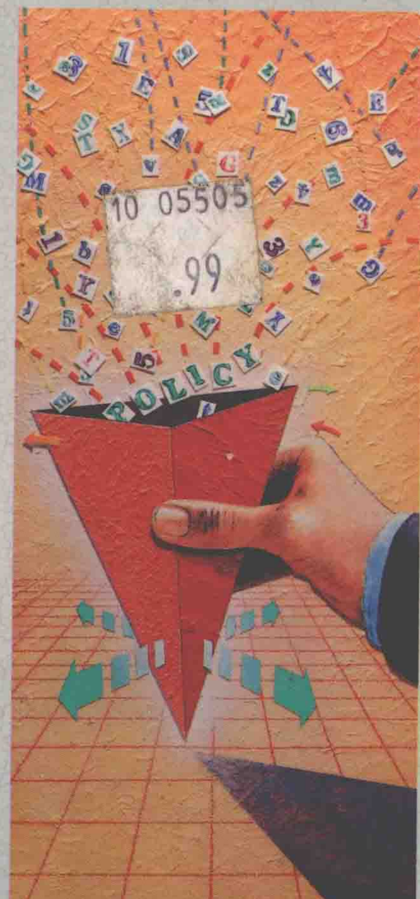
MANAGERIAL ECONOMICS

SECOND EDITION



Bruce T. Allen

SECOND EDITION

MANAGERIAL ECONOMICS

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Managerial Economics

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PREFACE TO THE SECOND EDITION

Managerial Economics, Second Edition, is written with one overriding conviction: That students of business can learn to apply microeconomic principles to business decisions and issues, and that they can retain and use the analytical perspective and logic of microeconomics throughout their careers.

This emphasis on application has become not only timely but urgent. Business people are increasingly questioning the relevance and content of business education. In response, the most recent curriculum standards of the American Assembly of Collegiate Schools of Business are uncomfortably and unfortunately silent on the need for instruction in some of the formal business disciplines—including economics. A still-popular version of the managerial economics course piggybacks on a calculus prerequisite, teaches economics simply as applied math, and examines students largely on their ability to regurgitate relations and to set up and solve first-order conditions. Such a course offers wonderful intellectual discipline and analytical practice. But its relevance is questionable and its survival in the curriculum dubious; real-world managers don't spend their days doing algebra! So *Managerial Economics,* Second Edition, is not the "calculus version" for which more than one instructor has asked me. Lots of those are on the market, and our courses regularly teach (Chapter 11) what competing against a flock of substitutes doesn't do for the bottom line. Conversely, this is not a "dumbed down" text; the analysis is at the intermediate to advanced level and many of the problems are both sophisticated and demanding. Indeed, I've had a few students complain that my version of managerial economics is "too applied," which appears to be a euphemism for "made me think too much."

This book emphasizes application to real business problems. This emphasis grabs the student at the outset of each chapter with a verbally stated real-world Preview Problem, to be addressed during the course of the chapter. Near the end of all the chapters are from one to three, sometimes extended, Applications and Issues examples from a long list of firms and industries. Between them, the Preview Problems and Applications and Issues include familiar companies and topics such as

- Corporate growth at Ryder System (Chapter 1)
- Are Japanese buyers different? (Chapter 4)
- Productivity problems (Chapters 7 and 8)
- Turnarounds in oil exploration (Chapter 10)
- Hertz, Avis, oligopoly, and strategy (Chapter 12)
- Sales promotion in soft drinks (Chapter 13)
- The economics of airline fares (Chapters 12 and 13)
- Monopoly, regulation, and cable television (Chapters 11 and 15).

In addition, the analytical exposition contains numerous brief examples and illustrations. Each chapter concludes with a set of problems and questions whose primary source is often the business press and whose analytical answers can be graphic, verbal, or algebraic. If you want a quick view of what any textbook, including this one, is all about, consult its problems.

This book, like its first edition, is designed for a one-term course in managerial economics. This is the name given to intermediate-level courses in applying microeconomic analysis to business problems. They are usually taken by upper-division business students as a substitute for a conventional intermediate micro theory course, or by students enrolled in MBA programs. Beyond the fact that such courses are almost always required, their analytical core is most of what they have in common.

FEATURES OF THIS TEXT

This basic outline and qualities of the First Edition remain:

1. *A solid core of conventional microeconomic analysis.* This may be found in Chapters 3, 4, 7, 8, 10, 11, and 12. The relevant parts of the theory of the firm are explained thoroughly and carefully. Where there was a tradeoff between just stating a principle to be memorized (for simplicity) and its explanation (to "show why," or to reinforce the principle), I chose to err on the side of more explanation rather than less. Despite its focus on managerial applications, there are places where this book can and should read like a good micro theory text. What is explained is more likely to be learned than what isn't.
2. *A "cafeteria" containing both relevant extensions of economic analysis and business topics on which the analysis sheds light.* Chapters 5, 13, and 14 on demand estimation and pricing models cover standard economics topics while Chapter 9 (linear programming) is a special kind of economic analysis. Forecasting (Chapter 6), business and government (Chapter 15), investment (Chapter 16), and decision theory (Appendix to Chapter 16) are often assigned to the managerial economics course although other texts treat them in a largely noneconomic fashion. In this book their connection with economic analysis is emphasized. For

example, a fairly complete treatment of externalities and the Coase Theorem (Chapter 10) complements discussion of the Pollution Control Act Amendments of 1990 (Chapter 15). Discussion of the Sherman Antitrust Act not only emphasizes the Act as a commandment to compete (Chapter 15) but appears throughout related analytical chapters (11–14) as a constraint on anticompetitive business behavior.

3. *Within-text features to assist student learning.* All technical terms are identified in **boldface** and defined at the point of first mention. Each chapter ends with a point-by-point Summary to assist the student in review. Footnotes are used liberally where additional examples or extensions would be interesting or helpful, but could be unnecessarily distracting if they were left in the text. The first end-of-chapter problems often require simple but repeated computation or solution—for example, calculating marginal cost—in the interest of reinforcing the student's conceptual learning. Succeeding ones foster an increasing ability to size up a situation, identify the relevant economic principle, and apply it to the situation.
4. *A level of mathematics that clarifies the logic but that neither terrorizes the reader nor takes over the course.* Chapter 2 provides a review of all the relevant mathematical tools; it assumes one term of algebra beyond the conventional ninth-grade course. The concept of a derivative is used to show that "marginal" is a rate of change, and that this rate of change often varies continuously. (For instructers who wish to build a course on this level of math, there are a few calculus-based problems and you are free to devise additional ones, giving your students the benefits of both your own mathematical rigor and the text's focus on application.) Beyond this point, the use of calculus is restricted to footnotes and a few problems in which its use may be sidestepped if desired. (The "Missing Marginals" pages in Appendix A at back of the book furnish the required derivatives.) Of course, some of the problems properly require evaluation of formulas (for example, elasticities) or the setup and solution of equations, but I have limited their number.
5. *Above all, an orientation that consistently and continually exposes the student to illustration and application of economic principles.* This text introduces and works out most principles in the context of concrete, though sometimes simplified or stylized, situations. This focus on application is especially noticeable in the end-of-chapter problems, for which many of the answers are graphical or verbal rather than numerical. (Answers to nearly all problems are provided in the Instructor's Manual; short check answers to selected problems are at the back of this book.) I view working through this kind of exercise as "doing real economics." The manager faced with a practical economic problem is not always told explicitly which tool to get out of the box, or how to adapt it to the peculiarities of the situation.

NEW TO THE SECOND EDITION

Both teaching experience and reviewer comments have suggested the following changes:

1. A sketch of consumer theory has been added as an Appendix to Chapter 4. It includes indifference curves, consumer optimization, income and substitution effects, and implications for elasticities. It also points the way to some of the theory's more important applications (for example, pollution, risk, and uncertainty) to the rest of the course.
2. Chapter 12 now covers only oligopoly and has received a complete reorganization. The cooperate-or-compete divide introduces the chapter, and topics under the "cooperate" heading such as price leadership and cartel failure are retained. I have added an extensive treatment of noncooperation, using game theory, and including topics such as commitment, credibility, and strategic behavior.
3. Chapter 11 now makes more explicit the analysis of monopoly pricing (from Chapter 13). It also incorporates the material on monopolistic competition, which shares with single-firm monopoly the lack of "recognized mutual dependence." The material on the condition of entry has been reworked to include recent analysis in industrial organization, particularly the problem of credible commitment.
4. Each chapter now begins with a Preview Problem–which is worked out later in the chapter—to whet the student's interest in its analysis. About two-thirds of the Applications and Issues capsules and half of the chapter problems have been replaced with newer ones. The Applications and Issues are not only more recent and (I think) better; there are simply more of them.

COURSE POSSIBILITIES

The content of a managerial economics course—particularly one in an MBA program—is partly the result of careful planning, partly the result of academic history (and politics), and partly the residual of the other courses in the curriculum. The typical managerial economics course will include both an analytical core based on the theory of the firm, and a set of extensions and topics that will vary across institutions and instructors. Any text that passes the marketplace test must therefore include more noncore material than any particular course can cover in a single term. This text is no exception; even a fifteen-week four-credit course that tried to cover it all would be a breathless dash.

Three possible designs based on courses taught at Michigan State University are as follows:

1. **Undergraduate Managerial Economics.** (ten weeks, three one-hour sessions per week).
   Chapter 1
   Chapter 2 (refer to as needed)
   Chapters 3–5, 7–13
   Chapter 15 (selected parts)
   Comment: This course is taken primarily by students in agricultural economics (public affairs management).

2. **MBA Managerial Economics** (Regular campus version, fourteen weeks, two ninety-minute sessions per week).
   Chapters 1–5
   Chapters 7, 8, 10, 11, 12, 13
   Chapter 14 (if time permits)
   Comment: Regression (Chapter 5), time-series analysis (Chapter 6), linear programming (Chapter 9), and decision theory (Appendix to Chapter 16) are taught in a management-science course. Public policy (Chapter 15) and finance (Chapter 16) are covered in other required courses. Specific attention is given to international markets.
3. **MBA Managerial Economics** (Executive program, eleven weeks, one four-hour session per week).
   Chapter 1
   Chapter 2 (refer to as needed)
   Chapters 3, 4, 7, 8, 10, 11, 12
   Chapter 13 (part), Chapter 15 (part)
   Comment: The course incorporates additional reading on industrial organization and some reading of antitrust cases. Finance and the "quaint" topics are taught in other required courses.

My experience teaching MBA students has required dealing with sizeable differences in student backgrounds and preparation. One result is that this book is similarly accommodating.

ACKNOWLEDGMENTS

Twenty years ago, the course on which this book was based was a conventional microeconomics course required of (and often resented by) MBA students at Michigan State University. My dissatisfaction with the "irrevelance" of its approach started me on a long search through various managerial economics texts (and a fifteen-year stint as a manuscript reviewer), as well as experimentation with a wide variety of supplementary materials. Each of two MBA curriculum reviews required that the course be justified to a significant minority of noneconomics colleagues who insisted that "we don't use price theory, and our students won't, either." The course that evolved over those two decades has successfully met those challenges. Student complaints about "irrevelance" (but not those about the demanding problems) have all but disappeared. A third curriculum review (revisions implemented in 1992) was striking in its absence of anti-economics sentiment. Most of the Applications and Issues capsules and the end-of-chapter problems were developed to teach both economic analysis and its relevance; many began life as exam questions. Some problems were inspired by executives in MSU's Advanced Management Program version of the course. Since 1988 my students have also been very forthcoming with comments on the First Edition and helpful in debugging the new applications, examples, and test questions that appear in this edition. On the whole, their responses have been at least as encouraging as critical. As with the First Edition, my primary debt is to

those students in Economics 860 (now 803) who challenged me to teach them something.

I owe much to the support of colleagues in the Economics Department and elsewhere in the Eli Broad Graduate School of Management at MSU. Beyond the intellectual stimulation of several dozen microeconomics teachers is the very tangible sharing of clippings, questions, and examples. Some have shared the course, its benefits and its costs, with me: Stephen Martin, Richard Anderson, Stacey Schreft, and Leslie Papke. The less perceptible but no less welcome help of Dan Hamermesh, Carl Liedholm, and Byron Brown added to the question pile and to my encouragement. Two former doctoral students deserve mention: Bill Meade, who has been a cheerleader for my approach to economics and helped with Chapter 13, and Gilbert B. Davis, who contributed both striking graphics and sage advice for the Instructor's Manual. Ram Narasimhan, Professor of Management Science at Michigan State, gave me such a careful reading of Chapters 5, 6, and 9 in the first edition that I didn't have to ask for his help in the revised one. And to Virginia P. Allen, who has seen me through two editions with a thousand handholdings, forbearances, and smiles—and ducked when it was prudent—thanks.

I am grateful to the Literary Executor of the late Sir Ronald A. Fisher, F.R.S., to Dr. Frank Yates, F.R.S., and the Longman Group Ltd., London, for permission to reprint Table IV from their book *Statistical Tables for Biological, Agricultural, and Medical Research,* 6th Edition (1974).

Finally, my thanks to Roger LeRoy Miller, whose encouragement and assistance made the First Edition possible. The format of this revision still follows that of his major textbooks; his experience in communicating with students is reflected throughout these pages. Still, my work is responsible for how well this book serves your courses. Please communicate any suggestions, critical or supportive, to me.

Bruce T. Allen

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C H A P T E R   O N E

MANAGERS AND ECONOMICS

Preview Problem: *Bumstead and Business.* Besides a punch line, what is in this strip? Business principles? Economic principles? Common sense, or a sense in common? As we will find out at the end of this chapter, there is a bit of all three.

Managerial economics is the application of economic principles to problems faced by managers. Many of you are enrolled in the tightly scheduled last year of an undergraduate program in business. Even more of you are working on a Master's degree in business administration within an equally tight time constraint. You probably recall enough economics to know that the subject deals with the allocation of scarce resources.[1] Since your time is scarce, you may well ask why you are spending a major portion of it taking another course in economics—even one labeled "managerial" as a partial come-on. As a student of economics, you are entitled to an answer.

1.1 WHY ARE YOU STUDYING MANAGERIAL ECONOMICS?

In general terms, economics is the science of how societies organize themselves to deal with issues raised by scarcity. Human wants are infinite, resources are scarce, and someone, some institution, or some process must decide the uses to which resources are put and see to it that they are used efficiently. An important part of this analysis is the concept of the firm, an abstract representation of a business enterprise and its decisions. This concept is the main point of contact between the field of economics and its managerial applications.

What Managerial Economics Can Do

The subject of managerial economics takes many of the principles of ordinary microeconomic analysis—sometimes called "neoclassical price theory"—and applies them to the business context. (We define "microeconomics" and other technical terms in the following pages.) For the business person, managerial economics has three major uses:

1. *Managerial economics organizes information for decisions.* Managers make decisions. The effect of a decision—to introduce a new product, to change the quality-control procedures, to revise a price list—on profits can only be known if it can be shown how the decision alternatives affect revenues, costs, or both. Economic analysis consists of a set of quantitative (or quantifiable) relations between inputs and outputs, outputs and costs, prices and revenues, and so forth. Understanding these relationships allows us to trace the logical effects of a decision from its immediate result to the bottom line of profit and loss. It also tells us something about what information to look for, saves us time and effort, and may even save us from error by telling us to disregard some facts as irrelevant. Economics may even show us what range of uncertainty the lack of a specific piece of information imposes on a decision's expected profitability.
2. *Managerial economics leads to a better understanding of a company's environment.* A business enterprise is affected by hundreds of forces, many of which are beyond its control. Many of these forces affect the demand for its products. Still other forces affect its costs via what it must pay for its resources. A company's costs are also influenced by changes in technology. The environment of a firm generates all kinds of changes, and gives out signals about what the changes—and their implications—may be. Economic analysis provides a way of sorting this information,

[1]If you have never taken an economics course, do not panic. This book begins every important topic at the elementary level or builds on it from earlier material in the book. We look more fully at the matter of prerequisites at the end of this chapter.