

新世纪高校经济学英文版教材

# 微观经济理论

Microeconomic Theory

Andreu Mas-Colell

Michael D. Whinston 著

Jerry R. Green

Microeconomic Theory



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本书是最近十余年来欧美经济学界最具影响力的高级微观经济学教科书。原著 (*Microeconomic Theory*) 由牛津大学出版社出版以来, 受到了经济学界的广泛关注和好评。全书系统全面地介绍了高级微观经济理论的各个方面, 涉及的论题丰富、信息量大, 是公认的微观经济理论的“圣经”; 本书被国外几乎所有的一流大学采用, 是经济学专业研究生的必读书籍。

本书逻辑脉络清晰、写作风格严谨、分析方法精湛, 以空前的深度和广度阐述了微观经济学所有重要的论题, 不仅对经典理论进行了充分论述, 而且对最新理论也给予了深入的分析, 并展示了一些前沿论题的研究现状和发展趋势。

本书内容包括个体决策、博弈论、市场均衡与市场失灵、一般均衡、福利经济学与激励等五大部分。第一部分从对个人行为的一般分析出发, 相对完整地介绍了经典的消费者和生产者理论, 并介绍了不确定情况下的个人选择。第二部分是博弈论, 阐述了静态博弈与动态博弈的各种解概念与分析方法, 分析了行为相互影响下的个人决策。第三部分是市场均衡和市场失灵, 详细介绍了外部性与公共物品、市场垄断、逆向选择以及委托代理等信息经济学的基本模型。第四部分关于一般均衡理论, 介绍与一般均衡相关的各种概念, 包括均衡的存在性和稳定性及福利特征等。第五部分涉及福利经济学与激励问题, 分析在个人效用可比和不可比情况下, 由个人偏好加总为社会偏好的可能性, 以及在关于个人偏好的信息不完全时的社会选择和经济机制设计等规范分析问题。本书的数学附录为读者提供了所需的基本数学知识。书中每一章都提供必要的详细参考文献, 方便学生进一步学习及寻找研究课题; 同时, 各章配备的层次不同的练习题, 非常有利于学生测试自己对各章内容的掌握程度。

本书作者安德鲁·马斯-科莱尔 (Andreu Mas-Colell)、迈克尔·D. 温斯顿 (Michael D. Whinston)、杰里·R. 格林 (Jerry R. Green) 三位教授长期在美国哈佛大学及其他世界名校从事研究生层面的微观经济学课程的教学工作, 且在各自的研究领域多有建树。此书是他们多年教学和合作的成果。

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# Preface

*Microeconomic Theory* is intended to serve as the text for a first-year graduate course in microeconomic theory. The original sources for much of the book's material are the lecture notes that we have provided over the years to students in the first-year microeconomic theory course at Harvard. Starting from these notes, we have tried to produce a text that covers in an accessible yet rigorous way the full range of topics taught in a typical first-year course.

The nonlexicographic ordering of our names deserves some explanation. The project was first planned and begun by the three of us in the spring of 1990. However, in February 1992, after early versions of most of the book's chapters had been drafted, Jerry Green was selected to serve as Provost of Harvard University, a position that forced him to suspend his involvement in the project. From this point in time until the manuscript's completion in June 1994, Andreu Mas-Colell and Michael Whinston assumed full responsibility for the project. With the conclusion of Jerry Green's service as Provost, the original three-person team was reunited for the review of galley and page proofs during the winter of 1994/1995.

## *The Organization of the Book*

Microeconomic theory as a discipline begins by considering the behavior of individual agents and builds from this foundation to a theory of aggregate economic outcomes. *Microeconomic Theory* (the book) follows exactly this outline. It is divided into five parts. Part I covers individual decision making. It opens with a general treatment of individual choice and proceeds to develop the classical theories of consumer and producer behavior. It also provides an introduction to the theory of individual choice under uncertainty. Part II covers game theory, the extension of the theory of individual decision making to situations in which several decision makers interact. Part III initiates the investigation of market equilibria. It begins with an introduction to competitive equilibrium and the fundamental theorems of welfare economics in the context of the Marshallian partial equilibrium model. It then explores the possibilities for market failures in the presence of externalities, market power, and asymmetric information. Part IV substantially extends our previous study of competitive markets to the general equilibrium context. The positive and normative aspects of the theory are examined in detail, as are extensions of the theory to equilibrium under uncertainty and over time. Part V studies welfare economics. It discusses the possibilities for aggregation of individual preferences into social preferences both with and without interpersonal utility comparisons, as well as the implementation of social choices in the presence of incomplete information about agents' preferences. A Mathematical Appendix provides an introduction to most of the more advanced mathematics used in the book (e.g., concave/convex

functions, constrained optimization techniques, fixed point theorems, etc.) as well as references for further reading.

### *The Style of the Book*

In choosing the content of *Microeconomic Theory* we have tried to err on the side of inclusion. Our aim has been to assure coverage of most topics that instructors in a first-year graduate microeconomic theory course might want to teach. An inevitable consequence of this choice is that the book covers more topics than any single first-year course can discuss adequately. (We certainly have never taught all of it in any one year.) Our hope is that the range of topics presented will allow instructors the freedom to emphasize those they find most important.

We have sought a style of presentation that is accessible, yet also rigorous. Wherever possible we give precise definitions and formal proofs of propositions. At the same time, we accompany this analysis with extensive verbal discussion as well as with numerous examples to illustrate key concepts. Where we have considered a proof or topic either too difficult or too peripheral we have put it into smaller type to allow students to skip over it easily in a first reading.

Each chapter offers many exercises, ranging from easy to hard [graded from A (easiest) to C (hardest)] to help students master the material. Some of these exercises also appear within the text of the chapters so that students can check their understanding along the way (almost all of these are level A exercises).

The mathematical prerequisites for use of the book are a basic knowledge of calculus, some familiarity with linear algebra (although the use of vectors and matrices is introduced gradually in Part I), and a grasp of the elementary aspects of probability. Students also will find helpful some familiarity with microeconomics at the level of an intermediate undergraduate course.

### *Teaching the Book*

The material in this book may be taught in many different sequences. Typically we have taught Parts I–III in the Fall semester and Parts IV and V in the Spring (omitting some topics in each case). A very natural alternative to this sequence (one used in a number of departments that we know of) might instead teach Parts I and IV in the Fall, and Parts II, III, and V in the Spring.<sup>1</sup> The advantage of this alternative sequence is that the study of general equilibrium analysis more closely follows the study of individual behavior in competitive markets that is developed in Part I. The disadvantage, and the reason we have not used this sequence in our own course, is that this makes for a more abstract first semester; our students have seemed happy to have the change of pace offered by game theory, oligopoly, and asymmetric information after studying Part I.

The chapters have been written to be relatively self-contained. As a result, they can be shifted easily among the parts to accommodate many other course sequences. For example, we have often opted to teach game theory on an “as needed” basis,

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1. Obviously, some adjustment needs to be made by programs that operate on a quarter system.

breaking it up into segments that are discussed right before they are used (e.g., Chapter 7, Chapter 8, and Sections 9.A–B before studying oligopoly, Sections 9.C–D before covering signaling). Some other possibilities include teaching the aggregation of preferences (Chapter 21) immediately after individual decision making and covering the principal-agent problem (Chapter 14), adverse selection, signaling, and screening (Chapter 13), and mechanism design (Chapter 23) together in a section of the course focusing on information economics.

In addition, even within each part, the sequence of topics can often be altered easily. For example, it has been common in many programs to teach the preference-based theory of consumer demand before teaching the revealed preference, or “choice-based,” theory. Although we think there are good reasons to reverse this sequence as we have done in Part I,<sup>2</sup> we have made sure that the material on demand can be covered in this more traditional way as well.<sup>3</sup>

### *On Mathematical Notation*

For the most part, our use of mathematical notation is standard. Perhaps the most important mathematical rule to keep straight regards matrix notation. Put simply, vectors are always treated mathematically as *column vectors*, even though they are often displayed within the written text as rows to conserve space. The transpose of the (column) vector  $x$  is denoted by  $x^T$ . When taking the inner product of two (column) vectors  $x$  and  $y$ , we write  $x \cdot y$ ; it has the same meaning as  $x^T y$ . This and other aspects of matrix notation are reviewed in greater detail in Section M.A of the Mathematical Appendix.

To help highlight definitions and propositions we have chosen to display them in a different typeface than is used elsewhere in the text. One perhaps unfortunate consequence of this choice is that mathematical symbols sometimes appear slightly differently there than in the rest of the text. With this warning, we hope that no confusion will result.

Summation symbols ( $\sum$ ) are displayed in various ways throughout the text. Sometimes they are written as

$$\sum_{n=1}^N$$

(usually only in displayed equations), but often to conserve space they appear as  $\sum_{n=1}^N$ , and in the many cases in which no confusion exists about the upper and lower limit of the index in the summation, we typically write just  $\sum_n$ . A similar point applies to the product symbol  $\prod$ .

2. In particular, it is *much* easier to introduce and derive many properties of demand in the choice-based theory than it is using the preference-based approach; and the choice-based theory gives you *almost* all the properties of demand that follow from assuming the existence of rational preferences.

3. To do this, one introduces the basics of the consumer’s problem using Sections 2.A–D and 3.A–D, discusses the properties of uncompensated and compensated demand functions, the indirect utility function, and the expenditure function using Sections 3.D–I and 2.E, and then studies revealed preference theory using Sections 2.F and 3.J (and Chapter 1 for a more general overview of the two approaches).

Also described below are the meanings we attach to a few mathematical symbols whose use is somewhat less uniform in the literature [in this list,  $x = (x_1, \dots, x_N)$  and  $y = (y_1, \dots, y_N)$  are (column) vectors, while  $X$  and  $Y$  are sets]:

<i>Symbol</i>	<i>Meaning</i>
$x \geq y$	$x_n \geq y_n$ for all $n = 1, \dots, N$ .
$x \gg y$	$x_n > y_n$ for all $n = 1, \dots, N$ .
$X \subset Y$	<i>weak</i> set inclusion ( $x \in X$ implies $x \in Y$ ).
$X \setminus Y$	The set $\{x: x \in X \text{ but } x \notin Y\}$ .
$E_x[f(x, y)]$	The expected value of the function $f(\cdot)$ over realizations of the random variable $x$ . (When the expectation is over all of the arguments of the function we simply write $E[f(x, y)]$ .)

### *Acknowledgments*

Many people have contributed to the development of this book. Dilip Abreu, Doug Bernheim, David Card, Prajit Dutta, Steve Goldman, John Panzar, and David Pearce all (bravely) test-taught a very early version of the manuscript during the 1991–92 academic year. Their comments at that early stage were instrumental in the refinement of the book into its current style, and led to many other substantive improvements in the text. Our colleagues (and in some cases former students) Luis Corchón, Simon Grant, Drew Fudenberg, Chiaki Hara, Sergiu Hart, Bengt Holmstrom, Eric Maskin, John Nachbar, Martin Osborne, Ben Polak, Ariel Rubinstein, and Martin Weitzman offered numerous helpful suggestions. The book would undoubtedly have been better still had we managed to incorporate all of their ideas.

Many generations of first-year Harvard graduate students have helped us with their questions, comments, and corrections. In addition, a number of current and former students have played a more formal role in the book's development, serving as research assistants in various capacities. Shira Lewin read the entire manuscript, finding errors in our proofs, suggesting improvements in exposition, and even (indeed, often) correcting our grammar. Chiaki Hara, Ilya Segal, and Steve Tadelis, with the assistance of Marc Nachman, have checked that the book's many exercises could be solved, and have suggested how they might be formulated properly when our first attempt to do so failed. Chiaki Hara and Steve Tadelis have also given us extensive comments and corrections on the text itself. Emily Mechner, Nick Palmer, Phil Panet, and Billy Pizer were members of a team of first-year students that read our early drafts in the summer of 1992 and offered very helpful suggestions on how we could convey the material better.

Betsy Carpenter and Claudia Napolilli provided expert secretarial support throughout the project, helping to type some chapter drafts, copying material on very tight deadlines, and providing their support in hundreds of other ways. Gloria Gerrig kept careful track of our ever-increasing expenditures.

Our editor at Oxford, Herb Addison, was instrumental in developing the test teaching program that so helped us in the book's early stages, and offered his support throughout the book's development. Leslie Phillips of Oxford took our expression of appreciation for the look of the Feynman Lectures, and turned it into a book design that exceeded our highest expectations. Alan Chesterton and the rest of the



staff at Keyword Publishing Services did an absolutely superb job editing and producing the book on a very tight schedule. Their complete professionalism has been deeply appreciated.

The influence of many other individuals on the book, although more indirect, has been no less important. Many of the exercises that appear in the book have been conceived over the years by others, both at Harvard and elsewhere. We have indicated our source for an exercise whenever we were aware of it. Good exercises are an enormously valuable resource. We thank the anonymous authors of many of the exercises that appear here.

The work of numerous scholars has contributed to our knowledge of the topics discussed in this book. Of necessity we have been able to provide references in each chapter to only a limited number of sources. Many interesting and important contributions have not been included. These usually can be found in the references of the works we do list; indeed, most chapters include at least one reference to a general survey of their topic.

We have also had the good fortune to teach the first-year graduate microeconomic theory course at Harvard in the years prior to writing this book with Ken Arrow, Dale Jorgenson, Steve Marglin, Eric Maskin, and Mike Spence, from whom we learned a great deal about microeconomics and its teaching.

We also thank the NSF and Sloan Foundation for their support of our research over the years. In addition, the Center for Advanced Study in the Behavioral Sciences provided an ideal environment to Michael Whinston for completing the manuscript during the 1993/1994 academic year. The Universitat Pompeu Fabra also offered its hospitality to Andreu Mas-Colell at numerous points during the book's development.

Finally, we want to offer a special thanks to those who first excited us about the subject matter that appears here: Gerard Debreu, Leo Hurwicz, Roy Radner, Marcel Richter, and Hugo Sonnenschein (A.M.-C.); David Cass, Peter Diamond, Franklin Fisher, Sanford Grossman, and Eric Maskin (M.D.W.); Emmanuel Drandakis, Ron Jones, Lionel McKenzie, and Edward Zabel (J.R.G.).

A.M.-C., M.D.W., J.R.G.

Cambridge, MA  
*March 1995*

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