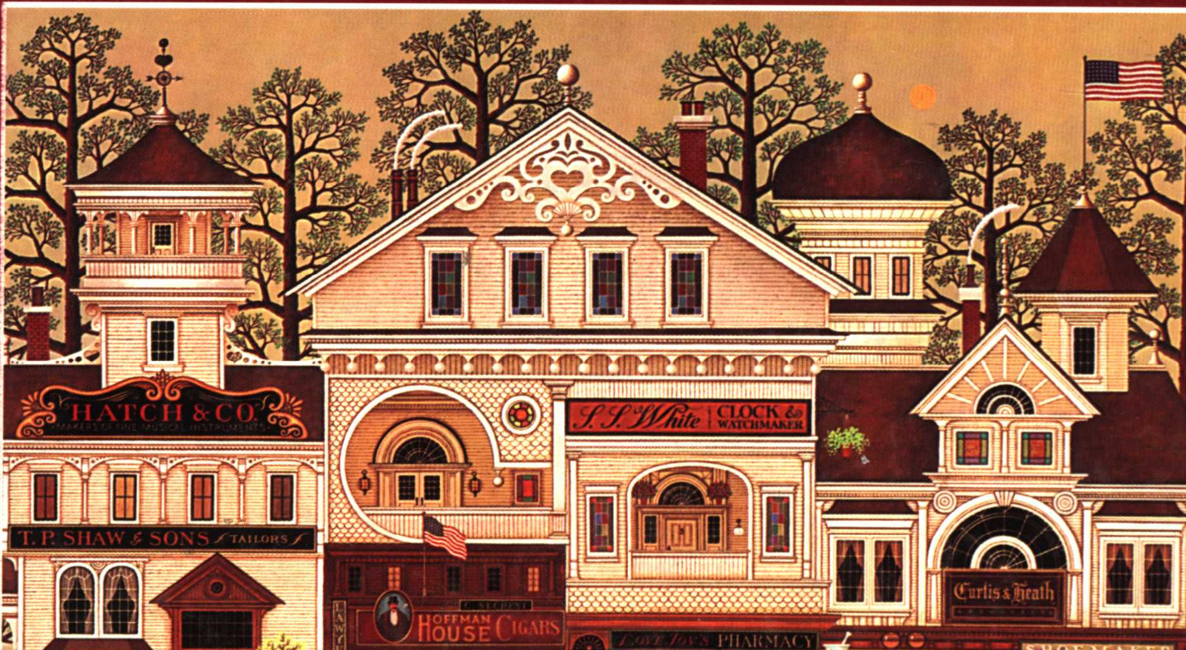
THIRD EDITION

PRICE THEORY AND APPLICATIONS



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Price Theory and Applications

THIRD EDITION

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Preface

Price theory is a challenging and rewarding subject. The student who masters price theory acquires a powerful tool for understanding a remarkable range of social phenomena. It illuminates questions about which students are naturally curious. How does a sales tax affect the price of coffee? Why do people trade? What happens to ticket prices when a baseball player gets a raise? How does free agency affect the allocation of baseball players to teams? Why might the revenue of orange growers increase when there is an unexpected frost—and what may we infer about the existence of monopoly power if it does?

Price theory teaches the student how to solve similar puzzles. Better yet, it poses new ones. Students learn to be intrigued by phenomena they might previously have considered unremarkable. When rock concerts predictably sell out in advance, why don't the promoters raise prices? Why are bank buildings fancier than supermarkets? Why do ski resorts sell lift tickets on a per-day basis rather than a per-ride basis?

Throughout this book, such questions are used to motivate a careful and rigorous development of microeconomic theory. New concepts are immediately illustrated with entertaining and informative examples, both verbal and numerical. Ideas and techniques are allowed to arise naturally in the discussion, and they are given names (like "marginal rate of substitution") only after the student has discovered their usefulness. Students are encouraged to develop a strong economic intuition and then to test their intuition by submitting it to rigorous graphical and verbal analysis.

I think that students will find this book inviting. There are no mathematical demands nor prerequisites and no lists of axioms to memorize. At the same time, the level of economic rigor and sophistication is quite high. In many cases, I have carried analysis beyond what is found in most other books at this level. There are digressions, examples, and especially problems that will challenge even the most ambitious and talented students.

To the Student

Many books begin by telling you, at some length, what price theory is. This book begins by showing you. When you finish the first chapter, you will know how to analyze the effects of sales and excise taxes, and you will have discovered the surprising result that a tax on buyers and a tax on sellers have exactly the same effects. When you finish the second chapter, you will understand why oranges, on average, taste better in New York than in Florida. In each succeeding chapter, you will be exposed to new ideas in economics and to their surprising consequences for the world around you.

To learn what price theory is, dig in and begin reading. The next few paragraphs give you a hint of what it's all about.

Price theory, or *microeconomics,* is the study of the ways in which individuals and firms make choices, and the ways in which these choices interact with each other. We assume that individuals have certain well-defined preferences and limits to their behavior. For example, you might enjoy eating both cake and ice cream, but the size of your stomach limits your ability to pursue these pleasures; moreover, the amount of cake that you eat affects the amount of ice cream you can eat and vice versa.

In predicting behavior, we assume that individuals behave *rationally,* which is to say that they make themselves as well-off as possible, as measured by their own preferences, and within the limitations imposed on them. While this assumption (like any assumption in any science) is only an approximation to reality, it is an extraordinarily powerful one, and it leads to many profound and surprising conclusions.

Price theory is made richer by the fact that each individual's choices can affect the opportunities available to others. If you decide to eat all of the cake, your roommate cannot decide to eat some too. An *equilibrium* is an outcome in which each person's behavior is compatible with the restrictions imposed by everybody else's behavior. In many situations, it is possible to say both that there is only one possible equilibrium and that there are good reasons to expect that equilibrium to actually come about. This enables the economist to make predictions about the world.

Thus, price theory is most often concerned with two sorts of questions: those that are **positive** and those that are **normative.** A positive question is a question about what *is* or *will be,* whereas a normative question is a question about what *ought* to be. Positive questions have definite, correct answers (which may or may not be known), whereas the answers to normative questions depend on values. For example, suppose that a law is proposed that would prohibit any bank from foreclosing on any farmer's mortgage. Some positive questions are: How will this law affect the incomes of bankers? How will it affect the incomes of farmers? What effect will it have on the number of people who decide to become farmers and on the number of people who decide to start banks? Will it indirectly affect the average size of farms or of banks? Will it indirectly affect the price of land? How will it affect the price of food and the well-being of people who are neither farmers nor bankers? And so forth. A normative question is: Is this law, on balance, a good thing?

Economics can, at least in principle, provide answers to the positive questions. Economics by itself can never answer a normative question; in this case your answer to the normative question must depend on how you feel about the relative merits of helping farmers and helping bankers.

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Therefore, we will be concerned in this book primarily with positive questions. However, price theory is relevant in the consideration of normative questions as well. This is so in two ways. First, even if you are quite sure of your own values, it is often impossible to decide whether you consider some course of action desirable unless you know its consequences. Your decision about whether to support the antiforeclosure law will depend not only on your feelings about farmers and bankers, but also on what effects you believe the law will have. Thus, it can be important to study positive questions even when the questions of ultimate interest are normative ones.

For another example, suppose that you have decided to start recycling newspapers to help preserve large forests. One of your friends tells you that in fact recycling leads to *smaller* forests because it lowers the demand for trees and induces paper companies to do less planting. Whether or not your friend is correct is a positive question. You might want the answer to that positive question before returning to the normative question: Should I continue to recycle?

The second way in which price theory can assist us in thinking about normative questions is by showing us the consequences of consistently applying a given normative criterion. For example, if your criterion is "I am always for anything that will benefit farmers, provided that it does not drive any bankers out of business," the price theorist might be able to respond, "In that case, you must support such-and-such a law, because I can use economic reasoning to show that such-and-such a law will indeed benefit farmers without driving any bankers out of business." If such-and-such a law does not sound like a good idea to you, you might want to rethink your normative criterion.

In the first seven chapters of this book, you will receive a thorough grounding in the positive aspects of price theory. You will learn how consumers make decisions, how firms make decisions, and how these decisions interact in the competitive marketplace. In Chapter 8, you will examine the desirability of these outcomes from the viewpoints of various normative criteria. Chapter 9 rounds out the discussion of the competitive price system by examining the role of prices as conveyors of information.

In Chapters 10 through 14, you will learn about various situations in which the competitive model does not fully apply. These include conditions of monopoly and oligopoly, and circumstances in which the activities of one person or firm affect others involuntarily (for example, factories create pollution that their neighbors must breathe).

The first 14 chapters complete the discussion of the market for goods, which are supplied by firms and purchased by individuals. In Chapters 15 through 17 you will learn about the other side of the economy: The market for inputs to the production process (such as labor) that are supplied by individuals and purchased by firms. In Chapter 17, you will study the market for the productive input called *capital* and examine the way that individuals allocate goods across time, consuming less on one day so that they can consume more on another.

Chapter 18 concerns a special topic: the role of risk.

Chapter 19 provides an overview of what economics in general, and price theory in particular, is all about. Most of the discussion in that final chapter could have been included here. However, we believe that the discussion will be more meaningful *after* you have seen some examples of price theory in action, rather than before. Therefore, we make the following suggestion: Dip into Chapter 19. Not all of it will make sense at this point, but much of it will. After you have been through a few chapters of the book, dip into Chapter 19 again. Even the parts you understood the first time will be more meaningful now. Later on—say, after you have finished Chapter 7—try it yet again. You will get the most from the final chapter if you read it one last time, thoroughly, at the end of the course.

Using This Book

This book provides many tools to help you learn. Here are a few hints on how to use them.

Exhibits

Most of the exhibits have extensive explanatory captions that summarize key points from the discussion in the text.

Exercises

Exercises are sprinkled throughout the text and, with a few exceptions (marked with two square bullets), they are routine. They are intended to slow you down and make sure that you understand one paragraph before going on to the next. If you cannot do an exercise quickly and accurately, you have probably missed an important point. In that case, it is wise to pause and reread the preceding few paragraphs. Answers to all of the exercises are provided in Appendix B at the back of the book.

Dangerous Curves

The dangerous curve symbol appears periodically to warn you against the most common misunderstandings. Passages marked with this symbol describe mistakes that students and theorists often make and explain how to avoid them. ◆

Marginal Glossary

Each new term is defined both in the text (in bold) and in the margin, where you can easily find it. All of the definitions in the marginal glossary are gathered in alphabetical order in the Glossary at the back of the book.

Chapter Summaries

The summaries at the end of each chapter provide concise descriptions of the main ideas. You will find them useful in organizing your studying.

Review Questions

The Review Questions at the end of each chapter test to see whether you have learned and can repeat the main ideas of the chapter.

Numerical Exercises

About half of the chapters have Numerical Exercises at the end. By working these, you apply economic theory to data to make precise predictions. For example, at the end of Chapter 7, you are given some information about the costs of producing kites and the demand for kites. Using this and the theory that you have learned, you will be able to deduce the price of kites, the number of kites sold by each firm, and the number of firms in the industry.

Problem Sets

The extensive Problem Sets at the end of each chapter occupy a wide range of difficulty. Some are quite straightforward. Others are challenging and open-ended and give you the opportunity to think deeply and creatively. A few of the most difficult are labeled "hard problems."

Often, problems require additional assumptions that are not explicitly stated. Learning to make additional assumptions is a large part of learning to do economics. In some cases there will be more than one correct answer, depending on what assumptions you made. Thus, in answering problems you should always spell out your reasoning very carefully. This is particularly so of "true or false" problems, where the quality of your explanations will usually matter far more than your conclusion.

About one third of the problems are discussed in Appendix C at the end of the book; answers are provided for the Problem Set questions where the number appears in color. The discussions in Appendix C range from hints to complete answers. In many cases, the answer section lists only conclusions without the reasoning necessary to support them; your instructor will probably require you to provide that reasoning.

If your instructor allows it, you will learn a lot by working on problems together with your classmates. You may find that you and they have different answers to the same problem, and that both you and they are equally sure of your answers. In attempting to convince each other, and in trying to pinpoint the spot at which your thinking diverged, you will be forced to clarify your ideas and you will discover which concepts you need to study further.

Now you are ready to begin.

To the Instructor

In addition to what has been said above, you will want to know some details about the content of this book. If you are familiar with earlier editions, you will find that the general structure is very much as it was before. On a "micro" level, I improved the exposition here and there, updated many examples, and expanded the Problem Sets. On a "macro" level, a major innovation is the inclusion of an entirely new chapter on game theory.

As in earlier editions, all of the standard topics of intermediate price theory are covered. I retained all of the book's unique features, of which the following are the most important:

The Use of Social Welfare (via Triangles of Consumers' and Producers' Surplus) as a Unifying Concept

Consumers' and producers' surplus are introduced in Chapter 8, immediately following the theory of the competitive industry. There, they are used to analyze the effects of various forms of market interference. Thereafter, most new concepts are related to social welfare and analyzed in this light.

The Economics of Information

Chapter 9 (Knowledge and Information) surveys the key role of prices in disseminating information and relates this to their key role in equilibrating markets. Section 9.1 emphasizes the price system's remarkable success in this regard while Section 9.3 surveys some of its equally remarkable failures. Section 9.2 studies information in financial markets.

Treatment of the Theory of the Firm

It is often difficult for students to understand the importance of production functions, average cost curves, and the like until after they have been asked to study them for several weeks. To remedy this, Chapter 5 (The Behavior of Firms) provides an overview of how firms make decisions, introducing the general principle of equating marginal costs with marginal benefits and relating this principle back to the consumer theory that the student has just learned. Having seen the importance of cost curves, students may be more motivated to study their derivation in Chapter 6 (Production and Costs).

The material on firms is presented in a manner that gives a lot of flexibility to the instructor. Those who prefer the more traditional approach of starting immediately with production can easily skip Chapter 5 or postpone it until after Chapter 6. Chapter 6 itself has been extensively reorganized for this edition, to rigorously separate the short-run theory (in Section 6.1) from the long-run theory (in Section 6.2). Relations between the short and the long run are thoroughly explored in Section 6.3. Instructors who want to defer the more difficult topic of long-run production will find it easy to simply cover Section 6.1 and then move directly on to Chapter 7.

An Extended Analysis of Market Failures, Property Rights, and Rules of Law

This is the material of Chapter 13, which I have found to be very popular with students. The theory of externalities is developed in great detail, using a series of extended examples and illustrated with actual court cases. Section 13.4 (The Law and Economics) analyzes various legal theories from the point of view of economic efficiency.

Relationships to Macroeconomics

The topic coverage provides a solid preparation for a rigorous course in macroeconomics. In addition, several purely "micro" topics are illustrated with "macro" applications. (None of these applications is central to the book, and all can be easily skipped by instructors who wish to do so.) There are sections on information, intertemporal decision making, labor markets in general equilibrium, and rational expectations. In the chapter on interest rates, there is a purely microeconomic analysis of the effects of federal deficits, including Ricardian Equivalence, the hypotheses necessary for it to hold, and the consequences of relaxing these hypotheses. (This material has been extensively rewritten and simplified for this edition.) The section on rational expectations, in Chapter 18, is presented in the context of a purely micro problem, involving agricultural prices, but it includes a discussion of "why economists make wrong predictions" with a moral that applies to macroeconomics.

Other Nontraditional Topics

There are extensive sections devoted to topics excluded from many standard intermediate textbooks. Among these are alternative normative criteria, efficient asset markets, contestable markets, antitrust law, mechanisms for eliciting private information about the demand for public goods, human capital (including the external effects of human capital accumulation), the role of increasing returns in economic growth, the Capital Asset Pricing Model, and the pricing of stock options. The book concludes with a chapter on the methods and scope of economic analysis (titled What Is Economics?), with examples drawn from biology, sociology, and history.

Supplements

The *Instructor's Manual* contains the following features in each chapter: general discussion, teaching suggestions, suggested additional problems, and solutions to all of the end-of-chapter problems in the textbook.

The *Testbank*, prepared by William Weber, Eastern Illinois University, offers True/False questions, multiple-choice questions, and essay questions for each chapter. This is an entirely new testbank prepared for this edition.

The *Study Guide*, prepared by William Weber, Eastern Illinois University, has chapters that correspond to the textbook. Each chapter contains key terms, key ideas, completion exercises, graphical analyses, multiple-choice questions, questions for review, and problems for analysis. All artwork in the text is reprinted in the *Study Guide*, with ample space to take notes during classroom discussion.

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Acknowledgments

I first learned economics at the University of Chicago in the 1970s, which means that I learned most of it, directly or indirectly, from Don McCloskey. Generations of Chicago graduate students were infected by his enthusiasm for economics as a tool for understanding the world, and the members of one generation communicated their exuberance to me. They, and consequently I, learned from Don that the world is full of puzzles—not the abstract or technical puzzles of formal economic theory, but puzzles like: Could the advent of free public education cause less education to be consumed? We learned to see puzzles everywhere and to delight in their solutions. Later, I had the privilege to know Don as a friend, a colleague, and the greatest of my teachers. Without him, this book would not exist.

The exuberance that Don personifies is endemic at Chicago, and I had the great good fortune to encounter it every day. I absorbed ideas and garnered examples in cafeterias, the library's coffee lounge, and especially in all-night seminars at Jimmy's Woodlawn Tap. Many of those ideas and examples appear in this book, their exact sources long forgotten. To all who contributed, thank you.

Among the many Chicago students who deserve explicit mention are Craig Hakkio, Eric Hirschhorn, and Maury Wolff, who were there from the beginning. John Martin and Russell Roberts taught me much and contributed many valuable suggestions specifically for this book. Ken Judd gave me a theory of executive compensation. Dan Gressell taught me the two ways to get a chicken to lay more eggs.

I received further education, and much encouragement, from the Chicago faculty. I thank Gary Becker, who enticed me to think more seriously about economics; Sherwin Rosen, who had planted the seeds of all this years before; and José Scheinkman, who listened to my ideas even when they were foolish. Above all, Bob Lucas can have no idea of how grateful I have been for his many gracious kindnesses. I remember them all, and value his generosity as I value the inspiration of his intellectual depth, honesty, and rigor.

Since leaving Chicago, my good fortune in colleagues followed me to Iowa and Cornell, and especially to Rochester, where this book was written. There is no faculty member in economics at Rochester who did not contribute to this book in one way or another. Some suggested examples and problems; others helped me learn material that I had thought I understood until I tried to write about it; and many did both. I should name them all, but have space for only a few. William Thomson taught me about mechanisms for revealing the demand for public goods and suggested that they belonged in a book at this

level. Walter Oi contributed more entertaining ideas and illustrations than I can remember and told me how Chinese bargemen were paid. Alan Stockman and Ken McLaughlin come in for special mention. Alan has been teaching me both economics and the joys of economics for almost fifteen years; when I first met Ken he crammed fifteen years of teaching into two.

I must also mention the contributions of the daily lunch group at the Hillside Restaurant, where no subject is off limits and no opinion too outrageous for consideration. The daily discussions about how society is or should be structured were punctuated by numerous tangential discussions of how various ideas could best be presented in an intermediate textbook. I thank especially Stockman, McLaughlin, Mark Bils, John Boyd, Jim Kahn, Marvin Goodfriend (the first inductee into the Hillside Hall of Fame), and various part-time members.

Lauren Feinstone should have been mentioned in nearly all of the above categories, as a Chicago student, a Rochester faculty member, and a sometime Hillsider. She taught me how to think about Ricardian Equivalence and told me the best way to present it to students. For that, I thank her here. For so much more, no words can be enough.

Harold Winter's extensive written criticism of Chapter 11 led to substantial improvements. Wendy Betts gave me the epigram for Section 9.3.

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I am especially pleased that this new edition of *Price Theory and Applications* is being published by acquiring editor Sharon Adams and the production staff of West Publishing Company. I am confident that West will provide excellent services to users and potential users. I expect that long-time users will notice and appreciate that change more than any other.

Steven E. Landsburg

Brief Contents

Contents

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