






MANAGERIAL ECONOMICS

APPLICATIONS, STRATEGY, and TACTICS

McGuigan
Moyer
Harris

13th Edition

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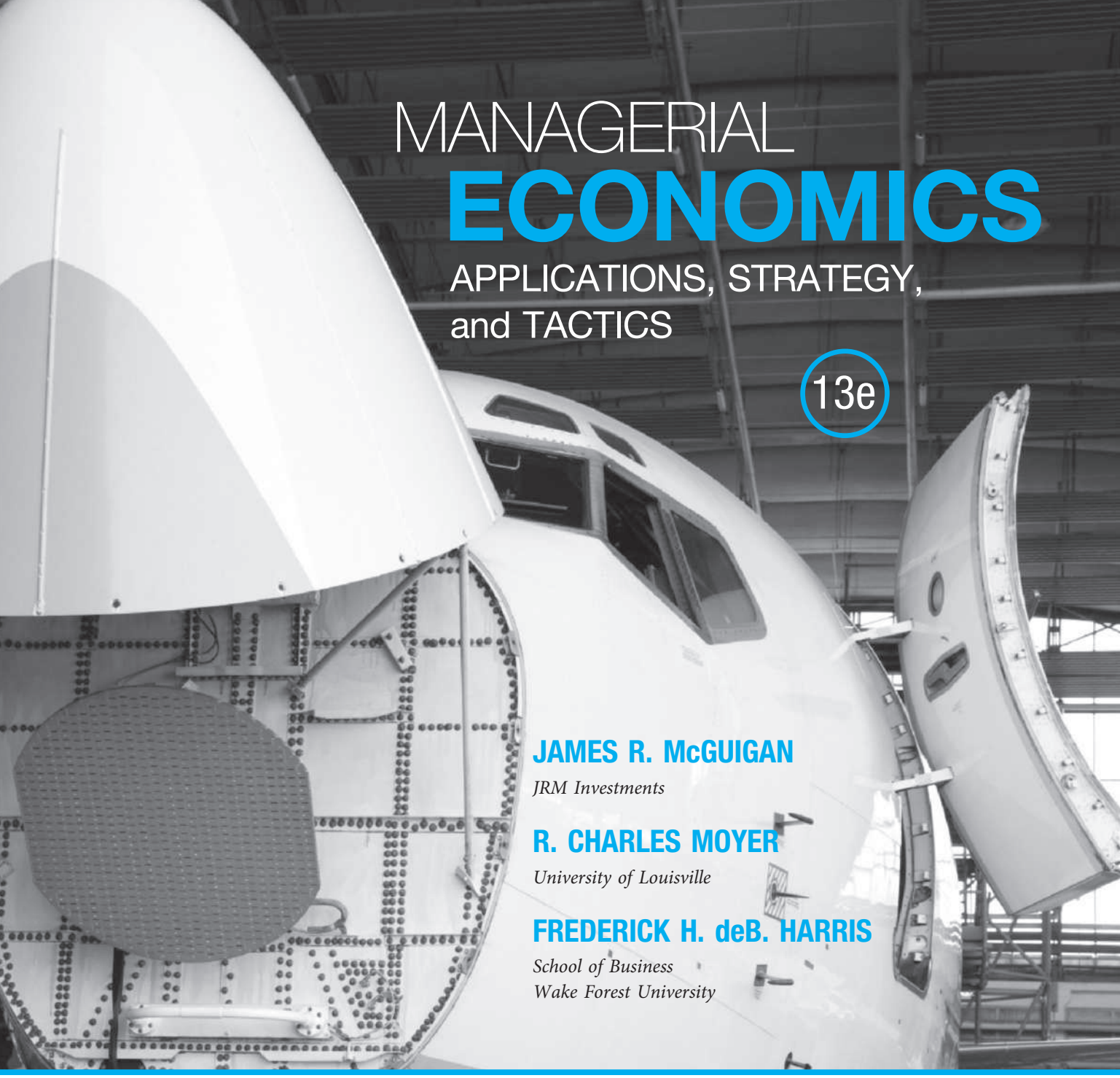

MANAGERIAL ECONOMICS

APPLICATIONS, STRATEGY, and TACTICS

13e

JAMES R. McGUIGAN
JRM Investments

R. CHARLES MOYER
University of Louisville

FREDERICK H. deB. HARRIS
School of Business
Wake Forest University

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Managerial Economics: Applications, Strategy, and Tactics, 13th Edition
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Library of Congress Control Number: 2013935706

ISBN-13: 978-1-285-42092-9

ISBN-10: 1-285-42092-6

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Printed in the United States of America
1 2 3 4 5 6 7 17 16 15 14 13

To my family
J.R.M.

To Sally, Laura, and Craig
R.C.M.

To my family and Ken Elzinga
F.H.B.H.

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PART II

Preface

ORGANIZATION OF THE TEXT

The 13th edition has been thoroughly updated with 45 new applications and dozens of new figures and tables. Responding to user request, we continue to expand the review of microeconomic fundamentals in Chapter 2, employing a wide-ranging discussion of the equilibrium price of crude oil and gasoline as well as the marginal analysis of long-lasting lightbulbs and driving a Mini-Cooper. A wind vane symbol highlights discussion of environmental effects and sustainability spread throughout the text. Another special feature is the extensive treatment in Chapter 6 of managing global businesses, import-export trade, exchange rates, currency unions and free trade areas, trade policy, and an expanded new section on China.

Several major new analyses appear in the 13th edition (and the chapter in which they appear): moral hazard in teams (1), demand for a branded candy product (4), forecasting in the global financial crisis (5), geographic distribution of value-added for an iPad (6), GM's cost structure post-bailout (8), $80 operating loss on flat screen TVs (10), Chrome takes share (12), pricing the Chevy Volt and ebook pricing (14), luxury goods and RPMs (16), and insourcing of appliance manufacturing at GE (17).

There is more comprehensive material on applied game theory in Chapters 13, 13A, 15, 15A, and Web Appendix D than in any other managerial economics textbook, and a unique treatment of revenue (yield) management appears in Chapter 14A. Part V includes the hot topics of corporate governance, information economics, auction design, and the choice of organizational form. Chapter 16 on economic regulation includes a broad discussion of cap and trade policy, pollution taxes, and the optimal abatement of externalities. Chapter 17 now leads off with a capital budgeting decision by GE to return appliance manufacturing to the United States.

By far the most distinctive feature of the book is its 300 boxed examples, Managerial Challenges, What Went Right/What Went Wrong explorations of corporate practice, and mini-case examples on every other page demonstrating what each analytical concept is used for in practice. This list of concept applications is highlighted on the inside front and back covers.

STUDENT PREPARATION

The text is designed for use by upper-level undergraduates and first-year graduate students in business schools, departments of economics, and professional schools of management, public policy, and information science as well as in executive training programs. Students are presumed to have a background in the basic principles of microeconomics, although Chapter 2 offers an extensive review of those topics. No prior work in statistics is assumed; development of all the quantitative concepts employed is self-contained. The book makes occasional use of elementary concepts of differential calculus. In all cases where calculus is employed, at least one alternative approach, such as graphical, algebraic, or tabular analysis, is also presented. Spreadsheet applications have become so prominent in the practice of managerial economics that we now address optimization in that context.

PEDAGOGICAL FEATURES OF THE 13TH EDITION

The 13th edition of *Managerial Economics* makes extensive use of pedagogical aids to enhance individualized student learning. The key features of the book are:

1. **Managerial Challenges.** Each chapter opens with a Managerial Challenge (MC) illuminating a real-life problem faced by managers that is closely related to the topics covered in the chapter. Instructors can use the new discussion questions following each MC to "hook" student interest at the start of the class or in preclass preparation assignments.
2. **What Went Right/What Went Wrong.** This feature allows students to relate business mistakes and triumphs to what they have just learned, and helps build that elusive goal of managerial insight.
3. **Extensive Use of Boxed Examples.** More than 300 real-world applications and examples derived from actual corporate practice are highlighted throughout the text. These applications help the analytical tools and concepts to come alive and thereby enhance student learning. They are listed on the inside front and back covers to highlight the prominence of this feature of the book.
4. **Environmental Effects Symbol.** A wind vane symbol highlights numerous passages that address environmental effects and sustainability throughout the book.
5. **Exercises.** Each chapter contains a large problem analysis set. Check answers to selected problems color-coded in blue type are provided in Appendix D at the end of the book. Problems that can be solved using Excel are highlighted with an Excel icon. The book's Web site (www.cengage.com/economics/mcguigan) has answers to all the other textbook problems.
6. **Case Exercises.** Most chapters include mini-cases that extend the concepts and tools developed into a deep fact situation context of a real-world company.
7. **Chapter Glossaries.** In the margins of the text, new terms are defined as they are introduced. The placement of the glossary terms next to the location where the term is first used reinforces the importance of these new concepts and aids in later studying.
8. **International Perspectives.** Throughout the book, special International Perspectives sections that illustrate the application of managerial economics concepts to an increasingly global economy are provided. A globe symbol highlights this internationally relevant material.
9. **Point-by-Point Summaries.** Each chapter ends with a detailed, point-by-point summary of important concepts from the chapter.
10. **Diversity of Presentation Approaches.** Important analytical concepts are presented in several different ways, including tabular, spreadsheet, graphical, and algebraic analysis to individualize the learning process.

ANCILLARY MATERIALS

A complete set of ancillary materials is available to adopters to supplement the text, including the following:

Instructor's Manual and Test Bank

The instructor's manual and test bank that accompany the book contain suggested answers to the end-of-chapter exercises and cases. The authors have taken great care to provide an error-free manual for instructors to use. The manual is available to instructors on the book's Web site as well as on the Instructor's Resource CD-ROM (IRCD).

The test bank, containing a large collection of true-false, multiple-choice, and numerical problems, is available to adopters and is also available on the Web site in Word format, as well as on the IRCD.

ExamView

Simplifying the preparation of quizzes and exams, this easy-to-use test creation software includes all of the questions in the printed test bank and is compatible with Microsoft Windows. Instructors select questions by previewing them on the screen, choosing them randomly, or picking them by number. They can easily add or edit questions, instructions, and answers. Quizzes can also be created and administered online, whether over the Internet, a local area network (LAN), or a wide area network (WAN).

Textbook Support Web Site

When you adopt *Managerial Economics: Applications, Strategy, and Tactics,* 13e, you and your students will have access to a rich array of teaching and learning resources that you won't find anywhere else. Located at www.CengageBrain.com, this outstanding site features additional Web Appendices including appendices on indifference curve analysis of consumer choice, international parity conditions, linear programming applications, a capacity planning entry deterrence case study, joint product pricing and transfer prices, decision making under uncertainty, and production optimization subject to cost constraints. It also provides links to additional instructor and student resources.

Accessing CengageBrain

1. Use your browser to go to www.CengageBrain.com.
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3. Once you have registered and logged in for the first time, go to the "Search for Books or Materials" bar and enter the author or ISBN for your textbook. When the title of your text appears, click on it and you will be taken to the companion site. There you can choose among the various folders provided on the Student side of the site. NOTE: If you are currently using more than one Cengage textbook, the same user name and password will give you access to all the companion sites for your Cengage titles. After you have entered the information for each title, all the titles you are using will appear listed in the pull-down menu in the "Search for Books or Materials" bar. Whenever you return to CengageBrain, you can click on the title of the site you wish to visit and go directly there.

PowerPoint Presentation

Available on the product companion Web site, this comprehensive package provides an excellent lecture aid for instructors. Prepared by Richard D. Marcus at the University of Wisconsin–Milwaukee, these slides cover many of the most important topics from the text, and they can be customized by instructors to meet specific course needs.

CourseMate

Interested in a simple way to complement your text and course content with study and practice materials? Cengage Learning's Economics CourseMate brings course concepts to life with interactive learning, study, and exam preparation tools that support the printed

textbook. Watch student comprehension soar as your class works with the printed textbook and the textbook-specific Web site. Economics CourseMate goes beyond the book to deliver what you need! You and your students will have access to ABC/BBC videos, Cengage's EconApps (such as EconNews and EconDebate), unique study guide content specific to the text, and much more.

ACKNOWLEDGMENTS

A number of reviewers, users, and colleagues have been particularly helpful in providing us with many worthwhile comments and suggestions at various stages in the development of this and earlier editions of the book. Included among these individuals are:

William Beranek, J. Walter Elliott, William J. Kretlow, William Gunther, J. William Hanlon, Robert Knapp, Robert S. Main, Edward Sussna, Bruce T. Allen, Allen Moran, Edward Oppermann, Dwight Porter, Robert L. Conn, Allen Parkman, Daniel Slate, Richard L. Pfister, J. P. Magaddino, Richard A. Stanford, Donald Bumpass, Barry P. Keating, John Wittman, Sisay Asefa, James R. Ashley, David Bunting, Amy H. Dalton, Richard D. Evans, Gordon V. Karels, Richard S. Bower, Massoud M. Saghafi, John C. Callahan, Frank Falero, Ramon Rabinovitch, D. Steinnes, Jay Damon Hobson, Clifford Fry, John Crockett, Marvin Frankel, James T. Peach, Paul Kozlowski, Dennis Fixler, Steven Crane, Scott L. Smith, Edward Miller, Fred Kolb, Bill Carson, Jack W. Thornton, Changhee Chae, Robert B. Dallin, Christopher J. Zappe, Anthony V. Popp, Phillip M. Sisneros, George Brower, Carlos Sevilla, Dean Baim, Charles Callahan, Phillip Robins, Bruce Jaffee, Alwyn du Plessis, Darly Winn, Gary Shoesmith, Richard J. Ward, William H. Hoyt, Irvin Grossack, William Simeone, Satyajit Ghosh, David Levy, Simon Hakim, Patricia Sanderson, David P. Ely, Albert A. O'Kunade, Doug Sharp, Arne Dag Sti, Walker Davidson, David Buschena, George M. Radakovic, Harpal S. Grewal, Stephen J. Silver, Michael J. O'Hara, Luke M. Froeb, Dean Waters, Jake Vogelsang, Lynda Y. de la Viña, Audie R. Brewton, Paul M. Hayashi, Lawrence B. Pulley, Tim Mages, Robert Brooker, Carl Emomoto, Charles Leathers, Marshall Medoff, Gary Brester, Stephan Gohmann, L. Joe Moffitt, Christopher Erickson, Antoine El Khoury, Steven Rock, Rajeev K. Goel, Lee S. Redding, Paul J. Hoyt, Bijan Vasigh, Cheryl A. Casper, Semoon Chang, Kwang Soo Cheong, Barbara M. Fischer, John A. Karikari, Francis D. Mummery, Lucjan T. Orlowski, Dennis Proffitt, and Steven S. Shwiff.

People who were especially helpful in the preparation of the 13th edition include Robert F. Brooker, Kristen E. Collett-Schmitt, Simon Medcalfe, Dr. Paul Stock, Shahab Dabirian, James Leady, Stephen Onyeiwu, and Karl W. Einoff. A special thanks to B. Ramy Elitzur of Tel Aviv University for suggesting the exercise on designing a managerial incentive contract and to Bob Hebert, Business Librarian at Wake Forest School of Business, for his tireless pursuit of reference material.

We are also indebted to Wake Forest University and the University of Louisville for the support they provided and owe thanks to our faculty colleagues for the encouragement and assistance provided on a continuing basis during the preparation of the manuscript. We wish to express our appreciation to the members of the Cengage Learning staff for their help in the preparation and promotion of this book. We are grateful to the Literary Executor of the late Sir Ronald A. Fisher, F.R.S.; to Dr. Frank Yates, F.R.S.; and to Longman Group, Ltd., London, for permission to reprint Table III from their book *Statistical Tables for Biological, Agricultural, and Medical Research* (6th ed., 1974).

James R. McGuigan
R. Charles Moyer
Frederick H. deB. Harris

About the Authors

James R. McGuigan

James R. McGuigan owns and operates his own numismatic investment firm. Prior to this business, he was Associate Professor of Finance and Business Economics in the School of Business Administration at Wayne State University. He also taught at the University of Pittsburgh and Point Park College. McGuigan received his undergraduate degree from Carnegie Mellon University. He earned an M.B.A. at the Graduate School of Business at the University of Chicago and his Ph.D. from the University of Pittsburgh. In addition to his interests in economics, he has coauthored books on financial management. His research articles on options have been published in the *Journal of Financial and Quantitative Analysis*.

R. Charles Moyer

R. Charles Moyer earned his B.A. in Economics from Howard University and his M.B.A. and Ph.D. in Finance and Managerial Economics from the University of Pittsburgh. Professor Moyer is Dean of the College of Business at the University of Louisville. He is Dean Emeritus and former holder of the GMAC Insurance Chair in Finance at the Babcock Graduate School of Management, Wake Forest University. Previously, he was Professor of Finance and Chairman of the Department of Finance at Texas Tech University. Professor Moyer also has taught at the University of Houston, Lehigh University, and the University of New Mexico, and spent a year at the Federal Reserve Bank of Cleveland. Professor Moyer has taught extensively abroad in Germany, France, and Russia. In addition to this text, Moyer has coauthored two other financial management texts. He has been published in many leading journals, including *Financial Management, Journal of Financial and Quantitative Analysis, Journal of Finance, Financial Review, Journal of Financial Research, International Journal of Forecasting, Strategic Management Journal*, and *Journal of Economics and Business.* Professor Moyer is a member of the Board of Directors of King Pharmaceuticals, Inc., Capital South Partners, and the Kentucky Seed Capital Fund.

Frederick H. deB. Harris

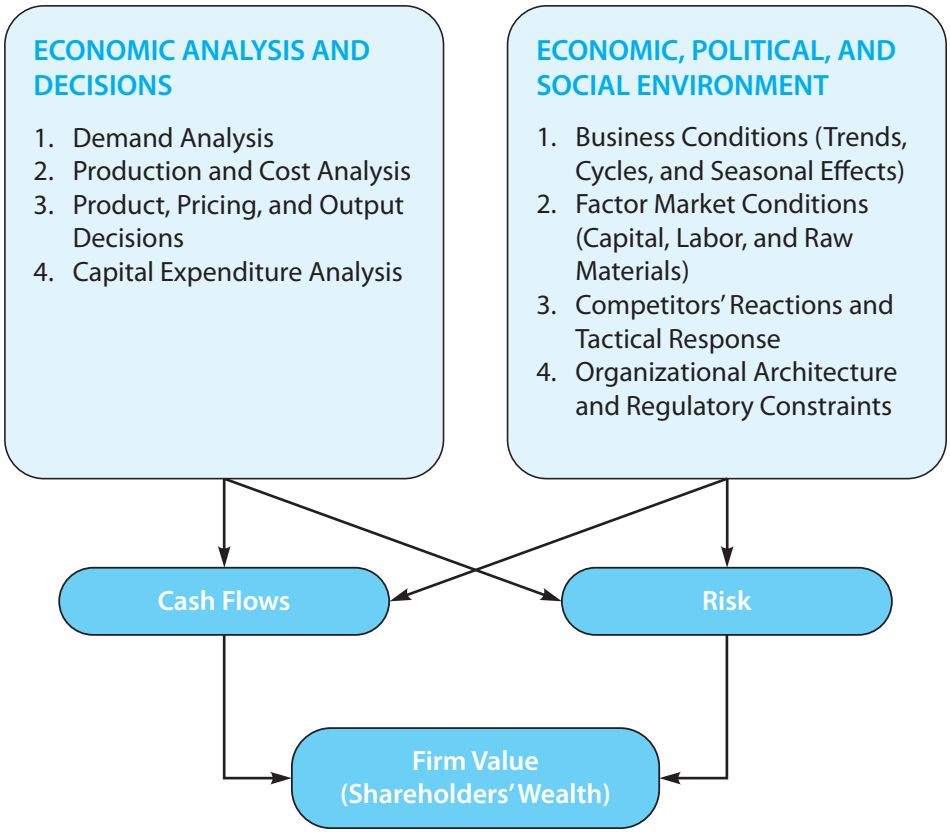
Frederick H. deB. Harris is the John B. McKinnon Professor of Managerial Economics and Finance at the School of Business, Wake Forest University. His specialties are pricing tactics and capacity planning. Professor Harris has taught integrative managerial economics core courses and B.A., B.S., M.S., M.B.A., and Ph.D. electives in business schools and economics departments in the United States, Germany, France, Italy, and Australia. He has won two school-wide Professor of the Year teaching awards and two Researcher of the Year awards. Other recognitions include Outstanding Faculty by *Inc.* magazine (1998), Most Popular Courses by *Business Week Online* 2000–2001, and Outstanding Faculty by *BusinessWeek's Guide to the Best Business Schools*, 5th to 9th eds., 1997–2004.

Professor Harris has published widely in economics, marketing, operations, and finance journals, including the *Review of Economics and Statistics, Journal of Financial and Quantitative Analysis, Journal of Operations Management, Journal of Industrial Economics,* and *Journal of Financial Markets*. From 1988 through 1993, Professor Harris served on the Board of Associate Editors of the *Journal of Industrial Economics.*

His path breaking work on price discovery has been frequently cited in leading academic journals, and several articles with practitioners have been published in the *Journal of Trading*. In addition, he often benchmarks the pricing, order processing, and capacity planning functions of large companies against state-of-the-art techniques in revenue management and writes about his findings in journals like *Marketing Management* and INFORMS's *Journal of Revenue and Pricing Management*.

PART I

Introduction



CHAPTER

1

Introduction and Goals of the Firm

CHAPTER PREVIEW

Managerial economics is the application of microeconomics to problems faced by decision makers in the private, public, and not-for-profit sectors. Managerial economics assists managers in efficiently allocating scarce resources, planning corporate strategy, and executing effective tactics. In this chapter, the responsibilities of management are explored. Economic profit is defined, and the role of profits in allocating resources in a free enterprise system is examined. The primary goal of the firm, namely, shareholder wealth maximization, is developed along with a discussion of how managerial decisions influence shareholder wealth. The problems associated with the separation of ownership and control, moral hazard in teams, and principal-agent relationships in large corporations are explored.

MANAGERIAL CHALLENGE

How to Achieve Sustainability: Southern Company Electric Power Generation[1]

In the second decade of the twenty-first century, companies all across the industrial landscape are seeking to achieve sustainability. Sustainability is a powerful metaphor but an elusive goal. It means much more than aligning oneself with environmental sensitivity, though that commitment itself tests higher in opinion polling of the latent preferences of Americans and Europeans than any other response. Sustainability also implies renewability and longevity of business plans that are adaptable to changing circumstances. But what exactly should management pursue as a set of objectives to achieve this goal?

Management response to pollution abatement illustrates one type of sustainability challenge. At the insistence of the prime minister of Canada during the Reagan Administration, the U.S. Congress enacted a bipartisan cap-and-trade bill to address smokestack emissions. Sulfur dioxide and nitrous oxide (SOX and NOX) emissions precipitate as acid rain, mist, and ice, imposing damage downwind hundreds of miles away to trees, painted and stone surfaces, and asthmatics. The Clean Air Act (CAA) of 1990, amended in 1997 and 2003, granted tradable pollution allowances (TPAs) to known polluters. The CAA also authorized an auction market for these TPA assets. The Environmental Protection Agency Web site (www.epa.gov) displays on a daily basis the equilibrium, market-clearing price of these new assets on the balance sheet (e.g., $250 per ton of soot). The cap-and-trade system literally identified for the first time a price for the use of what had previously been unpriced common property resources—namely, acid-free air and rainwater. As a result, large point-source polluters like power plants and steel mills now incur an actual cost per ton for the SOX and NOX–laden soot by-products of burning lots of high sulfur coal. These amounts were promptly placed in spreadsheets designed to find ways of minimizing operating costs.[2] No less importantly, each polluter felt

Cont.

MANAGERIAL CHALLENGE *Continued*

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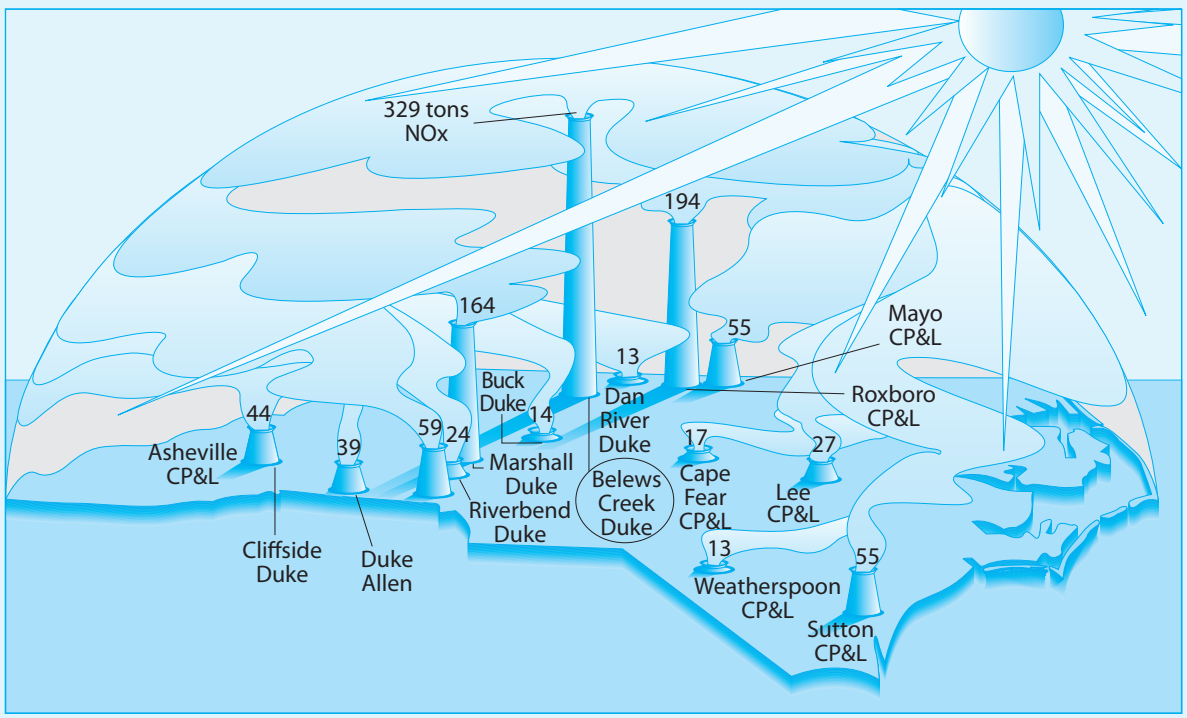
powerful incremental incentives to reduce compliance cost by abating pollution. And an entire industry devoted to developing pollution abatement technology sprang up.

The TPAs granted were set at approximately 80 percent of the known pollution taking place at each plant in 1990. For example, Duke Power's Belews Creek power plant, generating 120,085 tons of nitrous oxide acidic soot annually from burning 400 train carloads of coal per day, was granted 96,068 tons of allowances (see Figure 1.1). Although this approach "grandfathered" a substantial amount of pollution, the gradual transition cap-and-trade legislation was pivotally important to its widespread success. Industries such as steel and electric power were given five years to comply with the regulated emissions requirements, and then in 1997, the initial allowances were cut in half. Duke Power initially bought 19,146 allowances for Belews Creek at prices ranging from $131 to $480 per ton and then in 2003 built two 30-story smokestack scrubbers that reduced the NOX emissions by 75 percent.

Another major electric utility, Southern Company, analyzed three compliance choices on a least-cost cash flow basis: (1) buying allowances, (2) installing smokestack scrubbers, or (3) adopting fuel-switching technology to burn low-sulfur coal or even cleaner natural gas. In a widely studied case, the Southern Company found its huge Bowen plant in North Georgia would require a $657 million scrubber that after tax deductions for capital equipment depreciation and further offsets from excess allowance revenue cost $476 million. Alternatively, continuing to burn high-sulfur coal from the

FIGURE 1.1 Nitrous Oxide from Coal-Fired Power Plants (Daily Emissions in Tons, pre Clean Air Act)



Source: NC Division of Air Quality.

Cont.

MANAGERIAL CHALLENGE *Continued*

nearby Appalachian Mountain region and purchasing the requisite allowances in the cap-and-trade market was projected to cost $266 million. And finally, switching to low-sulfur coal while adopting fuel-switching technology was found to cost $176 million. All these analyses were performed on a present value basis with cost projections over 25 years. Chapter 2 offers a quick primer on the net present value concept.

Southern Company's decision to switch to low-sulfur coal was hailed far and wide as environmentally sensitive and sustainable. Many electric utilities support cap-and-trade policies and actively pursue the mandate of the states in which they operate to derive 15 percent of their power from renewable energy (RE). In a Case Study at the end of the chapter, we analyze several wind power RE alternatives for generating electricity.

The choice of fuel-switching technology to abate smokestack emissions was a shareholder value-maximizing choice for Southern Company for two reasons. First, switching to low-sulfur coal minimized their projected cash flow compliance costs under the CAA but, in addition, the fuel-switching technology created a strategic flexibility (a "real option") and that in itself created additional shareholder value. In this chapter, we will see what maximizing capitalized value of equity (shareholder value) is and what it is not.

Discussion Questions

- What is the basic externality problem with acid rain? What objectives should management serve in responding to the acid rain problem?
- How does the Clean Air Act's cap-and-trade approach to air pollution affect the Southern Company's analysis of the previously unpriced common property air and water resources damaged by smokestack emissions?
- How should management comply with the Clean Air Act, or should the Southern Company just pay the EPA's fines? Why? How would you decide?
- Which among Southern Company's three alternatives for compliance offered the most strategic flexibility? Explain.

[1]Based on Frederick Harris, Alternative Energy Symposium, Wake Forest Schools of Business (September 2008); and "Acid Rain: The Southern Company," Harvard Business School Publishing, HBS: 9-792-060.

[2]EPA fines for noncompliance of $2,000 per ton have always far exceeded the auction market cost of allowances ($131–$473 in recent years).

WHAT IS MANAGERIAL ECONOMICS?

Managerial economics extracts from microeconomic theory those concepts and techniques that enable managers to select strategic direction, to allocate efficiently the resources available to the organization, and to respond effectively to tactical issues. All such managerial decision making seeks to do the following:

1. identify the alternatives,
2. select the choice that accomplishes the objective(s) in the most efficient manner,
3. taking into account the constraints,
4. and the likely actions and reactions of rival decision makers.

For example, consider the following stylized decision problem:

Example

Capacity Expansion at Honda, N.A., and Toyota Motors, N.A.

Honda and Toyota are attempting to expand their already substantial assembly operations in North America. Both companies face increasing demand for their U.S.-manufactured vehicles, especially Toyota Camrys and Honda Accords. Camrys and Accords rate extremely highly in consumer reports of durability and reliability.

(continued)

The demand for used Accords is so strong that they depreciate only 45 percent in their first four years. Other competing vehicles may depreciate as much as 65 percent in the same period. Toyota and Honda have identified two possible strategies (S1NEW and S2USED) to meet the growing demand for Camrys and Accords. Strategy S1NEW involves an internal expansion of capacity at Toyota's $700 million Princeton, Indiana, plant and Honda's Marysville, Ohio, plant. Strategy S2USED involves the purchase and renovation of assembly plants now owned by General Motors. The new plants will likely receive substantial public subsidies through reduced property taxes. The older plants already possess an enormous infrastructure of local suppliers and regulatory relief.

The objective of Toyota's managers is to maximize the value today (present value) of the expected future profit from the expansion. This problem can be summarized as follows:

Objective function:	Maximize the present value (P.V.) of profit (S1NEW, S2USED)
Decision rule:	Choose strategy S1NEW if P.V. (Profit S1NEW) > P.V. (Profit S2USED) Choose strategy S2USED if the reverse.

This simple illustration shows how resource-allocation decisions of managers attempt to maximize the value of their firms across forward-looking dynamic strategies for growth while respecting all ethical, legal, and regulatory constraints.

THE DECISION-MAKING MODEL

The ability to make good decisions is the key to successful managerial performance. All decision making shares several common elements. First, the decision maker must *establish the objectives*. Next, the decision maker must *identify the problem*. For example, the CEO of electronics retailer Best Buy may note that the profit margin on sales has been decreasing. This could be caused by pricing errors, declining labor productivity, or the use of outdated retailing concepts. Once the source or sources of the problem are identified, the manager can move to an *examination of potential solutions*. The choice between these alternatives depends on an *analysis of the relative costs and benefits*, as well as other organizational and societal constraints that may make one alternative preferable to another.

The final step in the decision-making process, after all alternatives have been evaluated, is to analyze the best available alternative under a variety of changes in the assumptions before making a recommendation. This crucial final step is referred to as a *sensitivity analysis*. Knowing the limitations of the planned course of action as the decision environment changes, the manager can then proceed to an *implementation of the decision*, monitoring carefully any unintended consequences or unanticipated changes in the market. The case problem at the end of the chapter highlights the role of sensitivity analysis in analyzing wind turbines as a renewable energy source of electricity.

The Responsibilities of Management

In a free enterprise system, managers are responsible for a number of goals. Managers are responsible for proactively solving problems in the current business model before

WHAT WENT RIGHT • WHAT WENT WRONG

Saturn Corporation[3]

When General Motors (GM) rolled out their "different kind of car company," J.D. Powers rated product quality 8 percent ahead of Honda, and customers liked the no-haggle selling process. Saturn achieved the 200,000 unit sales enjoyed by the Honda Civic and the Toyota Corolla in two short years and caught the 285,000 volume of the Ford Escort in Saturn's fourth year. Making interpersonal aspects of customer service the number-one priority and possessing superior inventory and MIS systems, Saturn dealerships proved very profitable and quickly developed a reputation for some of the highest customer loyalty in the industry.

However, with pricing of the base Saturn model $1,200 below the $12,050 rival Japanese compact cars, the GM parent earned only a $400 gross profit margin per vehicle. In a typical year, this meant GM was recovering only about $100 million of its $3 billion capital investment, a paltry 3 percent return. Netting out GM's 11 percent cost of capital, each Saturn was losing approximately $1,000. These figures compare to a $3,300 gross profit margin per vehicle in some of GM's other divisions. Consequently, cash flow was not reinvested in the Saturn division, products were not updated, and the models stagnated. By 1997, sales were slumping at −9 percent and in 1998 they fell an additional 20 percent. In 2009, GM announced it was permanently closing the Saturn division.

GM managers had not established the next Saturn business model which would have transferred young childless couples to more profitable GM divisions as their lifecycle called for bigger sedans, minivans, and SUVs. Rather than trading up to Buick and Pontiac, middle-aged loyal Saturn owners sought to trade up within Saturn, and finding no sporty larger models available, they switched to larger Japanese imports like the Honda Accord and Toyota Camry. After almost collapsing, Saturn introduced a sport wagon, an efficient SUV, and a high-profile sports coupe. GM ultimately abandoned the brand in 2009.

[3]Based on M. Cohen, "Saturn's Supply-Chain Innovation," *Sloan Management Review* (Summer 2000), pp. 93–96; "Small Car Sales Are Back" and "Why Didn't GM Do More for Saturn?" *BusinessWeek*, September 22, 1997, pp. 40–42, and March 16, 1998, p. 62.

they become crises and for selecting strategies to assure the more likely success of the next business model. Research In Motion built the world's best international cell phone (the Blackberry) but missed the market as customer demand evolved to web-enabled smart phones with 500,000 and then millions of apps. Managers create organizational structure and culture based on the organization's mission. Senior management especially is responsible for establishing a vision of new business directions and setting stretch goals to get there. In addition, managers coordinate the integration of marketing, operations, and finance functions. If plant managers don't know the realized margins from particular segments targeted by the sales team, then they will often expedite and fulfill orders to the wrong customers. Finally, managers undertake the critical responsibility of motivating and monitoring teamwork.

Moral Hazard in Teams

Teamwork skills and the ability to motivate teams is widely acknowledged as the single most critical trait of effective managers. This applies equally to Navy Seal teams, factory work cell teams, brand management teams, or consulting teams. Why is that? Why is teamwork so important, and why is attaining good teamwork so hard? The essence of teamwork is synergistic value creation in excess of the sum of the parts. As individuals on a team, we can each "pull our own weight" or contribute more than that and compound our extra effort with the extraordinary efforts of those around us. Just as in sports, 110 percent effort on company teams often defeats more skilled opponents and sometimes even those with better resources. But how does a manager attain the commitment from a team to put forth 110 percent effort when doing less would not impose as much personal sacrifice, and when individual shirking on one's effort may not be transparently obvious? This constitutes the so-called moral hazard problem in team-making.

If penalties and sanctions are few and far between, only a sense of moral duty induces full-effort teamwork rather than the reduced effort associated with free-riding.

Consider the following example of the teamwork involved in bringing a product to market. Mack and Myer are collaborating on a product launch. Each has specialized skills that are required to achieve the maximum output and a gross profit of $100 if they each "Pull Hard," devoting their best effort to the project. In that event, $25 personal cost for each leaves $25 net profit available to each of them. If either shirks and reduces effort unilaterally, the output is reduced and gross profit declines by 30 percent to $70 to be divided between them, but the shirker reduces his or her personal cost to $0, thereby yielding a $35 net profit to the free rider and only $10 to the dutiful teammate who Pulled Hard. If both shirk and fail to provide best effort, then output collapses, gross profit falls to $30, yielding each just $15 net profit. These payoffs are depicted in the normal form game matrix Figure 1.2, Panel A.

What if this is a one-time-only situation, and each player must decide simultaneously without knowing the choice of his or her teammate? One of the insights of game theory is that in the absence of repeated games involving the same teammates, rational players in such situations will ignore reputation effects and select the action whose payoff dominates all others. In this case, that means each player will choose to Shirk since the $35 outcome exceeds $25, and the $15 outcome exceeds $10. In short, the outcomes from the action Shirk in the right-hand column dominate those in the Pull Hard column (and so too in the rows of the payoff matrix). Each team member therefore prefers to defect (by choosing Shirk), whatever the choice of his or her teammate; Shirk is said to be a dominant strategy. Therefore, {Shirk, Shirk} emerges as a dominant strategy outcome with great predictability.

But if they both do so, a tragic dilemma arises. In the southeast {Shirk, Shirk} cell, the payoff to each player is just $15, and total value added is only $30. Both teammates

FIGURE 1.2 Payoffs from Team Production with and without a Supervisor

Panel A No Supervisor

		Mack: Pull Hard	Mack: Shirk
Meyer: Pull Hard		$25 / $25	$10 / $35
Meyer: Shirk		$35 / $10	$15 / $15

Panel B Supervisor Present. A $10 Manager is Hired as a Monitor of Shirking for which A $15 Penalty is Imposed.

		Mack: Pull Hard	Mack: Shirk
Meyer: Pull Hard		$20 / $20	$5 / $15
Meyer: Shirk		$15 / $5	$–5 / $–5

realize, however, that if they had just found a way to elicit cooperation from one another, $50 net profit would have been available in the northwest {Pull Hard, Pull Hard} cell. Their individually optimal decision-making (reflected by the dominant strategy to defect from cooperative arrangements) leaves −$20 foregone profits until the players themselves organize their team-making differently. As a result, we might well expect that the players would evolve mechanisms for contracting around the moral hazard problem in order to capture the foregone value. How can this be accomplished?

What if the team hired a manager as project supervisor to monitor the teamwork and punish shirking? Splitting the cost of paying a manager $10 leaves $40 gross profit in the {Pull Hard, Pull Hard} cell, to be divided evenly between Mack and Meyer. In the diagonal cells, the manager now penalizes whichever teammate shirks their duty −$15. The payoff for this unilateral defector now becomes ($70/2 = $35) − $15 − $5 = $15, less than the ($100/2 = $50) − $25 − $5 = $20 associated with the cooperative decision to Pull Hard. And this is a symmetric payoff game, so both players now conclude the same thing—that is, it pays to adopt mutually cooperative teamwork and deliver full effort. Since each player will receive only ($30/2 = $15) − $15 − $5 = −$5 in the event they both shirk their duties, and ($70/2 = $35) − $25 − $5 = $5 in the event their Hard Pull is unilaterally defected upon, each decides to Pull Hard. Indeed, examining the new payoff matrix in Figure 1.2, Panel B the choice pair {Pull Hard, Pull Hard} has now become the dominant strategy. So, in conclusion, moral hazard in teams can be avoided. What is needed is a manager as supervisor who imposes sanctions for the shirking behavior of teammates that decide to free ride.

Managers in a capitalist economy are motivated to monitor teamwork ultimately because of their overarching goal to maximize returns to the owners of the business—that is, economic profits.

economic profit The difference between total revenue and total economic cost. Economic cost includes a "normal" rate of return on the capital contributions of the firm's partners.

Economic profit is the difference between total sales revenue (price times units sold) and total economic cost. The *economic cost* of any activity may be thought of as the highest valued alternative opportunity that is forgone. To attract labor, capital, intellectual property, land, and matériel, the firm must offer to pay a price that is sufficient to convince the owners of these resources to forego other alternative activities and commit their resources to this use. Thus, economic costs should always be thought of as *opportunity costs*—that is, the costs of attracting a resource such as investment capital from its next best alternative use.

THE ROLE OF PROFITS

In a free enterprise system, economic profits play an important role in guiding the decisions made by the thousands of competing independent resource owners. The existence of profits determines the type and quantity of goods and services that are produced and sold, as well as the resulting derived demand for resources. Several theories of profit indicate how this works.

Risk-Bearing Theory of Profit

Economic profits arise in part to compensate the owners of the firm for the risk they assume when making their investments. Because a firm's shareholders are not entitled to a fixed rate of return on their investment—that is, they are claimants to the firm's residual cash flows after all other contractual payments have been made—they need to be compensated for this risk in the form of a higher rate of return.

The risk-bearing theory of profits is explained in the context of normal profits, where *normal* is defined in terms of the relative risk of alternative investments. Normal profits for a high-risk firm, such as Las Vegas hotels and casinos, a biotech pharmaceutical company, or an oil field exploration well operator, should be higher than normal profits for firms of lesser risk, such as water utilities. For example, in 2005, the industry average return on net worth for the casino hotel/gaming industry was 12.6 percent, compared to 9 percent for the water utility industry.

Temporary Disequilibrium Theory of Profit

Although there exists a long-run equilibrium normal rate of profit (adjusted for risk) that all firms should tend to earn, at any point in time, firms may find themselves earning a rate of return above or below this long-run normal return level. This can occur because of temporary dislocations (shocks) in various sectors of the economy. Rates of return in the oil industry rose substantially when the price of crude oil doubled from $75 in mid-2007 to $146 in July 2008. However, those high returns declined sharply by late 2008, when oil market conditions led to excess supplies and the price of crude oil fell to $45.

Monopoly Theory of Profit

In some industries, one firm is effectively able to dominate the market and persistently earn above-normal rates of return. This ability to dominate the market may arise from economies of scale (a situation in which one large firm, such as Boeing, can produce additional units of 747 aircraft at a lower cost than can smaller firms), control of essential natural resources (crude oil), control of critical patents (biotech pharmaceutical firms), or governmental restrictions that prohibit competition (cable franchise owners). The conditions under which a monopolist can earn above-normal profits are discussed in greater depth in Chapter 11.

Innovation Theory of Profit

The innovation theory of profit suggests that above-normal profits are the reward for successful innovations. Firms that develop high-quality products (such as Porsche) or successfully identify unique market opportunities (such as Apple) are rewarded with the potential for above-normal profits. Indeed, the U.S. patent system is designed to ensure that these above-normal return opportunities furnish strong incentives for continued innovation.

Managerial Efficiency Theory of Profit

Closely related to the innovation theory is the managerial efficiency theory of profit. Above-normal profits can arise because of the exceptional managerial skills of well-managed firms. No single theory of profit can explain the observed profit rates in each industry, nor are these theories necessarily mutually exclusive. Profit performance is invariably the result of many factors, including differential risk, innovation, managerial skills, the existence of monopoly power, and chance occurrences.

OBJECTIVE OF THE FIRM

These theories of simple profit maximization as an objective of management are insightful, but they ignore the timing and risk of profit streams. Shareholder wealth maximization as an objective overcomes both these limitations.