

PRINCIPLES OF MICROECONOMICS

SECOND EDITION



ROBERT H. FRANK
BEN S. BERNANKE



PRINCIPLES OF MICRO- ECONOMICS

SECOND EDITION

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Cover: Leaded glass window designed by Frank Lloyd Wright for the Dave Thomas House, Springfield, Illinois, circa 1904, 61 cm x 97.5 cm

Photo: Doug Carr, Springfield, Illinois

Design of book: The images in the design of this book are based on elements of the architecture of Frank Lloyd Wright, specifically from the leaded glass windows seen in many of his houses. Wright's design was rooted in nature and based on simplicity and harmony. His windows use elemental geometry to abstract natural forms, complementing and framing the natural world outside. This concept of seeing the world through an elegantly structured framework ties in nicely to the idea of framing one's view of the world through the window of economics.

The typeface used for some of the elements was taken from the Arts and Crafts movement. The typeface, as well as the color palette, bring in the feeling of that movement in a way that complements the geometric elements of Wright's windows. The Economic Naturalist icon is visually set apart from the more geometric elements but is a representation of the inspirational force behind all of Wright's work.

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DEDICATION

For Ellen

R. H. F.

For Anna

B. S. B.

ABOUT THE AUTHORS

ROBERT H. FRANK

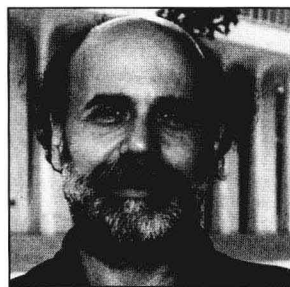


Professor Frank received his B.S. from Georgia Tech in 1966, then taught math and science for two years as a Peace Corps volunteer in rural Nepal. He received his M.A. in statistics and his Ph.D. in economics in 1972 from the University of California at Berkeley. He is the H. J. Louis Professor of Eco-

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Professor Frank is the author of a best-selling intermediate economics textbook—*Microeconomics and Behavior*, Fifth Edition (McGraw-Hill/Irwin, 2003). He has published on a variety of subjects, including price and wage discrimination, public utility pricing, the measurement of unemployment spell lengths, and the distributional consequences of direct foreign investment. His research has focused on rivalry and cooperation in economic and social behavior. His books on these themes include *Choosing the Right Pond: Human Behavior and the Quest for Status* (Oxford University Press, 1985) and *Passions Within Reason: The Strategic Role of the Emotions* (W.W. Norton, 1988). He and Philip Cook are coauthors of *The Winner-Take-All Society* (The Free Press, 1995), which received a Critic's Choice Award and appeared on both the *New York Times* Notable Books list and the *Business Week* Ten Best list for 1995. His most recent general-interest publication, *Luxury Fever* (The Free Press, 1999), was named to the Knight-Ridder Best Books list for 1999. He was awarded an Andrew W. Mellon Professorship (1987–1990), a Kenan Enterprise Award (1993), and a Merrill Scholars Program Outstanding Educator Citation (1991). Professor Frank's introductory microeconomics course has graduated more than 5,000 enthusiastic economic naturalists over the years.

BEN S. BERNANKE

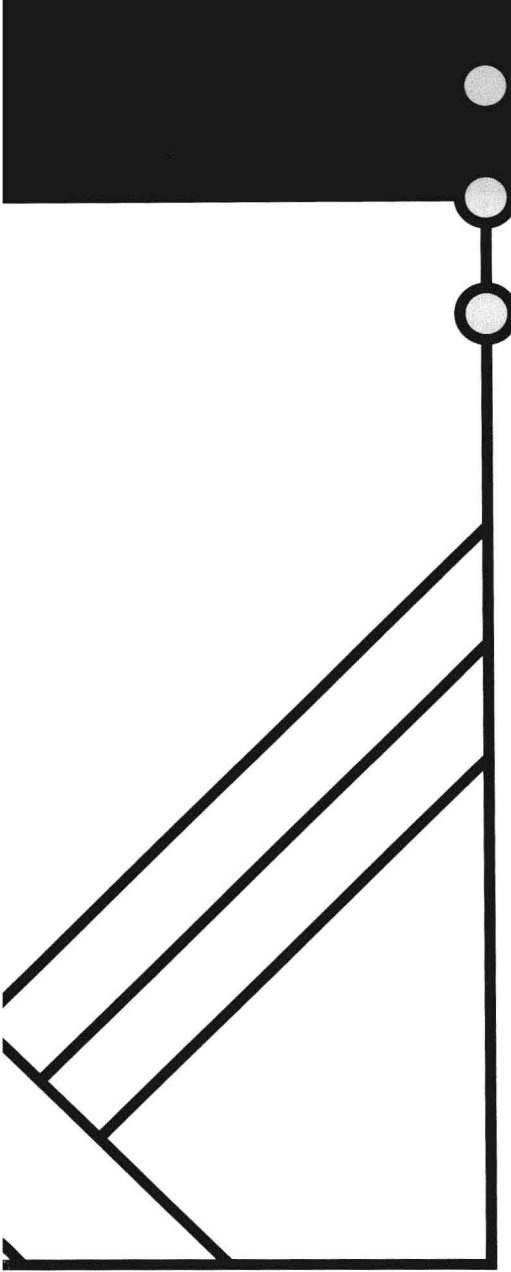


Professor Bernanke received his B.A. in economics from Harvard University in 1975 and his Ph.D. in economics from MIT in 1979. He taught at the Stanford Graduate School of Business from 1979 to 1985 and moved to Princeton University in 1985, where he is the Howard Harrison and Gabrielle Snyder

Beck Professor of Economics and Public Affairs, and where he served as Chairman of the Economics Department. He has consulted for the Board of Governors of the European Central Bank and other central banks, and he served on a U.S. State Department Committee that advises the Israeli government on economic policy. He is a member of the American Academy of Arts and Sciences, Fellow of the Econometrics Society, and a Research Associate for the National Bureau of Economic Research. He has been a visiting scholar at the Federal Reserve System in Boston, Philadelphia, and New York, and he was recently named to the Board of Governors of the Federal Reserve.

Professor Bernanke's intermediate textbook, with Andrew Abel, *Macroeconomics*, Fourth Edition (Addison-Wesley, 2001) is a best seller in its field. He has written more than 50 scholarly publications in macroeconomics, macroeconomic history, and finance. He has done significant research on the causes of the Great Depression, the role of financial markets and institutions in the business cycle, and measuring the effects of monetary policy on the economy. His two most recent books, both published by Princeton University Press, are *Inflation Targeting: Lessons from the International Experience* (with coauthors) and *Essays on the Great Depression*. He is the editor of the *American Economic Review* and has been the coeditor of the *NBER Macroeconomics Annual* and of *Economics Letters*. He has served as associate editor for the *Journal of Financial Intermediation*, the *Quarterly Journal of Economics*, the *Journal of Money, Credit, and Banking*, and the *Review of Economics and Statistics*. Professor Bernanke has taught principles of economics at both Stanford and Princeton.

PREFACE

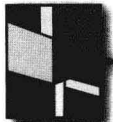


In recent years, innovative texts in mathematics, science, foreign languages, and other fields have achieved dramatic pedagogical gains by abandoning the traditional encyclopedic approach in favor of attempting to teach a short list of core principles in depth. The enthusiastic reactions of users of the first edition of this book confirm that this less-is-more approach affords similar gains in introductory economics. Although recent editions of a few other texts have paid lip service to this new approach, ours is by consensus the most carefully thought out and well-executed text in this mold. Avoiding excessive reliance on formal mathematical derivations, it presents concepts intuitively through examples drawn from familiar contexts. It relies throughout on a well-articulated short list of core principles, which it reinforces repeatedly by illustrating and applying each in numerous contexts. It asks students periodically to apply these principles to answer related questions, exercises, and problems.

The text encourages students to become “economic naturalists,” people who employ basic economic principles to understand and explain what they observe in the world around them. An economic naturalist understands, for example, that infant safety seats are required in cars but not in airplanes because the marginal cost of space to accommodate these seats is typically zero in cars but often hundreds of dollars in airplanes. Such examples engage student interest while teaching them to see each feature of their economic landscape as the reflection of an implicit or explicit cost-benefit calculation.

Our second edition incorporates several significant pedagogical improvements. Based on extensive reviewer feedback, it offers (1) even more streamlined coverage of the cost-benefit approach in the introductory chapter; (2) exercises that are more closely tied to the examples; (3) for important or difficult concepts, expanded narrative explanations that are more accessible to average students; and (4) expanded coverage of several key topics (see below). The result is a revision that is even more clutter-free, engaging, and pedagogically effective than its predecessor.

FEATURES

- 
- **Core Principles Emphasized:** A few core principles do most of the work in economics. By focusing almost exclusively on these principles, the text ensures that students leave the course with a deep mastery of them. In contrast, traditional encyclopedic texts so overwhelm students with detail that they often leave the course with little useful working knowledge at all.
 - **Economic Naturalism Introduced in Micro:** Our ultimate goal is to produce “economic naturalists”—people who see each human action as the result of an implicit or explicit cost-benefit calculation. The economic naturalist sees mundane details of ordinary existence in a new light and becomes actively engaged in the attempt to understand them. Some representative examples:
 - Why do auto manufacturers no longer make cars without heaters?
 - Why are whales, but not chickens, threatened with extinction?
 - Why do movie theaters give student discounts on the price of admission but not on the price of popcorn?



ECONOMIC
NATURALIST

- **Active Learning Stressed:** The only way to learn to hit an overhead smash in tennis or to speak a foreign language is through repeated practice. The same is true for learning economics. Accordingly, we consistently introduce new ideas in the context of simple examples and then follow them with applications showing how they work in familiar settings. At frequent intervals, we pose exercises that both test and reinforce the understanding of these ideas. The end-of-chapter questions and problems are carefully crafted to help students internalize and extend core concepts. Experience with our first edition confirms that our text really does prepare students to apply basic economic principles to solve economic puzzles drawn from the real world.
- **Modern Microeconomics:** Economic surplus, introduced in Chapter 1 and applied repeatedly thereafter, is more fully developed here than in any other text. This concept underlies the argument for economic efficiency as an important social goal. Rather than speak of trade-offs between efficiency and other goals, we stress that maximizing economic surplus facilitates the achievement of *all* goals. **Common decision pitfalls** identified by 2002 Nobel Laureate Daniel Kahneman and others—such as the tendency to ignore implicit costs, the tendency not to ignore sunk costs, and the tendency to confuse average and marginal costs and benefits—are introduced early in Chapter 1. The book devotes a chapter to the economics of information, making available in intuitively accessible form key insights that earned the 2001 Nobel Prize in economics for George Akerlof, Joseph Stiglitz, and Michael Spence.
- **Web site:** The site was developed by Scott Simkins of North Carolina A & T State University, an expert in the growing field of economics education on the World Wide Web. The ambitious web site contains a host of features that will enhance the principles discussed in the classroom, including dynamic graphs, email updates, microeconomic experiments, current news articles, information about the text, an eLearning session, and more.

IMPROVEMENTS

- **Introductory Material Shortened and Refined:** The material from the first edition's Chapters 1 and 2 has been reworked and condensed into one chapter in an effort to launch these important concepts as clearly and efficiently as possible. From the very beginning, the focus is on how rational people make choices among alternative courses of action.
- **Separate Chapter on Elasticity Added:** The material covered in this chapter (Chapter 4) was covered in parts of two separate chapters in the first edition (Chapters 5 and 6). The new combined chapter streamlines the presentation by making use of definitions and formulas common to both the supply and demand sides. The chapter also adds several new applications and graphical summaries of key relationships.
- **Cost Curve Coverage Added:** Responding to reviewer feedback, we added an introduction to average total cost and average variable cost curves in Chapter 6. To make the presentation as simple and uncluttered as possible, no single diagram ever portrays more than three cost curves at once, and most employ only two. While this treatment remains faithful to our belief that full-blown coverage of production functions and cost curves is ill-advised

at the principles level, it also provides substantially greater teaching flexibility. For example, it enables instructors to portray profits and losses graphically (Chapters 6, 8, and 9) and to discuss a firm's shutdown condition in diagrammatic terms (Chapter 6). It also facilitates an enriched discussion of the invisible hand process by which profit and loss signals drive resource allocation in competitive markets (Chapter 8).

- **Strategic Theory Accessible:** Chapter 10, "Thinking Strategically," includes many examples of how simple elements of game theory can be used not only to illuminate the interactions among oligopolists and other imperfectly competitive firms, but also to shed light on common patterns of human social interaction. This chapter
 - opens with an account of how the producers of a Robert DeNiro film lost several hundred thousand dollars by shooting most of the film before negotiating with the singer who was slated to appear in the final scene.
 - introduces the important Nash equilibrium concept through a series of intuitively accessible examples.
 - includes an extended discussion of the important prisoner's dilemma and strategies that have been developed for solving it.
 - deals with ultimatum bargaining games and unselfish human behavior.
- **Discussion of Labor Markets and Income Redistribution Streamlined:** Chapter 13 now contains material from the chapters on "Labor Markets" (13) and "Income Redistribution" (16) in the first edition. The new chapter is half the combined length of the earlier chapters, accomplished in part by eliminating examples, in part by trimming topic coverage. Sections on monopoly and comparable worth from the original Chapter 13 and sections on utilitarianism, tax policy and occupational choice, progressive consumption taxation, and redistribution and cost-benefit analysis from the original Chapter 16 have been deleted.
- **Discussion of International Trade Expanded:** The first edition had a brief section on international trade at the end of Chapter 3 on comparative advantage. This material has been expanded to an entire chapter (16) on trade. Because international trade involves important micro principles and policy issues, students will benefit greatly from this expanded coverage earlier in the book.

THE CHALLENGE

The world is a more competitive place now than it was when we started teaching in the 1970s. In arena after arena, business as usual is no longer good enough. Baseball players used to drink beer and go fishing during the off-season, but they now lift weights and ride exercise bicycles. Assistant professors used to work on their houses on weekends, but the current crop can be found most weekends at the office. The competition for student attention has grown similarly more intense. There are many tempting courses in the typical college curriculum, and even more tempting diversions outside the classroom. Students are freer than ever to pick and choose.

Yet many of us seem to operate under the illusion that most freshmen arrive with a burning desire to become economics majors. And many of us do not yet seem to have recognized that students' cognitive abilities and powers of concentration are scarce resources. To hold our ground we must become not only more selective in what we teach, but also more effective as advocates for our discipline. We must persuade students that we offer something of value.

A well-conceived and well-executed introductory course in economics can teach our students more about society and human behavior in a single term than virtually any other course in the university. This course can and should be an intellectual adventure of the first order. Not all students who take the kind of course we envisioned when writing this book will go on to become economics majors of course. But many will, and even those who do not will leave with a sense of admiration for the power of economic ideas.

A salesperson knows that he or she often gets only one chance to make a good first impression on a potential customer. Analogously, the principles course is often our only shot at persuading students to appreciate the value of economics. By trying to teach them everything we know—rather than teaching them the most important things we know—we too often squander this opportunity.

SUPPLEMENTS

We continue to believe that an ancillary package is most useful if each element in it is part of a well-considered whole, and here, as with the first edition, we've tried hard to coordinate all the elements. We have also worked hard to improve each element within the package—for example, the PowerPoints are more extensive and more sophisticated, the Instructor's Manual now provides more help than before, the Test Banks are larger and the questions more closely tied to the textbook, the Study Guide sends students to the web site more often, the web site itself is more extensive and more accessible, and the DiscoverEcon Tutorial Software is more student-friendly than ever and now allows instructors e-submission capability and easy syllabus linking. Finally, we listened to you about what, in the first edition, needed work and tried to make it better.

FOR THE INSTRUCTOR

Instructor's Manual: Prepared by Margaret Ray at Mary Washington College, this manual will be extremely useful for all teachers, but especially for those new to the job. In addition to such general topics as Using the Web Site, Economic Education Resources, Innovative Ideas, and Tips for Teaching, there will be, for each chapter, An Overview, An Outline, Core Principles, Important Concepts, Teaching Objectives, Web Site Applications, In-Class Activities, More Economic Naturalists, Answers to Textbook Problems, Sample Homework, and a Sample Reading Quiz.

Test Bank: Prepared by Sheryl Ball at Virginia Polytechnic Institute, this manual contains nearly 3,000 multiple-choice questions categorized by Teaching Objective (from the Study Guide); Learning Level (knowledge, comprehension, application, analysis); Type (graph, calculation, word problem); and Source (textbook, Study Guide, website, unique).

Computerized Test Bank: The print test bank is also available in the latest Diploma test-generating software, ensuring maximum flexibility in test prepa-

ration, including the reconfiguring of graphing exercises. This Brownstone program is the gold standard of testing programs. It is available in both a Windows and Macintosh format.

PowerPoints: Prepared by Steve Smith and Jeff Caldwell at Rose State, these slides contain all of the illustrations in the textbook, along with a detailed, chapter-by-chapter review of the important ideas presented in the textbook. These teachers have done PowerPoints for many books at both the principles and intermediate level.

Overhead Transparencies: These more than 150, four-color acetates contain all the illustrations presented in the textbook.

Instructor's CD-ROM: This remarkable Windows software program, which contains the complete Instructor's Manual, Computerized Test Bank, PowerPoints, and a full set of lecture notes for principles of microeconomics, prepared by Bob Frank for his successful introductory course at Cornell University, also allows the instructor to create presentations from any of the materials on the CD or from additional material that can be imported.

Online Learning Center (www.mhhe.com/economics/frankbernanke2): For teachers there are, among other things, an online newsletter called "Teaching Using the Web"; the Instructor's Manual; the PowerPoints; Economics on the Web, an annotated set of URLs/links to sites of interest to economists; a graphing library; and a description of what's on the student site along with some optional material from the book.

FOR THE STUDENT

Study Guide: Written by Jack Mogab and Bruce McClung at Southwest Texas State University, this book provides the following elements for each chapter: a Pretest; a Learning Objective Grid; a Key Point Review with Learning Tips; some Self-Tests (Key Term Matching, Multiple Choice, Problems) with answers; and an extension of the guide to the web site, where students may practice with graphing.

Online Learning Center (www.mhhe.com/economics/frankbernanke2): For students there are such useful and exciting features for the book as a whole as Interpreting the News—articles and summaries of relevant articles with analysis and discussion questions; a Math Tutor—help for those whose math skills are rusty; email updates—periodic sending of information/study tips; the Glossary from the textbook; and Economics on the Web—annotated URLs useful for economics students. Additionally, for each chapter there is an Electronic Learning Session that opens with a brief recap of the chapter followed by a test with answers and analysis; next is a set of study sessions based on Economic Naturalist Exercises; Graphing Exercises; PowerPoints; and Key Terms; and this is finally followed by a second quiz, with answers and analysis.



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By Gerald C. Nelson

to accompany

PRINCIPLES OF ECONOMICS

PRINCIPLES OF MACROECONOMICS

PRINCIPLES OF MICROECONOMICS

BY ROBERT FRANK & BEN BERNHARDT

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DiscoverEcon CD-ROM: Created by Gerald Nelson of the University of Illinois, DiscoverEcon is the best-selling academic economics software available. It is available as a CD or an online version. This widely class-tested software is Windows-based and text-specific. The software is available either in a standard CD format or via the Web by using a unique student pass code packaged free with each new book. Its many features include, for each chapter,

- *Multiple-choice test questions:* The user chooses the number of questions in the test; the software selects randomly from the question bank for the chapter.
- *Two Web questions:* Students working online can access Web addresses directly through their browsers. Students without Web access can simply ignore these questions.
- *Match the terms:* This exercise challenges the student to match randomly selected key glossary terms with their appropriate glossary explanation.
- *Essay questions*

In addition, the software features

- *New e-submission capability:* Instructors may now set up their courses for e-submission so that all exercise results for each student can be viewed and downloaded to other Windows applications (Web-based version only).
- *Easy syllabus linking:* For those instructors using a course management system, specific pages in DiscoverEcon can be linked to specific parts of the course web site. This makes navigation and therefore self-assessment easier than ever for both student and instructor.
- *The opportunity to experiment with graphs,* those seen in the classroom and the textbook. The software includes *movies* (graphs are drawn step-by-step with explanatory text appearing as the graph is constructed); *interactive graphs* (students change a parameter and see how the graph changes); and *interactive exercises* (students interpret a graph based on concepts presented in the text and in the software).

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editor, was enormously helpful as he guided us with intelligence, patience, and tact through three major revisions of the original manuscript, and further extensive revisions for the second edition. We also thank Paul Shensa, the sponsoring editor, and Marty Quinn, the marketing manager, whose considerable experience, insightful suggestions, and extensive knowledge of the marketplace were of incalculable help. We are especially grateful to Betty Morgan, our superb manuscript editor. And we are also grateful to the production team, whose professionalism was outstanding: Kimberly Hooker, Project Manager; Melonie Salvati, Production Supervisor; Becky Szura, Supplements Coordinator, and Melissa Kansa, Media Tech Producer.

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BRIEF CONTENTS

Preface ix

PART I Introduction

- 1 Thinking Like an Economist 2
- 2 Comparative Advantage: The Basis for Exchange 33
- 3 Supply and Demand: An Introduction 57

PART 2 Competition and the Invisible Hand

- 4 Elasticity 91
- 5 Demand: The Benefit Side of the Market 117
- 6 Perfectly Competitive Supply: The Cost Side of the Market 141
- 7 Efficiency and Exchange 167
- 8 The Quest for Profit and the Invisible Hand 193

PART 3 Market Imperfections

- 9 Monopoly and Other Forms of Imperfect Competition 221
- 10 Thinking Strategically 251
- 11 Externalities and Property Rights 277
- 12 The Economics of Information 301

PART 4 Economics of Public Policy

- 13 Labor Markets, Poverty, and Income Distribution 323
- 14 The Environment, Health, and Safety 351
- 15 Public Goods and Tax Policy 373

PART 5 International Trade

- 16 International Trade and Trade Policy 399

Glossary G-1

Index I-1



CONTENTS

Preface ix

PART I Introduction

Chapter 1 Thinking Like an Economist 2

Economics: Studying Choice in a World of Scarcity 4

Applying the Cost-Benefit Principle 5

Economic Surplus 6

Opportunity Cost 6

The Role of Economic Models 7

Four Important Decision Pitfalls 8

Pitfall 1: Measuring Costs and Benefits as Proportions

Rather Than Absolute Dollar Amounts 8

Pitfall 2: Ignoring Opportunity Costs 9

Pitfall 3: Failure to Ignore Sunk Costs 10

Pitfall 4: Failure to Understand the Average–Marginal Distinction 11

Economics: Micro and Macro 15

The Approach of This Text 15

Economic Naturalism 16

ECONOMIC NATURALIST 1.1: Why do many hardware manufacturers include more than \$1,000 worth of “free” software with a computer selling for only slightly more than that? 16

ECONOMIC NATURALIST 1.2: Why don’t auto manufacturers make cars without heaters? 17

ECONOMIC NATURALIST 1.3: Why do the keypad buttons on drive-up automatic teller machines have Braille dots? 18

Summary 18

Core Principles 19

Key Terms 19

Review Questions 19

Problems 19

Answers to In-Chapter Exercises 21

Appendix: Working with Equations, Graphs, and Tables 23

Chapter 2 Comparative Advantage: The Basis for Exchange 33

Exchange and Opportunity Cost 34

The Principle of Comparative Advantage 35

ECONOMIC NATURALIST 2.1: Where have all the .400 hitters gone? 37

Sources of Comparative Advantage 38

ECONOMIC NATURALIST 2.2: Televisions and videocassette recorders were developed and first produced in the United States, but today the U.S. accounts for only a

minuscule share total world production of these products. Why did the United States fail to retain its lead in these markets? 39

Comparative Advantage and Production Possibilities 39

The Production Possibilities Curve 39

How Individual Productivity Affects the Slope and Position of the PPC 42

The Gains from Specialization 44

A Production Possibilities Curve for a Many-Person Economy 45

Factors that Shift the Economy's Production Possibilities Curve 47

Why Have Some Countries Been Slow to Specialize? 49

Can We Have Too Much Specialization? 50

Comparative Advantage and International Trade 51

ECONOMIC NATURALIST 2.3: If trade between nations is so beneficial, why are free-trade agreements so controversial? 51

Summary 51

Core Principles 52

Key Terms 52

Review Questions 52

Problems 53

Answers to In-Chapter Exercises 54

Chapter 3 Supply and Demand: An Introduction 57

What, How, and for Whom? Central Planning versus the Market 59

Buyers and Sellers in Markets 60

The Demand Curve 61

The Supply Curve 62

Market Equilibrium 64

Rent Controls Reconsidered 67

Pizza Price Controls? 70

Predicting and Explaining Changes in Prices and Quantities 71

Shifts in Demand 72

ECONOMIC NATURALIST 3.1: When the federal government implements a large pay increase for its employees, why do rents for apartments located near Washington Metro stations go up relative to rents for apartments located far away from Metro stations? 74

Shifts in the Supply Curve 75

ECONOMIC NATURALIST 3.2: Why do major term papers go through so many more revisions today than in the 1970s? 77

Four Simple Rules 78

ECONOMIC NATURALIST 3.3: Why do the prices of some goods, like airline tickets to Europe, go up during the months of heaviest consumption, while others, like sweet corn, go down? 80

Markets and Social Welfare 81

Cash on the Table 81

Smart for One, Dumb for All 82

Summary 84

Core Principles 84

Key Terms 85

Review Questions 85

Problems 85

Answers to In-Chapter Exercises 86