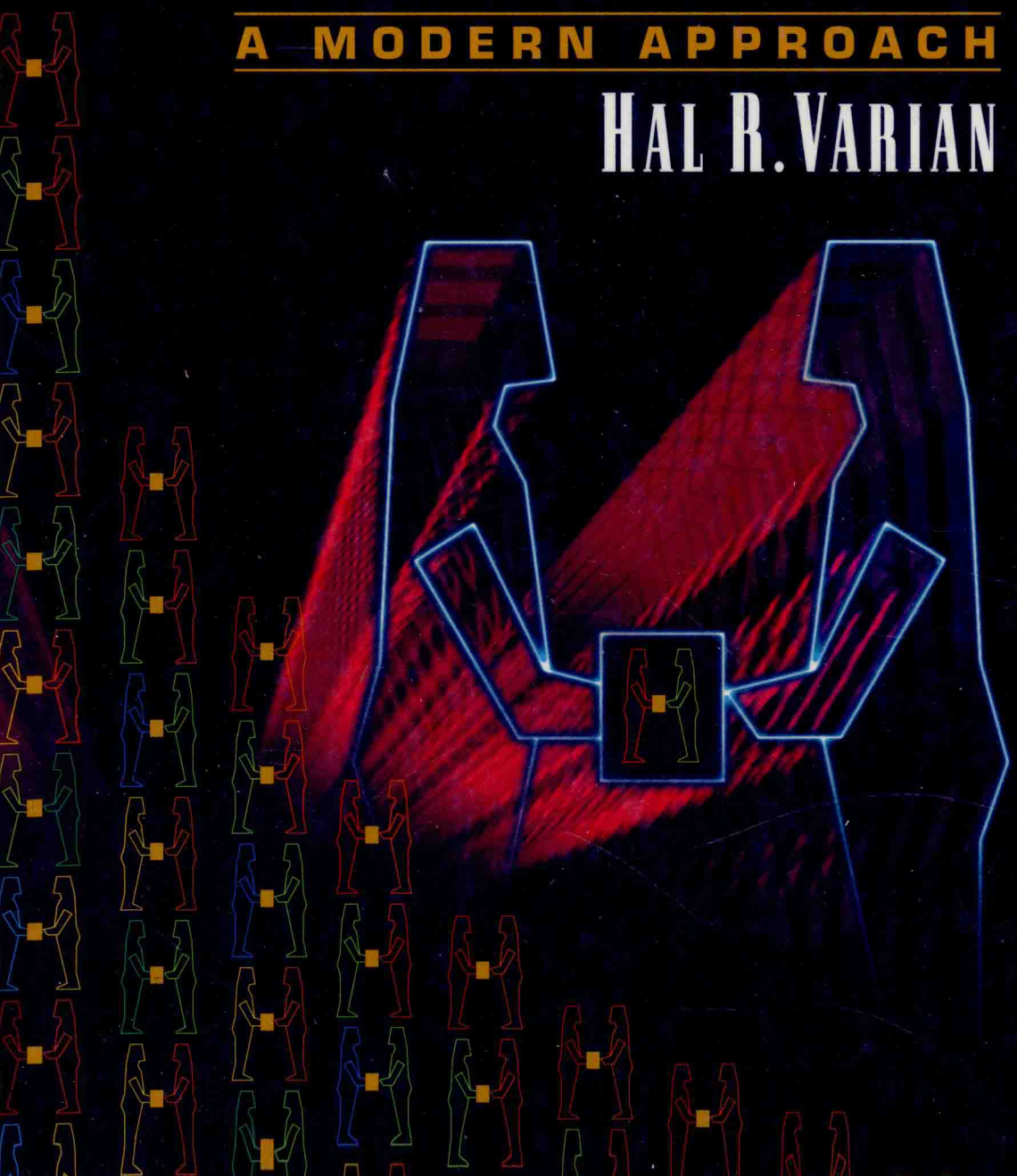
FOURTH EDITION

Intermediate Microeconomics

A MODERN APPROACH

HAL R. VARIAN



Intermediate Microeconomics

A Modern Approach

Fourth Edition

Hal R. Varian

University of California at Berkeley

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To Carol

PREFACE

The success of the first three editions of *Intermediate Microeconomics* has pleased me very much. It confirmed my belief that the market would welcome an analytic approach to microeconomics at the undergraduate level.

My aim in writing the first edition was to present a treatment of the methods of microeconomics that would allow students to apply these tools on their own and not just passively absorb the predigested cases described in the text. I have found that the best way to do this is to emphasize the fundamental conceptual foundations of microeconomics and to provide concrete examples of their application rather than to attempt to provide an encyclopedia of terminology and anecdote.

A challenge in pursuing this approach arises from the lack of mathematical prerequisites for economics courses at many colleges and universities. The lack of calculus and problem-solving experience in general makes it difficult to present some of the analytical methods of economics. However, it is not impossible. One can go a long way with a few simple facts about linear demand functions and supply functions and some elementary algebra. It is perfectly possible to be analytical without being excessively mathematical.

The distinction is worth emphasizing. An analytical approach to economics is one that uses rigorous, logical reasoning. This does not necessarily imply the use of advanced mathematical methods. The language of mathematics certainly helps to ensure a rigorous analysis, and using it is undoubtedly the best way to proceed when possible, but it may not be appropriate for all students.

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Many undergraduate majors in economics are students who *should* know calculus, but don't—at least, not very well. For this reason I have kept calculus out of the main body of the text. However, I have provided complete calculus appendices to many of the chapters. This means that the calculus methods are there for the students who can handle them, but they do not pose a barrier to understanding for the others.

I think that this approach manages to convey the idea that calculus is not just a footnote to the argument of the text, but is instead a deeper way to examine the same issues that one can also explore verbally and graphically. Many arguments are much simpler with a little mathematics, and all economics students should learn that. In many cases I've found that with a little motivation, and a few nice economic examples, students become quite enthusiastic about looking at things from an analytic perspective.

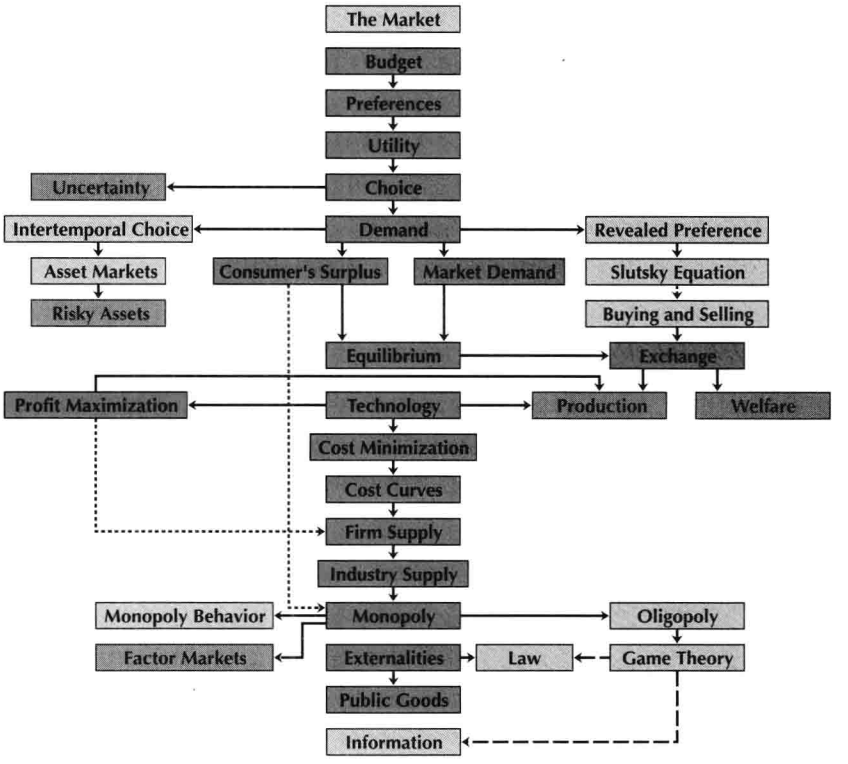
There are several other innovations in this text. First, the chapters are generally very short. I've tried to make most of them roughly "lecture size," so that they can be read at one sitting. I have followed the standard order of discussing first consumer theory and then producer theory, but I've spent a bit more time on consumer theory than is normally the case. This is not because I think that consumer theory is necessarily the most important part of microeconomics; rather, I have found that this is the material that students find the most mysterious, so I wanted to provide a more detailed treatment of it.

Second, I've tried to put in a lot of examples of how to use the theory described here. In most books, students look at a lot of diagrams of shifting curves, but they don't see much algebra, or much calculation of any sort for that matter. But it is the algebra that is used to solve problems in practice. Graphs can provide insight, but the real power of economic analysis comes in calculating quantitative answers to economic problems. Every economics student should be able to translate an economic story into an equation or a numerical example, but all too often the development of this skill is neglected. For this reason I have also provided a workbook that I feel is an integral accompaniment to this book. The workbook was written with my colleague Theodore Bergstrom, and we have put a lot of effort into generating interesting and instructive problems. We think that it provides an important aid to the student of microeconomics.

Third, I believe that the treatment of the topics in this book is more accurate than is usually the case in intermediate micro texts. It is true that I've sometimes chosen special cases to analyze when the general case is too difficult, but I've tried to be honest about that when I did it. In general, I've tried to spell out every step of each argument in detail. I believe that the discussion I've provided is not only more complete and more accurate than usual, but this attention to detail also makes the arguments easier to understand than the loose discussion presented in many other books.

There Are Many Paths to Economic Enlightenment

There is more material in this book than can comfortably be taught in one semester, so it is worthwhile picking and choosing carefully the material that you want to study. If you start on page 1 and proceed through the chapters in order, you will run out of time long before you reach the end of the book. The modular structure of the book allows the instructor a great deal of freedom in choosing how to present the material, and I hope that more people will take advantage of this freedom. The following chart illustrates the chapter dependencies.



The dark colored chapters are "core" chapters—they should probably be covered in every intermediate microeconomics course. The light-colored chapters are "optional" chapters: I cover some but not all of these every semester. The gray chapters are chapters I usually don't cover in my course, but they could easily be covered in other courses. A solid line going from Chapter A to Chapter B means that Chapter A should be read before chapter B. A broken line means that Chapter B requires knowing some material in Chapter A, but doesn't depend on it in a significant way.

I generally cover consumer theory and markets and then proceed directly to producer theory. Another popular path is to do exchange right after consumer theory; many instructors prefer this route and I have gone to some trouble to make sure that this path is possible.

Some people like to do producer theory before consumer theory. This is possible with this text, but if you choose this path, you will need to supplement the textbook treatment. The material on isoquants, for example, assumes that the students have already seen indifference curves.

Much of the material on public goods, externalities, law, and information can be introduced earlier in the course. I've arranged the material so that it is quite easy to put it pretty much wherever you desire. For example, the material on antitrust law fits naturally in with the discussion of monopoly; tort law can be used to illustrate ideas of efficiency; and criminal law can be used to illustrate consumer choice problems.

Similarly, the material on public goods can be introduced as an illustration of Edgeworth box analysis. Externalities can be introduced right after the discussion of cost curves, and topics from the information chapter can be introduced almost anywhere after students are familiar with the approach of economic analysis.

Changes for the Fourth Edition

The major addition is a new chapter on information technology. The newspapers never tire of telling us that we now live in an "information society." Although everyone talks about the information economy, few have attempted to do serious analysis of the issues. In this chapter I describe some economic models of information networks, of intellectual property enforcement, and of sharing information goods. The point is to show how standard economic techniques of the sort developed in this book can lend significant insight into these issues.

I have also added a more extensive treatment of first- and second-degree price discrimination. Previously I had only a very cursory treatment of nonlinear pricing, since the topic is usually considered too advanced for undergraduates. However, I have now found a way to present the essential analytic points at a very elementary level, using only the standard tools of consumers' surplus analysis. The chapter on "Monopoly Behavior" also contains a nice discussion of bundling, along with examples of this marketing technique drawn from the computer software industry. There are additional discussions of income elasticity, sunk costs, and a few other topics of this sort.

Finally, I have added about a dozen new examples illustrating a variety of economic phenomena. Many of these examples are drawn from hardware and software industries and emphasize the information technology theme of this edition.

The Test Bank and Workbook

The workbook, *Workouts in Intermediate Microeconomics,* is an integral part of the course. It contains hundreds of fill-in-the-blank exercises that lead the students through the steps of actually applying the tools they have learned in the textbook. In the third edition we have added a new section to *Workouts* that contains quizzes. These are short, multiple-choice questions that are often based on the longer fill-in-the-blanks problems. These quizzes give a quick way for the student to review the material he or she has learned by working the problems in the workbook.

But there is more ... instructors who have adopted *Workouts* for their course can get a free copy of a neat computer program called *Norton Test-Maker* that will generate new versions of these questions with different numerical values but the same internal logic. This can be used to make additional problems for students to practice on or make short quizzes to be taken in class.

With these quizzes and *Norton TestMaker* it is possible to generate lots of short questions that students can use to check their progress in understanding microeconomics. Grading is quick and reliable because the quizzes are multiple-choice and can be graded electronically. In our course, we tell the students to work through all the quiz questions for each chapter, either by themselves or with a study group. Then during the term we have a short in-class quiz every other week or so. In these quizzes, students are given newly generated versions of the previously assigned homework questions; these are essentially the homework questions with different numbers. Hence, students who have done their homework find it easy to do well on the quizzes.

We firmly believe that you can't learn economics without working some problems. The quizzes provided in *Workouts* and in *Norton TestMaker* make the learning process much easier for both the student and the teacher.

The Production of the Book

The entire book was typeset by the author using TEX, the wonderful typesetting system designed by Donald Knuth. TEX gives the author complete control over the structure and appearance of a document; it is especially convenient for text involving mathematics. I used the standard Unix tools `emacs` for editing and `rcs` for version control. I used Tom Rokicki's TEX system including his previewer, `TeXView`, and print driver, `dvips`. I used `makeindex` for the index, and Trevor Darrell's `psfig` software for inserting the diagrams.

The book design was by Nancy Dale Muldoon, with some modifications by Roy Tedoff and the author. Marie-Josée A. Schorp was the manuscript editor, and Drake McFeely coordinated the whole effort in his capacity as editor.

Acknowledgments

Several people contributed to this project. First, I must thank my editorial assistants for the first edition, John Miller and Debra Holt. John provided many comments, suggestions, and exercises based on early drafts of this text and made a significant contribution to the coherence of the final product. Debra did a careful proofreading and consistency check during the final stages and helped in preparing the index.

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My editorial assistants for the second edition were Sharon Parrott and Angela Bills. They provided much useful assistance with the writing and editing. Robert M. Costrell (University of Massachusetts at Amherst), Ashley Lyman (University of Idaho), Daniel Schwallie (Case-Western Reserve), A. D. Slivinskie (Western Ontario), and Charles Plourde (York University) provided me with detailed comments and suggestions about how to improve the second edition.

In preparing the third edition I received useful comments from the following individuals: Doris Cheng (San Jose), Imre Csekó (Budapest), Gregory Hildebrandt (UCLA), Jamie Brown Kruse (Colorado), Richard Manning (Brigham Young), Janet Mitchell (Cornell), Charles Plourde (York University), Yeung-Nan Shieh (San Jose), John Winder (Toronto). I especially want to thank Roger F. Miller (University of Wisconsin), David Wildasin (Indiana) for their detailed comments, suggestions, and corrections.

Berkeley
January 1996

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