

# VICROECONOMICS

Steven T. Call

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# Microeconomics

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# Preface

We have written this book believing intermediate students merit a richer treatment of modern microeconomics than is available to them in the current textbooks. We employ a verbal and graphical presentation consistently, never resorting to higher-level mathematics randomly when it might be convenient (for us) to do so. Nevertheless, the book sustains a relatively advanced level of rigor. Some economists think the only way to advance the rigor of the existing texts is to mathematize them. We disagree. We think there is a great deal more to do graphically and verbally in producing an intermediate text—a book that spans the gap between introductory and graduate-level analysis.

## **To Mathephobes**

Mathephobes (those of you exhibiting an irrational and persistent fear of mathematics) have been discouraged from taking any math or analytical courses, either out of a genuine fear or on the advice of a teacher or guidance counselor somewhere in the dim past. Now you find yourself reading the preface of a book that will develop your analytical skills and put your mathephobia to the test. If you close the book and select nonanalytical courses, you automatically sever yourself from the fascinating study of economics and its wealth of explanatory power about the world's problems. You may also cut yourself off from the many lucrative occupations that open up to people with analytical training. One result is that you may be doomed to already overcrowded majors and occupations. Our experience with students convinces us analytical training can be an important source of liberation for those who want satisfying careers.

Our graphical and verbal analysis, with occasional use of elementary algebra, is within the reach of nearly everyone and can be an invaluable aid in logical thinking and organizing thoughts. We believe all students have much to benefit from a careful presentation of economics using elementary mathematical techniques.

### **To Mathephiles**

Mathephiles (those of you favorably disposed toward mathematics) will learn the material here easier than the mathephobe. Your experience in *analytic thinking and in modeling gives you an edge*. Yours is an opportunity to penetrate the subject deeply and quickly. However, do not be overconfident; overconfidence may insulate you from the richness of economic reasoning that is contained in a verbal, graphical approach. Our book establishes a solid foundation for mathematical extension in subsequent courses. It will also be useful to students whose first exposure to economics took place in a mathematical context.

All Ph.D. economists need substantial training and intuition in mathematics to participate in the development of new knowledge. Anyone contemplating a career in economics or a related field is well advised to get a solid foundation in math. You have a head start here. But we feel strongly that a graphical and verbal presentation of economics plays an important role in the *sequence* of your courses. Hence we have purposely kept this book at the graphical and verbal level.

### **To All**

It is only a slight exaggeration to say that the only important change in intermediate microeconomics textbooks in recent memory is the addition of applications to the standard presentation of the theory. We agree that applications are an essential learning device and an enormously important component of microeconomics. But all too often the applications found in intermediate texts are better suited for presentation in introductory courses—they simply do not reinforce intermediate theory. We have taken special care to keep our applications at the level of the intermediate theory. Indeed, the opportunity to improve the quality of applications available to teachers and students has been a motivating force in the writing of this text.

We have also made an attempt to update and clarify the presentation of many parts of modern microeconomic theory in order to bring the intermediate student closer to the profession. For example, we have presented the more modern theory of competitive markets, in which the unnecessary assumption of identical firms and its implication of zero long-run profits for all firms is dropped. In monopoly, we start with the single-plant monopolist but quickly extend the theory to a detailed analysis of multiplant monopoly and cartels. In oligopoly, we present the standard analysis of firm interdependence with a unique graphical technique, which also allows



us to study the cheating and instability characteristics of cartels. Monopolistic competition, long the embarrassment of every available text, is made more useful by dropping various fictions about monopolistically competitive firms (such as all firms are identical even while selling differentiated products and entrepreneurs are constantly unaware of the reality of their rivals). Our chapter on monopolistic competition takes a fresh approach that is consistent with themes developed previously in the book. The factor markets receive extensive coverage, with emphasis on labor and capital markets, human capital, and wage differentials. General equilibrium, welfare economics, and externalities are natural extensions of the theory and, as always, are presented graphically.

Hence we present a book with innovations in theory and applications, the preparation of which has been enormously stimulating and a labor of love throughout. We thank Marshall Aronson, John Mahaney, and their capable staffs for their excellent editorial assistance along the way. We are grateful to the following reviewers for their suggestions on the manuscript: Harry E. Frech III, University of California, Santa Barbara; David E. R. Gay, University of Arkansas; Mansanori Hashimoto, University of Washington; Edward R. Kittrell, Northern Illinois University; James Moore, Purdue University; William G. Moss, University of California, Davis; and James B. Ramsey, New York University. Joyce Miezín, our bionic typist, is unexcelled. Thanks also are due to Brian and Suzanne Williams for supervising the editing and production of this book. Words cannot adequately convey our indebtedness to our wives and children for their constant encouragement and endless patience.

Finally, we extend sincere thanks to our many teachers who have helped us appreciate micro theory. Steven Call's greatest debt is to Richard Wirthlin and Dean Rickenbach, who sparked his interest in economics, and to James Witte and Elmus Wicker, whose superior scholarship and masterful teaching fanned the spark to full flame. Bill Holahan is especially grateful to John Prather Brown for demonstrating the wide applicability of the theory as a device for organizing thoughts and to Martin Beckmann for teaching elegant sneak attack problem solving. We gratefully acknowledge our many benefactors who, as teachers, colleagues, students, and historical and contemporary scholars, have molded our thinking and deepened our commitment to economic science.

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# 1 Introduction

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Microeconomics is potentially as interesting as it is important. Modern life and contemporary events make heavy demands upon our resourcefulness in approaching our chief economic problem—scarcity. Formally, economics is the study of how society chooses to allocate its scarce resources among the relatively unlimited wants of society's members. But such a formal definition is sterile and runs the risk of producing a boring textbook. To illuminate the definition, note that economics allows us to study (1) the effect of the OPEC cartel and the Mexican oil reserves on the price of gasoline and oil in the United States; (2) the best way to price products whose demand is irregular, such as electricity and mass transit; (3) how price controls on storable resources such as petroleum can actually *increase* current period supplies, thus obscuring and even exacerbating future shortages; (4) the relative work incentive effects of government programs designed to supplement the wage earnings of poor families, such as wage subsidies and negative income taxes; (5) the role of profit as a means of social control and the means by which the search for profits reduces them; (6) how voluntary trade between persons with identical initial endowments of goods and services can nevertheless cause envy between the trading parties; and (7) the most suitable pricing policies in the control of such externalities as pollution and highway congestion. These examples illustrate some of the exciting areas open to economic research and the wide range of problems to which economic analysis can be applied. We shall study these topics and more as we discuss the modern theory of microeconomics and apply it to important issues.

There are several ways to arrange the activities and components of an economic system. For example, every economy must answer four basic questions: (1) *What* output is to be produced? (2) *How* is the output to be produced? (3) *When* should the output be produced? (4) *For whom* is the output produced? The first three questions refer to *production*, and the fourth is a matter of *distribution* of output among the members of the economy. These are basic activities all viable economic systems must accomplish.

Another way to inventory the functions of an economy states that every economy must (1) *motivate* its members, (2) *coordinate* their activities, and (3) *distribute* the resulting output. In a free-enterprise system, these functions are performed by an interrelated web of components, including the legal system, markets, the government, and a social system made up of the family, church, clubs, and neighborhoods. For every good or service the economy produces, we select not only the quantity produced but also the institution that will produce and distribute it. The relationship between markets and society's other institutions is an important and often neglected aspect of economic inquiry.

Economics is a social science that employs the scientific method in studying the behavior of people in their economic choices. However, these choices are so utterly complex and interrelated that they cannot be understood without a systematic method of simplification. In response to the need to simplify, economists have developed *theories* or *models*, in which simplifying assumptions are made for the purpose of reducing problems to manageable and understandable proportions. A road map is a model of the terrain between cities; it is not the terrain itself. The map is a greatly oversimplified representation of the terrain, yet it contains enough information for the purpose at hand—to help drivers reach their destinations. The economist's analogue of the road map is the array of models employed to simplify real problems. Some of these models are household words, “supply and demand” and “diminishing returns” no doubt leading the list in name recognition.

Models perform several functions. They simplify and summarize relationships and facts, organize thoughts, and generate testable predictions. Thus models aid and guide our learning. It is important to realize that models are useful even if the data to test the models do not exist. We always make decisions based on incomplete information because information is expensive to collect and analyze. Thus because we have no choice, we often use untested models to shape our thinking, organize our thoughts, and aid us in decision making while we wait for the necessary data. No decision is merely a decision not to make a decision, which can be much worse than making decisions based on incomplete information and therefore imperfectly tested theories.

Thus we view microeconomics as a device for organizing our thoughts about and inquiries into economic problems. In the following chapters we will present many applications under the heading “Applied Micro Theory.” Some of these applications are theories that have been tested and measured empirically, but many others suggest ways of tackling particular problems even when the data to