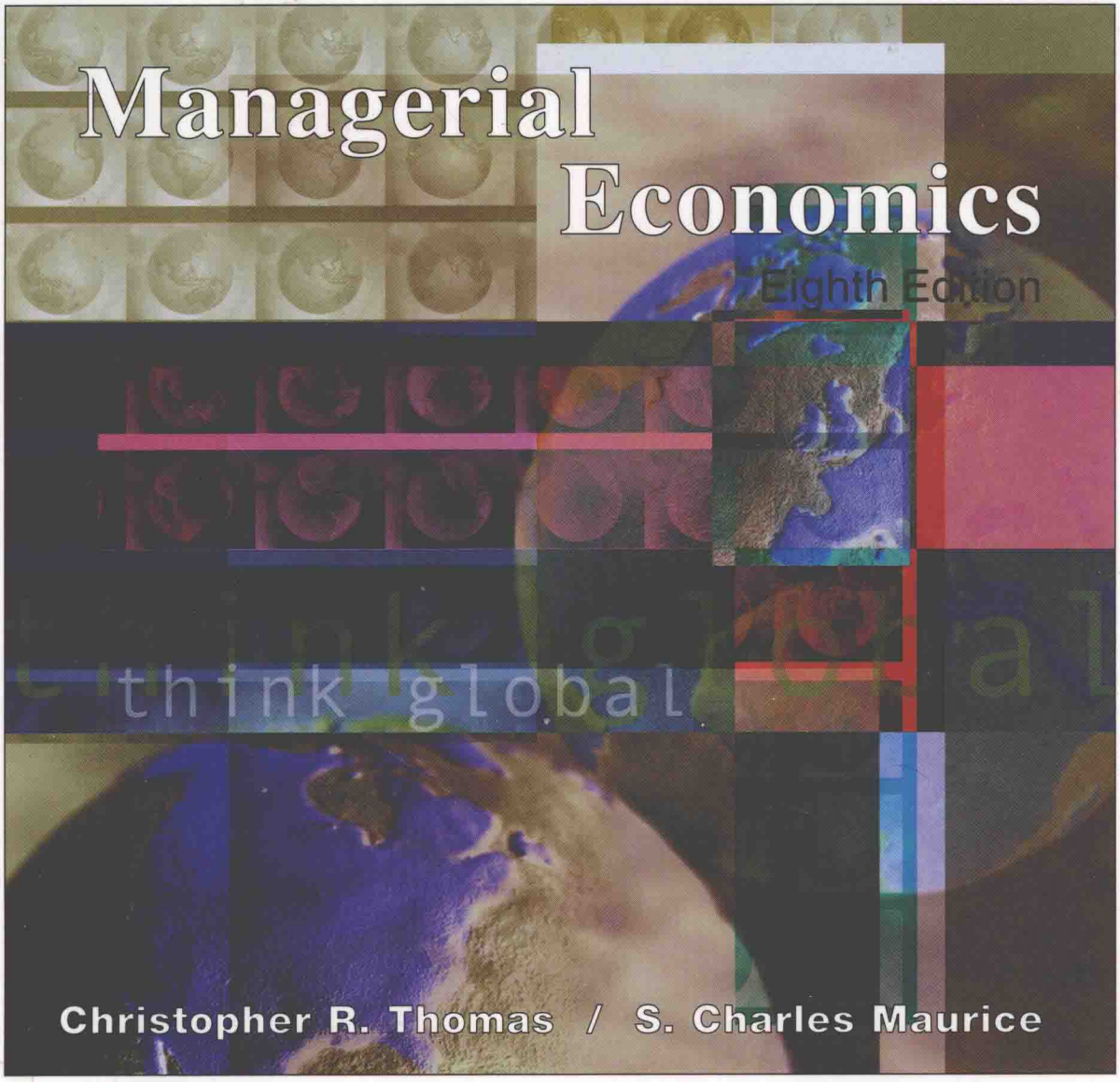
Managerial Economics

Eighth Edition



Christopher R. Thomas / S. Charles Maurice

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MANAGERIAL ECONOMICS

EIGHTH EDITION

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University of South Florida

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Late Professor Emeritus

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To Don and Sherry

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PREFACE

WHY MANAGERIAL ECONOMICS?

Over the past dozen or so years, business school curriculum committees have taken steps to strengthen the analytical and critical thinking skills of business students. While the trend toward stronger academic training in business schools stems from a number of factors, one of the most compelling reasons for doing so is, quite simply, that employers of business school graduates are demanding better thinkers. Many of us who teach economics to business students believe that training in economics not only helps business students better understand and predict the economic forces shaping real-world business decisions but also serves to develop and strengthen overall analytical skills of students of all majors.

Most business schools require students to take several courses in economics. Managerial economics, which is often one of these courses, brings together topics in microeconomics that can be applied to business decision making to create a valuable way of thinking about markets and business decisions. The objective of *Managerial Economics* is to help business students become architects of business strategy rather than simply middle managers plodding along the beaten path of others.

PEDAGOGICAL HIGHLIGHTS

The Eighth Edition of *Managerial Economics* maintains all of the pedagogical features that have made previous editions successful. These features follow.

Emphasis on the Economic Way of Thinking

The primary goal of this book has always been, and continues to be, to teach students the economic way of thinking about business decisions. *Managerial Economics* develops critical thinking skills and provides students with a logical way of analyzing business decisions.

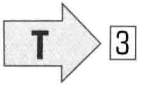
Easy to Learn and Teach From

Managerial Economics has always been a self-contained book that requires no previous training in microeconomics. While maintaining a rigorous style, this book is designed to be one of the easiest books in managerial economics from which to teach *and* learn. Rather than parading students quickly through every interesting or new topic in microeconomics and industrial organization, *Managerial Economics* instead carefully develops and applies the most *useful* concepts for business decision making.

Dual Sets of End-of-Chapter Questions

To promote the development of analytical and critical thinking skills, which most students probably do not know how to accomplish on their own, two different kinds of problem sets are provided for each chapter. Much like the pedagogy in mathematics textbooks, which employ both "exercises" and "word problems," *Managerial Economics* provides both Technical Problems and Applied Problems.

- **Technical Problems**—Each section of a chapter is linked (by an icon in the margin) to one or more Technical Problems specifically designed to build and reinforce a particular skill. The Technical Problems provide a step-by-step guide for students to follow in developing the analytical skills set forth in each chapter. The answers to all of the Technical Problems are provided at the end of the text, so the Technical Problems



serve as an integrated workbook within the text. The narrow focus of each Technical Problem accomplishes two things: (1) It encourages students to master concepts by taking small "bites" instead of trying to "gulp" the whole chapter at once, and (2) it allows students to pinpoint any areas of confusion so that interaction with the instructor—in the classroom or in the office—will be more productive. When students finish working the Technical Problems, they will have practiced all of the technical skills required to tackle the Applied Problems.

- **Applied Problems**—Following the Technical Problems, each chapter has a set of Applied Problems that serve to build critical thinking skills as well as business-decision-making skills. These problems, which are much like the "word problems" in a math textbook, are a mix of stylized business situations and real-world problems taken from *BusinessWeek*, the *Economist*, *The Wall Street Journal*, and other business news publications. Business students frequently find classroom discussion of the Applied Problems to be among the most valuable lessons of their entire business training. Answers to Applied Problems are only available in the *Instructor's Resource Manual.*

The clarity of exposition, coupled with the integrated, step-by-step process of the Technical Problems, allows students to learn most of the technical skills before coming to class. To the extent that technical skills are indeed mastered before class, instructors can spend more time in class showing students how to *apply* the economic way of thinking to business decision making.

Flexible Mathematical Rigor

Starting with only basic algebra and graph-reading skills, all other analytical tools employed in the book are developed within the text itself. The *Student Workbook* contains an 18-page tutorial review of the basic algebra and graphing skills needed to work the problems in the text. This tutorial, entitled "Review of Fundamental Mathematics," contains numerous mathematical exercises with answers.

While calculus is not a part of any chapter, instructors wishing to teach a calculus-based course can do so by using the Mathematical Appendixes at the end of most chapters. The Mathematical Appendixes employ calculus to analyze some of the key topics covered in the chapter. Most appendixes have a set of Mathematical Exercises that requires calculus to solve, and the answers to the Mathematical Exercises are available in the *Instructor's Resource Manual.* A "Brief Review of Derivatives and Optimization" is also provided in the *Instructor's Resource Manual* and in the student area of the website for this book (www.mhhe.com/economics/thomas8). This six-page tutorial covers the concept of a derivative, the rules for taking derivatives, unconstrained optimization, and constrained optimization.

Self-Contained Empirical Analysis

The Eighth Edition continues to offer a self-contained treatment of statistical estimation of demand, production, and cost functions. While this text avoids advanced topics in econometrics and strives to teach students only the fundamental statistical concepts needed to estimate demand, production, and cost, the explanations of statistical procedures nonetheless maintain the rigor found in the rest of the book. For those instructors who do not wish to include empirical analysis in their courses, the empirical content can be skipped with no loss of continuity.

Wide Audience

Managerial Economics is appropriate for undergraduate courses in managerial economics (or courses in applied microeconomics) and for M.B.A. and executive M.B.A. level courses. The self-contained nature of the book can be especially valuable in night classes or executive M.B.A. courses where students may have limited opportunity to meet with an instructor for help outside class.

SUPPLEMENTS

The following supplemental materials are available for the Eighth Edition.

Student Workbook

The *Student Workbook* provides students with chapter reviews and many extra problems with answers. Each chapter of the *Student Workbook* has five sections: Essential Concepts, Study Problems, Matching Definitions, Multiple-Choice/True-False, and Homework Exercises. As previously mentioned, the *Student Workbook* also provides a tutorial on business mathematics, which includes numerous exercises with answers.

Instructor's Resource Manual

The *Instructor's Resource Manual* contains answers to the Applied Problems, answers to the problems in the Mathematical Appendixes, and answers to the Homework Exercises in the *Student Workbook*.

Test Bank (Softcover and CD)

The *Test Bank* offers multiple-choice and fill-in-the-blank questions that closely match the Technical Problems in each chapter. The *Test Bank* is available both in softcover and on CD (Microsoft Word 2002) for easy compilation of exams.

Student Statistix 8 CD

As in the previous edition, *Managerial Economics* can be packaged with a CD that contains the Student Edition of *Statistix 8*, a popular Windows-based statistical software package. This software provides students with many easy-to-use statistical procedures including two-stage least-squares. The CD also contains all of the data sets used in this book—there are 12 of these. I have written and class-tested a tutorial, which is available on the website of the text, showing students how to use this software to work the problems in *Managerial Economics*.

PowerPoint Slides

All of the graphs contained in this edition of *Managerial Economics* are also available a *PowerPoint* slides on CD, as well as on the book website.

www.mhhe.com/economics/thomas8

The McGraw-Hill website for *Managerial Economics* supplies support material and information for both instructors and students. The website contains the following instructional materials: (1) chapter summaries and key terms, (2) 20 multiple-choice questions for each chapter with instant grading, (3) Special Topic Modules (STMs) covering linear programming in production analysis and investment or capital budgeting decisions, (4) Illustrations "retired" from previous editions, (5) Consulting Projects for take-home exercises requiring statistical analysis to make business decisions, (6) a brief tutorial on using *Statistix 8* to work problems in *Managerial Economics*, and (7) a six-page calculus review called "Brief Review of Derivatives and Optimization." The password-protected Instructor's site includes the *Instructor's Resource Manual* and downloadable PowerPoint slides.

NEW FEATURES IN THE EIGHTH EDITION

This edition of *Managerial Economics* represents a rather significant reorganization. And, as with all revisions, I have updated and revised material throughout the book to make improvements in clarity and content.

Previous users will notice several organizational changes. For one thing, I have moved several chapters to new locations. Optimization theory is now covered in Chapter 3, while the chapter on demand elasticity has been moved to Part II, Demand Analysis. I have also combined several chapters: Demand estimation and forecasting are now covered in a single chapter and strategic decision making now takes one chapter instead of two. Also, the chapter on multiple plants, markets, and products has been reorganized and renamed. Chapter 14, "Advanced Techniques for Profit Maximization," now covers two additional topics that have been moved from earlier parts of the book: cost-plus pricing and strategic entry deterrence.

Perhaps a more important organizational change involves my decision to move some topics from the textbook to the dedicated McGraw-Hill website for

the book. I have moved the chapter on investment decisions (capital budgeting) to the website, creating Special Topic Module 2. Many users observed that business students are required to take courses in finance that cover investment and capital budgeting analysis. So, beginning with this edition, this topic joins linear programming as a stand-alone Special Topic Module on the McGraw-Hill website. Hopefully, moving these topics to the website will pass the market test, which will make room in future editions for coverage of some new topics. As always, any advice or comments from adopters are valued and encouraged.

In addition to the changes in organization, the following revisions have been undertaken to improve clarity and coverage in the Eighth Edition:

- As previously discussed, strategic decision making in oligopoly markets is now covered in a single chapter, instead of two chapters as in the last edition. In the process of combining the two chapters, numerous improvements have been made: The process of identifying dominant, dominated, and Nash equilibrium cells in payoff tables has been simplified and unified; the discussion of trigger strategies has been shortened and simplified; the discussion of cartels now emphasizes the incentive to cheat on price-fixing arrangements (rather than how cartels make pricing and output decisions); and a new subsection on facilitating practices has been added.
- Eleven Illustrations from the last edition (all of which can still be found on the website at "Illustrations from Previous Editions") have been retired, and 25 percent of the Illustrations in this edition are either new or revised.
- The chapter on optimization theory has been substantially revised to emphasize the main idea of the chapter: using marginal analysis to make optimal decisions. The graphical analysis has been improved, and average cost has been added to the discussion of costs that are irrelevant in decision making (joining sunk and fixed costs).
- In the chapter on demand elasticities, the "Calculating Price Elasticity of Demand" section has been substantially revised to simplify, as much as possible, the methodology for computing point and interval elasticities. Computation of price, income, and cross-price elasticities in the case of linear demand functions is now fully developed in this chapter.
- Short-run and long-run costs are now related utilizing a short-run expansion path, which clarifies why output adjustments are more costly to accomplish in the short run than in the long run.
- Discussion of cost-plus pricing has been substantially improved and moved to the newly organized Chapter 14. My executive M.B.A. students continue to show great interest in this pricing technique. In this edition, the problems with cost-plus pricing, both theoretical and practical, are given greater attention. I have added some applied analysis with an example to show why, in the special case of constant costs, cost-plus pricing is no better and no easier than using the $MR = MC$ rule to find the profit-maximizing price. And, of course, in all other cases, cost-plus pricing fails to give the optimal price.
- As in all revisions, I have added a number of new Technical and Applied Problems throughout the book.

A WORD TO STUDENTS

One of the primary objectives in writing this book is to provide you, the student, with a book that enhances your learning experience in managerial economics. However, the degree of success you achieve in your managerial economics course will depend, in large measure, on the effectiveness of your study. I would like to offer you this one tip on studying: Emphasize *active* study rather than *passive* study. Passive study activities are those that do not require you to think for yourself. Reading the text, reviewing class notes, and listening to lectures are "passive" in nature because the authors of your textbook

or your instructor are providing the analytical guidance for you. You are simply following someone else's analytical thought process, working only hard enough to agree with the authors or instructor.

In contrast, "active" study techniques require you to think and reason for yourself. For example, when you close your book and put aside your lecture notes and try to explain a concept to yourself—perhaps sketching on a pad the graph or mathematical demonstration of a result—only then are you creating the path of logical analysis for yourself. The better you can explain the "how" and "why" of key concepts, the more thorough will be your understanding. Of course, some passive study is necessary to become familiar with the material, but genuine understanding and ability to use the decision-making skills of managerial economics require emphasis on active, rather than passive, study techniques.

ACKNOWLEDGMENTS

Many of the best ideas for improving a textbook come from colleagues, adopters, reviewers, and students. This revision was no exception. I would particularly like to thank my colleagues Celina Jozsi, Carole Green, Barbara Caldwell, Jim Lasseter, Victoria Perk, Betilde Rincon, and Mark Wilson at University of South Florida and Glen Archibald at University of Mississippi for their comments and valuable advice. In addition, Michael Welker at Franciscan University provided valuable assistance in developing self-test questions for the textbook website. I also benefited tremendously from ideas provided by the following reviewers:

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I am especially lucky to have had the opportunity to work again with Lucille Sutton and Katie Crouch, my editorial team at McGraw-Hill/Irwin. They offered their considerable experience and knowledge, making it a pleasure, once again, to revise this textbook. I also benefited greatly from the assistance provided by Laura Griffin, who ably served as project manager on this edition.

As always, I encourage faculty and students to communicate any comments or suggestions to my editors at McGraw-Hill or to me directly at cthomas@coba.usf.edu. Your feedback is much appreciated.

Christopher R. Thomas
Tampa, Florida
September 15, 2003

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