

# MODERN MICROECONOMICS

Analysis and Applications



DAVID N. HYMAN

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With 248 illustrations



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**MODERN  
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*The Market* by George Tooker



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## FOREWORD

**T**here is a strong need for a good undergraduate microeconomics textbook. *Modern Microeconomics: Analysis and Applications* should meet this need for a broad class of students. It is marked above all by clarity and careful development. In the spirit of the best expositions, it starts each topic with painstaking care in defining concepts and stating basic assumptions. This care enables the author to go surprisingly far in detailed developments and applications without losing sight of the main lessons about the economy that the student should learn. Basically, microeconomics teaches a certain viewpoint about the economy and to some extent about the social system in general—the implications of rational behavior by individuals and the coordination of individual activities by the price system and the clearing of markets. The same theme is developed in many contexts, but the unity of the underlying lesson is clarified rather than obscured by the variety of its applications.

The author has exhibited the workings of the price system both by showing its operation and by repeatedly stressing its boundaries. The role of property rights, the presence of transactions costs, and the importance of nonmarket activities are introduced in the first chapter, while their implications for welfare evaluation and for the role of the government in providing public goods and correcting externalities appear in Part Four. Indeed, the coordination among the chapters is striking. Not only are themes introduced in one chapter and taken up in later ones, but parallels in methods of analysis are also stressed.

The range of topics covered is also commendable. Competitive behavior is discussed in the early chapters, and the analysis continues into monopoly, monopolistic competition, general equilibrium, externalities, and public goods. The flow is smooth, and the more sophisticated, later sections appear as a natural extension of competitive and monopolistic behavior. The treatment of imperfect competition is always a problem, for there really is not a standard doctrine at the most advanced level. The author has made the student aware of the issues and sketched some of the possibilities without getting bogged down in controversial and detailed developments.

I believe this book will be a leading candidate for basic microeconomics courses not requiring use of calculus. Its clarity is matched by its frequent but not excessive references to concrete economic problems and empirical studies.

**Kenneth J. Arrow**

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**For Linda,**

who knows how much textbooks cost,  
and

**To My Parents,**

who were my first economics teachers

# PREFACE

**T**he purpose of *Modern Microeconomics: Analysis and Applications* is to provide an effective tool to aid students in learning and using modern microeconomic theory. I have drawn on nearly 20 years of teaching experience and have benefited from criticisms and suggestions of many colleagues in the course of preparing this textbook. My enthusiasm for the subject of economics and its usefulness in understanding social relationships will be apparent to the reader. Relevant examples are consistently integrated with theory. I believe the key to understanding theory is to use it. As a consequence, I apply theories developed in the text as soon as feasible.

This book is aimed at undergraduate students who have had a maximum of one course in economics. However, this book can even be used in courses that represent the student's first exposure to economics. My approach concentrates on graphic analysis. The student is presumed to have a basic understanding of elementary algebra, but no calculus is used. Instructors with students prepared for a more mathematical approach to economic theory can supplement this book with additional assignments and use calculus in their lectures.

Learning microeconomic theory represents a challenge to students, and meeting that challenge provides many rewards and insights. Understanding microeconomic theory will help students in both their careers and in their perceptions of public issues. It will provide insights into the behavior of business firms, consumers, bureaucrats, investors, and the students themselves as they conduct their daily lives. To meet the challenge students must be prepared to accept a new way of thinking about how persons make choices and exchange goods and services with others. Economic theory provides a framework for thinking about social problems and relationships. Once the student begins using the framework, the rewards will be apparent. I hope that readers of this book will eventually return, as many of my students have, to tell their instructor that microeconomics was one of their most useful college courses. I hope, as well, that students will view this text as one of the most practical they have ever purchased.

## Unique Features of This Book

*Modern Microeconomics: Analysis and Applications* contains many unique features to aid students in learning economics. The text is highly readable. Reviewers have found the writing style to be clear and concise. I have organized topics and



their development in a logical way and have avoided digressions. Once a topic is introduced, it is not abandoned until it is fully and carefully developed. This will help students in reviewing the material for examinations.

### **Applications**

I have avoided the temptation to overapply theory. It is easy to bewilder readers with a multitude of examples from the many fields in which economics is relevant. My approach is to introduce short examples as a theory is developed. I have used both business- and policy-related examples that are within the realm of experience of the undergraduate. In each chapter a few topics are thoroughly developed as applications of a theory. There are usually three to six fully developed applications per chapter. The motivation for these applications is carefully established so the reader knows the purpose to which the theory is being applied. Rather than having separate chapters devoted to applications, I prefer to have students exposed to applications immediately after theoretical ideas are developed. This emphasizes and reinforces the relevance of the theory.

There is also continuity of applications from chapter to chapter. For example, application of supply and demand analysis to rent controls is undertaken in Chapter 2, where price controls in markets are first discussed. This example is returned to in Chapter 9 after the theory of competitive equilibrium has been developed. At that point the student has been exposed to more theory, and the subtleties of rent control consequences can be considered further. In Chapter 2 it is concluded that rent controls are likely to result in housing shortages. In Chapter 9 the theory is used to show students that the long-run shortage is likely to exceed the short-run shortage and that rent controls are likely to result in a decrease in the quality of rental housing.

The important concept of transactions costs is introduced in Chapter 2. In Chapter 4 I use indifference curve analysis to show how transactions costs prevent home gardeners from selling tomatoes when they grow more than they can use. I also show how a reduction in transactions costs could bring many of these home gardeners into the market as sellers. Transactions costs are discussed again in Chapter 17 in conjunction with the theory of externalities.

Other applications relating to property rights, tax incidence, subsidies, licenses, nonprice rationing, and government regulation appear in several chapters. The student is led into realizing how the insights obtained from theory expand as the theory is further developed and its assumptions are altered. My goal is to make the student aware of the complexity of economic relationships and how conclusions that economic theories yield change when the underlying assumptions change. In this way, the student can see that economics is not simplistic. Theories can be adapted to handle a variety of situations. Multidimensional aspects of economic relationships are thereby highlighted.

Business issues that are used as applications are management of multidivision firms, allocation of resources in multiproduct firms, compensation of employees, unions, and the impact of government input use restrictions on costs of produc-

tion. Policy issues discussed include the impact of Social Security pensions on labor force participation by the elderly, taxes and subsidies, minimum wages, and price controls. The applications used in this book are intended to show students that the theories they are learning are useful.

### **Numerical Examples**

This text uses numbers. In almost every chapter there is a hypothetical example that is fully developed to aid the student in understanding a theory. For many students, numbers provide a security blanket, and it is easier for them to see functional relationships when numbers are used. I have also used realistic examples to lead the student into theory. For example, supply and demand analysis is illustrated with an example of the market for rib eye steak, which is a good that is standardized and one that most students have purchased. A more complex example is then developed that compares the effects of import quotas with those of tariffs.

Income and substitution effects are illustrated by a numerical example that shows how an airline club whose benefit is lower fares will allow observation of the substitution effect if the membership fee is high enough. In Chapter 6 a numerical example is introduced that gives production data for a hypothetical producer of a standardized chair. These data are then carried through to Chapter 7, where they are used to derive cost curves. These numbers are then coupled with additional data on demand in Chapters 8 and 9 to illustrate the behavior of the competitive firm. In Chapter 10 data on the demand for an entertainer's performances are used to derive marginal revenue curves and explain the profit-maximizing number of performances, assuming that the entertainer has a monopoly. Similarly, numerical examples are used to discuss input markets and illustrate externalities and the Coase theorem in later chapters.

Numerical examples enhance student learning. Instructors are encouraged to use similar examples in class. The Instructor's Manual (available to instructors from Times Mirror/Mosby College Publishing) includes transparency masters of all graphs and tables. This allows easy use of text material in the classroom. I usually photocopy tables and illustrations from the text for distribution to my students during lectures. I then draw the graph step by step on the board, using the original as a guide to avoid errors, while my students follow along using the handouts. This makes it easy for them to take notes without the pressure of accurately reproducing graphs and tables in their notebooks.

I have also been careful in using proper units of measurement in examples and graphs. A great deal of confusion can be avoided by making it clear to students that output is a flow per unit of time. On all graphs, a time dimension for output produced or input used is indicated.

### **Up-to-Date References**

I have peppered the book with footnotes that reference recent journal articles and books on both empirical and theoretical issues in economics. These should serve

as a starting point for those students who wish to investigate certain subjects in greater depth.

### **Boxed Summaries of Recent Empirical Research and Policy Issues**

Each chapter includes two boxed summaries either of recent research that applies a theory developed in the chapter or of a policy issue. The purpose of some summaries is to show students how economists have used economic theory to develop and test hypotheses about the relationship between economic variables. In other cases the analysis illustrates points made in the chapter along with observations about business behavior and the impact of government policies. The material presented in the boxes is short and concise. I have not tried to develop theory in the boxes; their purpose is to motivate the student by providing an interesting diversion from the more difficult job of learning the theory. The boxed material emphasizes that microeconomic theory is consistent with observations.

### **Readability**

I have been careful to define terms when they are first introduced. Key terms are presented in boldfaced type when they first appear. The level of presentation is consistent throughout. Difficult subjects are developed in an understandable way without the use of mathematics. This book was written with the student in mind. My experience as a teacher has alerted me to the areas where students are likely to become confused. I have tried to explain difficult concepts at a level that is understandable to the average student.

A special effort has been made to coordinate the placement of all graphs and tables with the appropriate textual discussion so that they can be easily referred to and understood by the students. All graphs are captioned. A two-color scheme has been used, and I have designed the color breaks to make the graphs easier to understand.

## **Teaching and Learning Aids**

### **Pedagogical Aids**

Each chapter contains pedagogical aids to assist the student in mastering the material. A brief overview of each chapter points out the issues that will be considered in the chapter. A concise summary appears at the end of each chapter. All key terms are repeated at the end of the chapter for review. Questions are designed to help students return to the chapter to test their understanding of important concepts. The reader should use the questions for review as a guide to check mastery of the content of each chapter. Except in Chapter 1, there are also five problems at the end of each chapter. These problems are more challenging than the review questions. Answers to the even-numbered problems are located at the end of the book. Selected suggestions for further reading are also found

at the end of each chapter. These are up-to-date and relevant annotated references that can serve as a starting point for the students with a term-paper assignment.

Appendices are included in two chapters to cover more difficult material that instructors might consider optional. The appendix to Chapter 2 discusses geometric aspects of the relationship between price elasticities and the slopes of supply and demand curves. The appendix to Chapter 5 covers advanced topics in demand theory.

Finally, there is a comprehensive glossary at the end of the book.

### Supplementary Resources

*Instructor's Manual* (available from the publisher). I have taken considerable care to write a useful, comprehensive manual that contains several unique elements. First, each chapter begins with a detailed set of notes that compare my treatment, coverage, and terminology with that found in competing textbooks. This section allows instructors to easily adapt (integrate) their existing lecture notes to use of this text. Second, each chapter contains comprehensive, enumerated teaching (lecture) notes. These notes are specifically and deliberately weighted to the most difficult topics and concepts in the text. Also included is a set of 500 test items that are carefully matched and correlated with the topics discussed in the text. The questions include multiple choice as well as problems requiring calculation and graphic exposition. All test items have been reviewed and thoroughly checked for accuracy, clarity, and range of difficulty by several instructors who also served as reviewers of the text.

*Transparencies*. To further facilitate use of this text, you will find another unique feature. Every graph and table in the text is reproduced as a transparency master in the Instructor's Manual.

*Study Guide/Workbook*. The accompanying Study Guide has also been carefully planned and developed. It contains numerous elements designed to assist the student in mastering the content of this course. Included for each chapter are concept overviews, additional exercises and problems—all graded according to complexity—and sample questions to aid students in learning and preparing for exams. *This guide was reviewed by several instructors for utility, accuracy, and clarity, and their comments were incorporated into the final draft.*

### Organization of This Book

This text is divided into six parts:

1. Introduction to Microeconomics
2. The Theory of Demand
3. Production, Cost, and Supply in Competitive Markets
4. Noncompetitive Markets
5. Input Markets
6. General Equilibrium, Efficiency, and Public Goods

Instructors vary in the way they prefer to teach microeconomics. It is also difficult to cover all the material in this book in a one-semester course. Instructors will find that this book can be adapted to a variety of approaches to teaching courses in intermediate microeconomics. For example, if students are especially well prepared, Chapters 1 and 2 can easily be skipped. These chapters essentially review material usually covered in Principles of Economics courses. As previously indicated, the appendix to Chapter 2 can also be viewed as optional. An instructor can easily begin the course with Chapter 3 and skip Part One of the book. Students can read the introductory chapters on their own to review material they had in other courses.

I have tried to include enough basic material to allow instructors to choose among the chapters to tailor their courses according to teaching preferences and student backgrounds. In addition, it is possible to assign material from selected chapters to achieve various teaching objectives.

Indifference curve analysis is covered in Chapters 3 and 4. To most instructors this is basic material that will not be skipped. Chapter 3 develops the theory of consumer choice. Chapter 4 concentrates on comparative static analysis and applications of indifference curve analysis. Because indifference curve analysis is the basis of the modern theory of choice, I have included diverse applications to a variety of fields in Chapter 4.

Chapter 5 covers market demand. Some instructors may wish to skip portions of this chapter. One topic covered is demographic determinants of market demand. This chapter also discusses and uses the concept of consumer surplus. Relevant measures of market demand elasticity are developed and their usefulness pointed out to the student. Techniques used to estimate market demand relationships and elasticities are discussed. The latter topic is included so that students will have some idea of how the estimated elasticities presented in this chapter were obtained.

The appendix to Chapter 5 contains more difficult material relating to consumer surplus and indifference curve analysis. Compensated demand curves are derived in this section. The material in this appendix will be difficult for many students and can easily be skipped without loss of continuity.

Chapters 6 to 9 are basic chapters dealing with production, cost, and competitive supply. Most of the material in these chapters is essential to an understanding of the theory of supply. Chapter 6 concentrates on physical productive relationships between inputs and outputs. The concept of a production function is introduced in Chapter 6. Chapter 7 introduces the concept of cost function. The duality between cost and productivity of inputs is emphasized in this chapter. The discussion of cost from the basic notion of opportunity cost to the derivation of short- and long-run supply curves is among the most thorough available. Chapter 8 introduces the competitive firm and derives the short-run supply for goods produced in competitive markets. Chapter 9 develops the theory of long-run competitive equilibrium. This chapter basically shows students how the supply side of the market works over time.

Most instructors will find Chapter 10 to be essential. This chapter develops the pure theory of monopoly. I have been careful to use examples that appeal to students. They include analyses of the behavior of performers and physicians having a monopoly of the supply of certain entertainment and medical services.

Chapter 11 covers monopolistic competition and oligopoly. This chapter can be skipped if necessary. It deals with market structures between the two extremes of perfect competition and oligopoly. An instructor can, as well, assign only portions of this chapter according to tastes and time constraints.

Similarly, Chapter 12 can be skipped if necessary. Alternatively, portions of this chapter can be assigned immediately after discussing pure monopoly. Chapter 12 is a unique chapter that includes problems involved in diagnosing monopoly power and issues concerning public policy toward monopoly. Among the topics covered in this chapter are the theory of contestable markets, measurement of the social cost of monopoly power, and antitrust policy. The normative concept of efficiency is concisely developed in Chapter 12 as a standard for evaluating market performance.

This text has particularly thorough chapters on input markets. Chapters 13 to 15 develop models of the supply and demand for input services. Chapter 13 is a basic chapter that few instructors will want to skip. This chapter develops the theory of demand for input services in competitive input markets. The emphasis is on labor markets, and most of the applications deal with this topic. Labor supply curves are derived. Applications include analyses of regional and occupational wage differentials. Portions of Chapters 14 and 15 can be skipped. Chapter 14 discusses imperfectly competitive input markets. Once again, the emphasis is on labor markets. Both monopsony and labor union influence on wages are discussed. Chapter 15 examines markets for loanable funds, capital, land, and the economics of interest rates and asset prices. This chapter gives a detailed and rigorous analysis of capital theory.

The concept of efficiency, introduced in Chapter 12 as part of a normative analysis of market structure, is further developed in Chapter 16. Some instructors may wish to cover the material in Chapter 17 on externalities immediately after Chapter 12. This can provide the starting point for a critical overview of the market system. Chapter 16 covers general equilibrium analysis and derives efficiency conditions rigorously. Chapter 17 thoroughly develops the theory of externalities. It contains a complete development of the Coase theorem. The theorem is illustrated with a numerical example and graphs. Many applications dealing with environmental problems are offered. The final chapter discusses the theory of public goods. There are many examples in the chapter designed to help students understand the differences between private and public goods.

## Acknowledgments

I have benefited from the assistance and expertise of the editorial staff at Times Mirror/Mosby College Publishing throughout the development of this book. Glenn Turner, Publisher, originally suggested the project to me and utilized his resources

and editorial staff to provide me with excellent reviews and guidance while I labored through three drafts before producing the final product. In most respects this book represents the result of a productive and effective partnership between writer, publisher, and reviewers.

I must also commend my editors for their choice of prepublication reviewers. Writing a textbook is a learning experience for the author. Putting down ideas on paper requires complete understanding of the theories and ideas to be explained. My reviewers have aided in helping me sort out my thoughts. They have provided criticism, suggestions, and insights that I have absorbed, reacted to, and used extensively to produce the final version of this book. I have learned a great deal from them and wish to thank them for their conscientious efforts. I hope they are pleased with the results and with how many of their suggestions I have incorporated in the book. The following economists participated as reviewers of one or more drafts of this project:

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**David N. Hyman**

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