. Alex is a global authority in corporate finance, with particular expertise in corporate governance, responsible business, and behavioral finance—three areas we have significantly bolstered as we will shortly describe. In addition to being a leading researcher, he has substantial practitioner expertise. He has also won a multitude of teaching awards at MIT, Wharton, and London Business School and is particularly noted for the ability to explain complex finance concepts in simple language. He recently gave a year-long Gresham College public lecture series on the principles of finance attended by a diverse audience, from schoolchildren to retirees.

This expansion of the author team has led to a number of important changes. For example, in recent years many observers have questioned companies’ focus on profits and have suggested that managers should promote the interests of all stakeholders rather than simply seeking to maximize shareholder value. The issue is an important one and we have, therefore, added a new chapter, Chapter 20, that discusses these different corporate objectives, how far they conflict, and how a responsible business should behave.

The structure of a firm’s governance is closely related to its objectives. We have therefore moved the material on corporate governance and agency issues to Chapter 19, where it now sits next to the chapter on corporate objectives. This chapter has also been substantially rewritten.

Other chapters with major changes include the two chapters on the pricing of risky assets (Chapters 7 and 8). Chapter 7 now focuses on portfolio choice and a stock’s effect on portfolio risk, while Chapter 8 concentrates on asset pricing. This is a clearer separation of topics than in previous editions; we think that it is more logical and helps understanding.

The discussion of market efficiency (Chapter 12) has also undergone substantial revision with additional and updated sections on empirical evidence. The chapter also contains an expanded discussion of behavioral finance and the evidence for behavioral biases.

Financial innovation today is being driven by technological developments such as artificial intelligence, big data, and cloud computing. Chapter 13 now includes a new section that reviews seven ways in which financial technology is changing financial practice.

U.S. financial managers work in a global environment and need to understand the financial systems of other countries. Also, many of the text’s readers come from countries other than the United States. Therefore, in recent editions, we have progressively introduced more international material, including information...
about the major developing economies, such as China and India. Material on international differences in financing is now integrated in Chapter 14, while Chapter 19 includes a discussion of governance systems around the world.

PEDAGOGICAL CHANGES

Throughout, we have tried to make the book more topical and easier to read. In many cases, the changes consist of some updated data here and a new example there. Often, these additions reflect some recent development in the financial markets or company practice.

We have also changed the introduction to each chapter to include summaries of the content of each of the chapter’s sections. We think that this will make it easier for the reader to understand the organization of the chapter and to jump forward to a particular topic of interest. Chapters now also conclude with key takeaway bullet points summarizing the chapter’s principal lessons.

Within each chapter we have interspersed a number of new self-test questions that provide an opportunity for readers to pause and check their understanding. Answers to these self-tests are located at the end of the chapter.

The Beyond the Page digital extensions and applications provide additional examples, anecdotes, spreadsheet programs, and more thoroughgoing explanations and practice examples of some topics. This extra material makes it possible to escape from the constraints of the printed page by providing more explanation for readers who need it and additional material for those who would like to dig deeper. This material is very easily accessed on the web. There are now more than 150 of these apps. They are seamlessly available with a click on the e-version of the book, but they are also readily accessible in the traditional hard copy of the text using the shortcut URLs provided in the margins of relevant pages. Check out mhhe.com/brealey14e to learn more.

Examples of these applications include:

- **Chapter 2** Would you like to to learn more about how to use Excel spreadsheets to solve time value of money problems? A Beyond the Page application shows how to do so.
- **Chapter 3** Do you need to calculate a bond’s duration, see how it predicts the effect of small interest rate changes on bond price, calculate the duration of a common stock, or learn how to measure convexity? The duration app allows you to do so.
- **Chapter 5** Want more practice in valuing annuities? There is an application that provides worked examples and hands-on practice.
- **Chapter 7** Ever wondered how COVID has affected the risk of stocks in the travel industry? An app provides the answer.
- **Chapter 12** Want an example of how speculative trading can swamp the actions of arbitrageurs? The app on the explosion in the price of GameStop shares provides one.
- **Chapter 18** The text briefly describes the flow-to-equity method for valuing businesses, but using the method can be tricky. We provide an application that guides you step by step.
- **Chapter 22** The Black–Scholes Beyond the Page application provides an option calculator. It also shows how to estimate the option’s sensitivity to changes in the inputs and how to measure an option’s risk.

**Chapter Structure**

Each chapter of the book includes an introductory preview, a list of key takeaways, and an annotated list of suggested further reading. The list of possible candidates for further reading is now voluminous. Rather than trying to include every important article, we largely list survey articles or general books. We give more specific references in footnotes.

In addition to the self-test questions within the chapter, each chapter is followed by a set of problems on both numerical and conceptual topics, together with a few challenge problems.

We include a Finance on the Web section in chapters where it makes sense to do so. This section now houses a number of Web Projects, along with new Data Analysis problems. These exercises seek to familiarize the reader with some useful websites and to explain how to download and process data from the web.

The book also contains 12 end-of-chapter Mini-Cases. These include specific questions to guide the case analyses. Answers to the mini-cases are available to instructors on the book’s website.

Spreadsheet programs such as Excel are tailor-made for many financial calculations. Several chapters include boxes that introduce the most useful financial functions and provide some short practice questions. We show how to use the Excel function key to locate the function and then enter the data. We think that this approach is much simpler than trying to remember the formula for each function.

We conclude the book with a glossary of financial terms.

The 34 chapters in this book are divided into 12 parts. Parts 1, 2 and 3 cover valuation and capital investment
decisions, including portfolio theory, asset pricing models, and the cost of capital. Parts 4 through 9 cover financing decisions, payout policy and capital structure, corporate objectives and governance, options, debt financing, and risk management. Part 10 covers financial analysis, planning, and working-capital management. Part 11 covers mergers and acquisitions, and corporate restructuring. Part 12 concludes.

We realize that instructors will wish to select topics and may prefer a different sequence. We have therefore written chapters so that topics can be introduced in several logical orders. For example, there should be no difficulty in reading the chapters on financial analysis and planning before the chapters on valuation and capital investment.

Acknowledgments

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Noyan Arsen Koc University

Anders Axvann Gothenburg University
John Banko University of Florida, Gainesville
Michael Barry Boston College
Jan Bartholdy Aarhus University
Penny Belk Loughborough University
Omar Benkato Ball State University
Erik Benrud Indiana University
Ronald Benson University of Maryland, University College
Peter Berman University of British Columbia
Kevin Boeh University of Washington
Tom Boulton Miami University of Ohio
Edward Boyer Temple University
Alon Brav Duke University
Jean Canil University of Adelaide
Robert Carlson Bethany College
Chuck Chahyadi Eastern Illinois University
Chongyang Chen Pacific Lutheran University
Fan Chen University of Mississippi
Bill Christie Vanderbilt University
Celtin Ciner University of North Carolina, Wilmington
John Cooney Texas Tech University
Charles Cuny Washington University, St. Louis
John Davenport Regent University
Ray DeGennaro University of Tennessee, Knoxville
Adri DeRidder Uppsala University
William Dimovski Deakin University, Melbourne
David Ding Nanyang Technological University
Robert Duvic University of Texas at Austin
Susan Edwards Grand Valley State University
Riza Emekter Robert Morris University
Robert Everett Millsersville University
Dave Fehr Southern New Hampshire University
Donald Flagg University of Tampa
Frank Flanegn Robert Morris University
Zsuzanna Fluck Michigan State University
Connel Fullenkamp Duke University
Mark Garmaise University of California, Los Angeles
Sharon Garrison University of Arizona
Christopher Geczy University of Pennsylvania
George Geis University of Virginia
Bradford Gibbs Brown University
Stuart Gillan University of North Texas
Felix Goltz Edhec Business School
Ning Gong Deakin Business School
Levon Goukasian Pepperdine University
Gary Gray Pennsylvania State University
C. J. Green Loughborough University
Mark Griffiths Miami University
Anthony Gu SUNY Geneseo
Re-Jin Guo University of Illinois, Chicago
Pia Gupta California State University, Long Beach
Ann Hackert Idaho State University
Winfried Hallerbach Robeco Asset Management
Milton Harris University of Chicago
Mary Hartman Bentley College
Glenn Henderson University of Cincinnati
Donna Hitscherich Columbia University
Ronald Hoffmeister Arizona State University
James Howard University of Maryland, College Park
George Jabbour George Washington University
Ravi Jagannathan Northwestern University
Preface

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Richard A. Brealey
Stewart C. Myers
Franklin Allen
Alex Edmans

Abu Jalal Saffold University
Nancy Jay Mercer University
Thadavilil (Nathan) Jithendranathan University of Saint Thomas
Travis Jones Florida Gulf Coast University
Kathleen Kahle University of Arizona
Jarl Kallberg NYU, Stern School of Business
Ron Kaniel University of Rochester
Steve Kaplan University of Chicago
Eric Kelley University of Tennessee, Knoxville
Arif Khursheed Manchester Business School
Ken Kim University at Buffalo School of Management, SUNY
Jiro Kondo McGill University
C. R. Krishnaswamy Western Michigan University
George Kutner Marquette University
Dirk Laschankzy University of Iowa
Scott Lee University of Nevada, Las Vegas
Becky Laframboise Colorado School of Mines
Bob Lightner San Diego Christian College
David Lins University of Illinois, Urbana
Brandon Lockhart University of Nebraska, Lincoln
David Lovatt University of East Anglia
Greg Lucado University of the Sciences in Philadelphia
Debbie Lucas Massachusetts Institute of Technology
Brian Lucey Trinity College, Dublin
Suren Munsingha University of California, Irvine
Ernst Maug University of Mannheim
George McCabe University of Nebraska
Eric McLaughlin California State University, Pomona
Joe Messina San Francisco State University
Tim Michael University of Houston, Clear Lake
Dag Michelsen BI Norwegian Business School
Franklin Michello Middle Tennessee State University
Peter Moles University of Edinburgh
Katherine Morgan Columbia University
James Nelson East Carolina University
James Owens West Texas A&M University
Darshana Palkar Minnesota State University, Mankato
Claus Parum Copenhagen Business School
Dilip Patro Federal Deposit Insurance Corporation (FDIC)
John Percival Minerva University
Birsel Pirim The Ohio State University
Latha Ramchand University of Houston
Narendar V. Rao Northeastern University
Rathin Rathinasamy Ball State University
Raghavendra Rau University of Cambridge
Joshua Rauh Stanford University
Charu Reheja TriageLogic Group
Thomas Rhee California State University, Long Beach
Tom Rietz University of Iowa
Robert Ritchey Texas Tech University
Michael Roberts University of Pennsylvania
Mo Rodriguez Texas Christian University
John Rozyczki Drake University
Frank Ryan San Diego State University
Patricia Ryan Colorado State University
George Sarraf University of California, Irvine
Eric Sartell Whitworth University
Marc Schauten Vrije Universiteit Amsterdam
Anjolein Schmeits NYU Stern School of Business
Brad Scott Webster University

Nejat Seyhun University of Michigan
Jay Shanken Emory University
Chander Shekhar University of Melbourne
Hamid Shomali Golden Gate University
Richard Simonds Michigan State University
Bernetta Stone Brigham Young University
John Strong College of William & Mary
Avanidhar Subrahmanyam University of California, Los Angeles
Tim Sullivan UKG (Ultimate Kronos Group)
Shrinivasan Sundaram Ball State University
Chu-Sheng Tai Texas Southern University
Tom Tallierico Dowling College
Stephen Todd Loyola University, Chicago
Walter Torous University of California, Los Angeles
Emery Trahan Northeastern University
Gary Tripp Southern New Hampshire University
Iliaas Tsiakas University of Guelph
David Vang St. Thomas University
Nikhil Varaiya, San Diego State University
Steve Vents Dartmouth College
Joseph Vu DePaul University
John Wald University of Texas, San Antonio
Chong Wang Naval Postgraduate School
Faye Wang University of Illinois, Chicago
Kelly Welch University of Kansas
Jill Wemore Saginaw Valley State University
John Wheeler University of Michigan
Patrick Wilkie University of Virginia
Matt Will University of Indianapolis
David Williams Texas A&M University, Commerce
Kalman Vadasz Stevens Institute of Technology
Art Wilson George Washington University
Albert Wang Auburn University
Shee Wong University of Minnesota, Duluth
Bob Wood Tennessee Tech University
Fei Xie University of Delaware
Minhua Yang University of Central Florida
David Zalewski Providence College
Chenying Zhang University of Pennsylvania

Stewart C. Myers
Franklin Allen
Alex Edmans
Pedagogical Features

Chapter Overview
Each chapter begins with a brief narrative and outline to explain the concepts that will be covered in more depth. Useful websites related to material for each part are provided in the Connect library.

Finance in Practice Boxes
Relevant news articles, often from financial publications, appear in various chapters throughout the text. Aimed at bringing real-world flavor into the classroom, these boxes provide insight into the business world today.

Numbered Examples
Numbered and titled examples are called out within chapters to further illustrate concepts. Students can learn how to solve specific problems step-by-step and apply key principles to answer concrete questions and scenarios.

Self-Test Questions
Each chapter includes a number of self-test questions that allow students to check their understanding. Answers to these questions are given at the end of the chapter.

Numbered Equations
Where a result can be stated formally, we do so in the form of a numbered equation. However, we are also careful to explain the intuition behind a financial theory, so that readers without a quantitative background should be able to read with understanding.

Beyond the Page Interactive Content and Applications
Additional resources and hands-on applications are just a click away. Students can use the web address or click on the icon in the eBook to learn more about key concepts and try out calculations, tables, and figures when they go Beyond the Page.
BEYOND THE PAGE features.

available in Connect and through the

Select tables are set as spreadsheets, and

that apply to the spreadsheet follow for

applying financial concepts. Questions

These boxes provide detailed examples

Excel Exhibits

Select tables are set as spreadsheets, and

the corresponding Excel files are also

available in Connect and through the

Beyond the Page features.

Excel

Spreadsheet Functions

Boxes

These boxes provide detailed examples of

how to use Excel spreadsheets when

applying financial concepts. Questions

that apply to the spreadsheet follow for

additional practice.

USEFUL SPREADSHEET FUNCTIONS

Estimating Stock and Market Risk

Spreadsheets such as Excel have some built-in statistical functions that are useful for calculating risk measures. You can find these functions by clicking Fx on the Excel toolbar. If you then click on the function that you wish to use, Excel will ask for the inputs that it needs. At the bottom left of the function box, there is a Help facility with an example of how the function is used.

Here is a list of useful functions for estimating stock and market risk. You can enter the inputs for all these functions as numbers or as the addresses of cells that contain the numbers. Note that different versions of Excel may use slightly different names for these functions.

1. VAR.P and STDEV.P: Calculate variance and standard deviation of a series of numbers, as shown in Section 7-2.
2. VAR.S and STDEV.S: Formula 12 of Chapter 7 noted that when variance is estimated from a sample of observations (the usual case), a correction should be made for the loss of a degree of freedom. VAR.S and STDEV.S provide the corrected measures. For any large sample, VAR.S and VAR.P will be similar.
3. SLOPE: Useful for calculating the beta of a stock or portfolio.
4. CORREL: Useful for calculating the correlation between the returns on any two investments.
5. COVARIANCE.P and COVARIANCE.S: Portfolio risk depends on the covariance between the returns on each pair of stocks. These functions calculate the covariance.
6. RSQ: R-squared is the square of the correlation coefficient and is useful for measuring the proportion of the variance of a stock’s returns that can be explained by the market.
7. AVERAGE: Calculates the average of any series of numbers.

If, say, you need to know the standard error of your estimate of beta, you can obtain more detailed statistics by going to the Tools menu and clicking on Data Analysis and then on Regression.

Spreadsheet Questions

The following questions provide opportunities to practice each of the Excel functions.
1. (VAR.P and STDEV.P) Choose two well-known stocks and download the latest 61 months of adjusted prices from finance.yahoo.com. Calculate the monthly returns for each stock. Now find the variance and standard deviation of the returns for each stock by using VAR.P and STDEV.P. Annualize the variance by multiplying by 12 and the standard deviation by multiplying by the square root of 12.
2. (AVERAGE, VAR.P, and STDEV.P) Now calculate the annualized variance and standard deviation for a portfolio that each month has equal holdings in the two stocks. Is the result more or less than the average of the standard deviations of the two stocks? Why?
3. (SLOPE) Download the Standard & Poor’s index for the same period (its symbol is ^GSPC). Find the beta of each stock and of the portfolio. (Note: You need to enter the stock returns as the Y-values and market returns as the X-values.) Is the beta of the portfolio more or less than the average of the betas of the two stocks?
4. (CORREL) Calculate the correlation between the returns on the two stocks. Use this measure and year-earlier estimates of each stock’s variance to calculate the variance of a portfolio that is evenly divided between the two stocks. (You may need to reread Section 7-3 to refresh your memory of how to do this.) Check that you get the same answer as when you calculated the portfolio variance directly.
5. (COVARIANCE.P) Repeat Question 4, but now calculate the covariance directly rather than from the correlations and variances.

Table 6.2

Initial forecast data for guano project

<table>
<thead>
<tr>
<th>Year</th>
<th>Year</th>
<th>Year</th>
<th>Year</th>
<th>Year</th>
<th>Year</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Capital investment</td>
<td>12,000</td>
<td>-1,940^*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Accumulated depreciation</td>
<td>2,000</td>
<td>4,000</td>
<td>6,000</td>
<td>8,000</td>
<td>10,000</td>
<td>12,000</td>
</tr>
<tr>
<td>3 Net book value</td>
<td>12,000</td>
<td>10,000</td>
<td>8,000</td>
<td>6,000</td>
<td>4,000</td>
<td>2,000</td>
</tr>
<tr>
<td>4 Working capital</td>
<td>550</td>
<td>1,289</td>
<td>3,261</td>
<td>4,890</td>
<td>5,383</td>
<td>2,002</td>
</tr>
<tr>
<td>5 Revenues</td>
<td>523</td>
<td>12,887</td>
<td>32,610</td>
<td>48,901</td>
<td>35,834</td>
<td>19,717</td>
</tr>
<tr>
<td>6 Expenses</td>
<td>4,000</td>
<td>3,037</td>
<td>8,939</td>
<td>20,883</td>
<td>30,809</td>
<td>23,103</td>
</tr>
<tr>
<td>7 Depreciation^*</td>
<td>2,000</td>
<td>2,000</td>
<td>2,000</td>
<td>2,000</td>
<td>2,000</td>
<td>2,000</td>
</tr>
<tr>
<td>8 Profit after tax (B – 6)</td>
<td>-4,000</td>
<td>-4,514</td>
<td>1,948</td>
<td>9,727</td>
<td>16,093</td>
<td>10,733</td>
</tr>
<tr>
<td>9 Tax at 21%</td>
<td>-948</td>
<td>409</td>
<td>2,043</td>
<td>3,379</td>
<td>2,254</td>
<td>684</td>
</tr>
<tr>
<td>10 Net profit after tax (B – 9)</td>
<td>-3,160</td>
<td>-3,566</td>
<td>1,539</td>
<td>7,684</td>
<td>12,713</td>
<td>7,477</td>
</tr>
</tbody>
</table>

^* In the income statement, the initial investment of $12 million is depreciated straight-line over the six years.

^* Gain on sale of assets. The asset has been entirely depreciated for tax purposes and the entire sales price is, therefore, subject to tax.

A negative tax payment means a cash inflow, assuming that IM&C uses the tax loss on the guano project to shield income from the rest of its operations.
End-of-Chapter Features

> Problem Sets
Beside each end-of-chapter problem we note the section of the chapter to which the question relates. This helps instructors create assignments and makes it simpler for students to look back for help. These end-of-chapter problems give students hands-on practice with key concepts and applications.

> Excel Problems
Most chapters contain problems, denoted by an icon, specifically linked to Excel spreadsheets that are available in Connect and through the Beyond the Page features.
Finance on the Web

These web exercises give students the opportunity to explore financial websites on their own. The web exercises make it easy to include current, real-world data in the classroom.

Mini-Cases

Mini-cases are included in select chapters so students can apply their knowledge to real-world scenarios.

MINI-CASE

Waldo County

Waldo County, the well-known real estate developer, worked long hours, and he expected the staff to do the same. So George Chavez was not surprised to receive a call from the boss just as George was about to leave for a long summer's weekend.

Mr. County's success had been built on a remarkable instinct for a good site. He would exclaim "Location! Location! Location!" at some point in every planning meeting. Yet finance was not his strong suit. On this occasion, he wanted George to go over the figures for a new $90 million outlet mall designed to intercept tourists heading downeast from Bar Harbor through southern Maine. "First thing Monday will do just fine," he said as he handed George the file. "I'll be in my house in Bar Harbor if you need me."

George's first task was to draw up a summary of the projected revenues and costs. The results are shown in Table 10.6. Note that the mall's revenues would come from two sources: The company would charge retailers an annual rent for the space they occupied and, in addition, it would receive 5% of each store's gross sales.

Construction of the mall was likely to take three years. The construction costs could be depreciated straight-line over 15 years starting in year 3. As in the case of the company's other developments, the mall would be built to the highest specifications and would not need to be rebuilt until year 17. The land was expected to retain its value, but could not be depreciated for tax purposes. Construction costs, revenues, operating and maintenance costs, and local real estate taxes were all likely to rise in line with inflation, which was forecasted at 5% a year. Local real estate taxes are deductible for corporate tax. The company's corporate tax rate was 25% and the cost of capital was 9.5% in nominal terms.

George decided first to check that the project made financial sense. He then proposed to look at some of the things that might go wrong. His boss certainly had a nose for a good retail project, but he was not infallible. The Salome project had been a disaster because store sales had turned out to be 40% below forecast. What if that happened here? George wondered just how far sales could fall short of forecast before the project would be underwater.

The Salome project had been a disaster because store sales had turned out to be 40% below forecast. What if that happened here? George wondered just how far sales could fall short of forecast before the project would be underwater.
In this edition, we have gone to great lengths to ensure that our supplements are equal in quality and authority to the text itself.

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McGraw Hill’s Connect is an online assignment and assessment solution that connects students with the tools and resources they’ll need to achieve success. McGraw Hill’s Connect helps prepare students for their future by enabling faster learning, more efficient studying, and higher retention of knowledge.

**McGraw Hill’s Connect Features**

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

**Instructor Library**

The Connect Instructor Library provides additional resources to improve student engagement in and out of class. This library contains information about the book and the authors, as well as all of the instructor supplements, many of which were carefully updated this edition by Nicholas Raccuela, Ph.D., St. Vincent University.

- **Instructor’s Manual** The Instructor’s Manual contains an overview of each chapter, teaching tips,
Supplements

learning objectives, challenge areas, key terms, and an annotated outline that provides references to the PowerPoint slides.

- **Solutions Manual** The Solutions Manual contains solutions to all basic, intermediate, and challenge problems found at the end of each chapter.

- **Test Bank** The Test Bank contains hundreds of multiple-choice and short answer/discussion questions, updated based on the revisions of the authors. The level of difficulty varies, as indicated by the easy, medium, or difficult labels.

- **PowerPoint Presentations** The PowerPoint presentations contain exhibits, outlines, key points, and summaries in a visually stimulating collection of slides. The instructor can edit, print, or rearrange the slides to fit the needs of his or her course.

- **Beyond the Page** The authors have created a wealth of additional examples, explanations, and applications, available for quick access by instructors and students. Each Beyond the Page feature is called out in the text with an icon that links directly to the content.

- **Excel Solutions and Templates** There are templates for select exhibits, as well as various end-of-chapter problems that have been set as Excel spreadsheets—all denoted by an icon. They correlate with specific concepts in the text and allow students to work through financial problems and gain experience using spreadsheets. Useful Spreadsheet Functions Boxes are sprinkled throughout the text to provide helpful prompts on working in Excel.

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**SMARTBOOK®** SmartBook®, powered by LearnSmart, is the first and only adaptive reading experience designed to change the way students read and learn. It creates a personalized reading experience by highlighting the most important concepts a student needs to learn at each moment in time. As a student engages with SmartBook, the reading experience continuously adapts by highlighting content based on what the student knows and doesn’t know. This ensures that the focus is on the content he or she needs to learn, while simultaneously promoting long-term retention of material. Use SmartBook’s real-time reports to quickly identify the concepts that require more attention from individual students—or the entire class. The end result? Students are more engaged with course content, can better prioritize their time, and come to class ready to participate.

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- Provides instant practice material and study questions, easily accessible on-the-go.

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