

SECOND EDITION

The Applied Theory of Price

DONALD N. McCLOSKEY

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DEPARTMENT OF ECONOMICS

UNIVERSITY OF IOWA

The
Applied Theory
of Price

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How to Use This Book

You learned to ride a bicycle by trying it out. You tried getting on, starting, turning, stopping. Each of these was a problem. By solving the problems one by one (and crash by crash) you developed the skill. This book teaches economic thinking as a skill like bicycle riding, and it teaches it the way skills are learned: problem solving. Most books in mathematics or chemistry teach the same way. They show you *what* the subject is all about, but their main purpose is to show you *how* to do it.

Most books in history or geography or economics do *not* use the problem-solving approach. It will seem harder to you at first. In a way it is harder: You can't rely on memorizing a bunch of definitions and dates; you have to get inside the skill and make it your own, like shooting a basket or knitting a sweater. In another way it's easier: Once you've caught on, that's it. You don't need refresher courses in riding a bicycle.

The doing is in the problems. In the early chapters the book gives you some advice on how to handle them. Your instructor can give you more. Try to give yourself advice, too, noticing when and how you cracked a problem. Being your own coach in this way is good practice for mastering other sorts of mental skills.

The chapters themselves have worked problems in the text, which will teach you "how." The "what" points that you have to know about microeconomics are explained in the chapter and highlighted in the What to Read For paragraphs at the beginning of each section.

The graphs play a big role in learning to think economics. Don't skip them. You should try to become fluent in the graphs and in the words treating each idea. The two are like two languages. It's sometimes easier to grasp an idea in one than in the other (and the easiness varies from one person to another: Some people have visual intelligence, others verbal).

Each graph has a full caption, which repeats the idea in different words than those in the text. It's a second chance to grasp it.

The diagrams have been carefully drawn with certain conventions to make

them easier. Lines and points are usually named instead of lettered, so you have another chance to get the idea but do not have to remember things like “locus QWerTy.” Thick lines and heavy points are the really important ones; the thin and light ones have supporting roles. Curved labeling lines refer to lines, straight labeling lines to points. When the names of lines and points are referred to in the text they appear in a different typeface, such as this: The Budget Line. Imagine that your instructor is pointing to these terms on a diagram when you encounter them in the text.

At the end of each section are Exercises. These are limited and direct, meant to review your understanding of the material in the section. There are plenty of them, and the odd numbers are answered at the end of the book. You’re not coaching yourself very intelligently, of course, if you look at the answers before trying to get them on your own.

After the Exercises are Problems, which will strike you at first as more vague and difficult. The world is vague and difficult, and the point is to ride the bicycle eventually in the world, not always on the practice track. Selected problems are also answered at the back of the book. These problems are identified in the text by a small circle beside the problem. Use these selected answers as models of how to think about the next problem.

The Study Guide, written by my collaborator Joel Scheraga, is an invaluable aid. It gives answers to the What to Read For questions, gives objective review questions, and provides additional help in problem solving. It contains hundreds of additional problems, many out of today’s newspaper.

Preface

The main feature of this text on the theory of price is its numerous examples and its approximately 1000 worked problems. While showing the student the form of economics, the examples and problems stress throughout the way an economist uses form to think about substance.

The revisions in the second edition make the approach still more accessible to students. Though it is essentially the same book, the prose has been simplified. Exercises of a straightforward sort have been added and the problems simplified. There are more step-by-step numerical problems, and each section now begins with a piece on what to read for (questions of a general nature that the section answers). Like clean air, space is scarce, so these additions required some cuts, but the basic emphasis on problem solving remains.

The motivation for this approach is clear. A college graduate in engineering can predict that a badly designed bridge will fall down, and why; a college graduate in chemistry can predict that a badly designed compound will blow up, and why. College graduates in economics should be able to predict that a badly designed tax on gasoline will hurt society, and why, but too often they cannot. Our students understand the derivation of demand curves from choice-theoretic axioms, the symmetry of consumption and production theory, the role of prices in a market economy, and many other things, but too often they do not know how to apply them and have no idea how to find out. They know the formalities but not the substance of economics.

Whatever the purpose of a course in price theory—whether it is meant to produce informed citizens, clever economic actors, educated graduates, useful social engineers, or creative economic scientists—it should give the student more than the formalities. Problem solving does this. A lesson on externalities can take the form of an abstract essay: “Define ‘externality’ and translate it into concise mathematical form.” Alternatively, it can take the form of a concrete problem: “Is it true or false that because California is beautiful and has many magnificent public parks it is likely from the economic point of view to be overpopulated?” Students (and, I can say for myself, teachers) do not understand

economics until they have faced and answered problems applying it. In fact, without this practice they hardly recognize the economics: a problem is a way of saying "Note well." Textbooks in economics so far have told *about* economics. This one tells about but also tells *how*.

The "about" book is good in its place, toward the end of an economic education rather than toward its beginning. After one knows the flesh and blood of economics, the exposure of the logical skeleton comes as a wonderful discovery. Someone who thinks of Stefano Fenoaltea the consumer, of the Ford Motor Company, and of the southern textile industry as bits of marginal analysis and then is presented with one of the many books translating and extending Samuelson's *Foundations of Economic Analysis* for the common reader has an experience of intellectual delight. The generation of Samuelson himself, which is responsible for the style of the current texts, was educated originally in an older, more applied economics and had the delightful experience of discovering its general principles. "Bliss was it in that dawn to be alive, / But to be young [and trained in engineering mathematics] was very heaven!"

The attempt to have our students leap directly to heaven, however, has been a mistake. These days a book in microeconomics cannot contain a single derivative, or even very many equations, yet send the message that the form of economics is its scientific substance. The students learn economic calculus before they learn to reason economically, and their capacity for reasoning is permanently damaged. The point is not to banish formal training from economics but to place it at the right stage of the educational process.

The idea of using hundreds of practical problems to transmit a skill is a commonplace in other fields. My college textbook in calculus, and no doubt yours, was jammed with problems, more than half of them answered; my chemistry text was similarly structured. Reading about applications of a theory is a step in the right direction; the completed voyage is to apply the theory oneself. An economist can hardly maintain—with due respect to Leontief—that economic understanding is produced by a unique recipe calling for large amounts of problem solving in fixed proportions. The production function is doubtless neoclassical to the extent of permitting substitutions. The hypothesis suggested by the experience of other fields, however, is that the ratio of problem solving to other techniques in teaching economics is at present inefficiently low.

The other features of the book are pedagogic implications of this hypothesis. The test of utility in problem solving alters the standard list of topics a little, chiefly in order and emphasis. The treatment of supply and demand is unusually extensive because supply and demand is unusually useful: the book returns to it repeatedly, each time with new sophistication in using it. The analysis of two-factor production functions has been deemphasized in the theory of the firm and the industry, where it would only slow down the story, and emphasized in the theory of marginal productivity and the demand for factors of production, where it *is* the story. The Condorcet-Arrow paradox and similar issues in political economy are treated not as a puzzling addendum but are in the middle of a chapter on welfare economics, itself in the middle of the book, as a step in the development of national income as a measure of welfare. Giving measurable utility and risk a full treatment and locating it with ordinal indifference curves early in the book, instead of back in a section of special topics, recognizes its growing importance in economics and its many applications. Consumers' and producers' surpluses get an uncommonly full treatment as well, because they

link the welfare economics of national income, index numbers, and general equilibrium to supply and demand. Applied welfare economics is emphasized throughout the book because it motivates the behavioral theories, such as marginal productivity. The novelties of mathematical coverage are purposely few; these are included for their uses rather than their beauty.

When a piece of analysis is not useful, it is not included, whatever the tradition of textbooks has been. Viner's analysis of cost curves, for example, is well beloved but in its traditional form is not worth the fat chapter usually devoted to it. It appears in this text in a nontraditional form that highlights its usefulness. A younger tradition favors a section on linear programming, but the payoff in economic insight is too small, given the level of mathematical and economic sophistication of advanced undergraduates or first-year graduates, to warrant the large investment of pages necessary to do it well. Monopolistic competition is treated thoroughly but only in the locational context in which it has proven its utility. The kinky oligopoly demand curve is a poor example of discontinuities in marginal revenue and appears to be wrong besides. Every topic must meet such tests of cost and benefit in making the student into a problem solver.

Certain mechanical features of the book contribute to the teaching by problem and answer. The questions in the text are answered fully, as models for answering the questions that conclude many of the sections. These answers are given in the *Instructor's Manual*, which also contains a large number of fresh problems. The summaries at the end of each section will help the student to keep sight of the essential formal skeleton to which the problems are attached.

Each point is explained in as many ways as possible—verbally, mathematically, and diagrammatically. The book is particularly full of verbal explanation of the most important points and has double the usual number of diagrams. The diagrams have self-explanatory titles, and points and lines within them are named rather than symbolized. Each diagram has a full explanatory caption (prepared for the most part by John Martin) written to follow the argument but not the wording of the text. The knowledge most worth having in economics is elusive and bears repetition.

The novelty of a problem-solving approach to price theory requires little adjustment in the teacher's routine. The big change will be in what happens in the student's study, not in the teacher's class. The *Instructor's Manual* contains suggestions for the classroom. The teacher may wish to allocate less time to the less useful pieces of price theory and more to the more useful or lecture a little more on formal principle and a little less on applications, although the many applications in the book may well suggest still more. Above all, the teacher may wish to assign problem sets.

The Applied Theory of Price fits the standard courses in intermediate price theory. The student is supposed to have had an introductory course in economics, most of which has been forgotten over the summer, and no mathematics beyond high school. Since students of intermediate economics can be expected to be taking a calculus course (in which they will acquire some mathematical sophistication as well as the techniques of differentiation), the mathematical level in the book rises gradually, though calculus is limited to the chapter appendixes. For a single-term course for college juniors who have had the usual basic economics course, and that at a fairly elementary level, the core chapters will be ample, constituting a short book:

Chapter 1	The Budget Line
Chapter 2	The Consumer's Choice
Chapter 5	Trade
Chapter 6	Using Market Supply and Demand (Sections 6.1 and 6.2)
Chapter 7	Measuring Supply and Demand (Section 7.1)
Chapter 8	Production Possibilities (Sections 8.1 and 8.3)
Chapter 10	Consumers' Surplus (Section 10.1)
Chapter 11	The Firm (Sections 11.1, 11.2, and 11.3)
Chapter 12	Cost Curves of the Firm
Chapter 13	Competitive Industry (Section 13.1)
Chapter 14	The Long-Run Supply Curve and the Principle of Entry
Chapter 16	Competition for Property Rights (Section 16.1)
Chapter 17	The Behavior of Monopoly
Chapter 19	The Welfare Economics of Monopoly
Chapter 22	Marginal Productivity and the Demand for Labor: The Fundamentals
Chapter 25	The Supply of Labor (Section 25.1)
Chapter 26	Capital's Supply and Demand (Section 26.1)

A still shorter course, aiming only at a thorough grasp of supply and demand (a noble and sufficient aim, it should be said), might thin out the later chapters in the list. For the year-long course in microeconomics for undergraduates that ought to become the standard, the whole book can be worked through methodically.

For very well prepared college juniors and MBA students, the whole book can be swallowed in a term without indigestion. I have used it on such audiences for many years with success, finding that in a very selective college even sophomores in their first economics course can digest most of it. We underestimate how much students can learn in three or four months if they are simply required to do so and face up to the requirement: look what the first course in college calculus or chemistry demands and gets from them.

For first-year students of graduate economics the book is useful as a refresher and foundation. I would like to see this book (or the others like it that will follow, if the principle of entry is true!) put in the hands of every one of them for their first month or so of graduate school. It is my experience, and probably yours, that even in highly selective graduate programs the students are weak in the bread and butter of economic thinking. Let them eat cake in December.

The book is tough, but so is life, and economics. We do our students a disservice if we pretend that economics is easy, to be learned by the rote methods with which so many bright and hardworking students conquered high school. Economics is not a list of terms but a way of thinking. If we can get this across to the students we will have at least given them the first part of knowledge, the knowledge that there is a great deal to know. And if the book is harder than most in some ways, it is easier in others. The students must try to identify with the economic actors in the problems; but they are burdened less with abstractions about the marginal rate of indifferent substitution. We must ask what the usual micro course is for, and how we would measure its success. Success is economic thoughtfulness; problem solving is how we all achieved it. It's time we let our students in on the secret. The payoff will be students who see the social world

as a thing of opportunity cost, marginal benefit, competition, collusion, equilibrium, search, ownership, maximization, entry, and scarcity; that is, students who think like economists. And that, we can agree, is a fine thing.

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In the summer of 1975 Gilbert Ghez of Roosevelt University and I decided to write this book. After putting in much work, he decided that the opportunity cost of text writing was too high, but his contribution was important. My other debts, specific and general, run as follows. At various times Alyce Monroe, Linda Freeman, Tricia Pate, Marye Allen, and Marguerite Knoedel have typed order out of chaos. Anthony English, Charles Place, Chip Price, Eileen Schlesinger, and Robert Hunter, my editors at Macmillan, have been patient and encouraging far beyond the call of profit. Together they illustrate the paradoxical economic theme that capitalism can be altruistic, or perhaps that altruists can be capitalists. My students at Chicago and Iowa in courses on price theory since 1968 have forced me to think clearly and have laughed at my jokes. John Komlos, Moonie Lavi, Bruce Lehmann, Fred Lindahl, Shumeet Banerji, Gundar Kaupins, and David Arens favored me with written comments, but I am uneasily aware that I have lost track of many others whose comments, written and verbal, mattered, too. I want them to tell me so that I can make amends later. Bart Taub, Kevin O'Meara, and especially John Martin made unusual contributions to the book as teaching assistants in courses—all three contributed greatly to the stock of problems, and Martin did the captions for many of the diagrams and numerous other editorial tasks with high intelligence and good taste. But again I fear that my faulty memory is not recalling every name it should. I shall not forget Gary Hawke for his detailed and encouraging comments. Many users have commented on the first edition, among them Ronald Johnson, Byron Boulier, David Vrooman, Fred Carstensen, Lin Lindert, Eric Gustafson, Frederick Harris, and Joel Mokyr. Joel Scheraga of Rutgers did an astonishingly good job in helping me revise the second edition, and in writing the Student Workbook.

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D. N. M.

About the Author Donald N. McCloskey is Professor of Economics and History at the University of Iowa. He received his B.A. and Ph.D. from Harvard. Previous to joining the University of Iowa in 1981, he was a member of the faculty at the University of Chicago for 12 years, teaching introductory economics, graduate price theory, and British economic history. He has been a visiting professor at Stanford University, the University of London, York University, and the Australian National University, and has held senior fellowships from the National Science Foundation, the National Endowment for the Humanities, the Guggenheim Foundation, and the Institute for Advanced Study. He has written three books on economic history and economic method, edited or compiled three more, and contributed dozens of articles to professional journals. Presently he is editor of the *Journal of Economic History*, and his current research interests include the rhetoric of economics and the history of the market.

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Introduction

You have just embarked on the study of the theory of price, known also as *microeconomics*, the science of markets. Although its Greek meaning is “small housekeeping,” microeconomics is not the little or trivial portion of economics. On the contrary, it comes close to being the whole. It is essential for an understanding beyond the first course. Not all fields of economics are based on microeconomics, but all strive to be: Most of the lasting advances in economic thinking over the past century or so have consisted of reducing one or another piece of economic behavior to microeconomics. What, then, is this craft or sullen art? Put briefly, it is the understanding of maximization and markets. It is one of the great products of the human mind.

You wouldn't know it from the image of economists as a confused mob of social forecasters. You may have heard of disagreements among economists—that if all economists in the world were placed end to end they wouldn't reach a conclusion; that if ten economists went into a conference room they would come out with eleven different opinions. Ha, ha. Very funny. The truth is that when economists disagree it is commonly about *macroeconomics*—the study of inflation and unemployment—not about the subject of this book, *microeconomics*—the study of markets. Similarly, astronomers disagree about the age of the universe or the way galaxies are formed, yet agree about why stars burn or why the moon's orbit is elliptical. As you might expect, a sample survey of economists found “more consensus about micro issues than macro issues.”¹

The astronomers are spared a further source of disagreement: Economic questions are often moral as well as factual. Should we support milk prices? Should the income tax be made strictly proportional to income? Should we restrict immigration from Mexico? These involve issues of morality as well as of fact. A moral issue is whether it is good to keep poor Mexicans from bettering their lot by coming to the United States; a factual issue is how immigration affects

¹ See J. R. Kearn, Clayne L. Pope, Gordon T. Whiting, and Larry T. Wimmer, “A Confusion of Economists?” *American Economic Review* 69 (May 1979): 33.