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Principles of **Microeconomics**

THIRTEENTH EDITION

Karl E. Case

Ray C. Fair

Sharon M. Oster



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Wellesley College

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This edition is dedicated to Chip Case, a wonderful colleague and friend. He was the inspiration for this textbook some 30 years ago, and he served as an inspiration to study economics for thousands of students.

About the Authors



Karl E. Case, who passed away in July, 2016, was a Professor of Economics Emeritus at Wellesley College where he taught for 34 years, serving several tours of duty as Department Chair. He was a Senior Fellow at the Joint Center for Housing Studies at Harvard University and a founding partner in the real estate research firm of Fiserv Case Shiller Weiss, which produces the S&P Case-Shiller Index of home prices. He served as a member of the Index Advisory Committee of Standard and Poor's, and on the Academic Advisory Board of the Federal Reserve Bank of Boston.

Professor Case received his B.A. from Miami University in 1968, spent three years on active duty in the Army, and received his Ph.D. in Economics from Harvard University in 1976.

Professor Case's research was in the areas of real estate, housing, and public finance. He authored or coauthored five books, including *Principles of Economics*, *Economics and Tax Policy*, and *Property Taxation: The Need for Reform*, and published numerous articles in professional journals, focused on real estate markets and prices.

Chip, as he was known to his many friends and colleagues, contributed to this textbook throughout its many editions. In his honor and with respect for his substantial contributions to the text and the discipline of economics, his co-authors plan to keep his name on the text for all future editions.



Ray C. Fair is Professor of Economics at Yale University. He is a member of the Cowles Foundation at Yale and a Fellow of the Econometric Society. He received a B.A. in Economics from Fresno State College in 1964 and a Ph.D. in Economics from MIT in 1968. He taught at Princeton University from 1968 to 1974. Professor Fair has taught introductory and intermediate macroeconomics at Yale since 1974. He has also taught graduate courses in macroeconomic theory and macroeconometrics.

Professor Fair's research has primarily been in the areas of macroeconomics and econometrics, with particular emphasis on macroeconomic model building. He has also done work in the areas of finance, voting behavior, and aging in sports. His publications include *Specification, Estimation, and Analysis of Macroeconometric Models* (Harvard Press, 1984); *Testing Macroeconometric Models* (Harvard Press, 1994); *Estimating How the Macroeconomy Works* (Harvard Press, 2004), and *Predicting Presidential Elections and Other Things* (Stanford University Press, 2012).

Professor Fair's U.S. and multicountry models are available for use on the Internet free of charge. The address is <http://fairmodel.econ.yale.edu>. Many teachers have found that having students work with the U.S. model on the Internet is a useful complement to an introductory macroeconomics course.



Sharon M. Oster is the Frederic Wolfe Professor of Economics and Management and former Dean of the Yale School of Management. Professor Oster joined Case and Fair as a coauthor in the ninth edition of this book. Professor Oster has a B.A. in Economics from Hofstra University and a Ph.D. in Economics from Harvard University.

Professor Oster's research is in the area of industrial organization. She has worked on problems of diffusion of innovation in a number of different industries, on the effect of regulations on business, and on competitive strategy. She has published a number of articles in these areas and is the author of several books, including *Modern Competitive Analysis* and *The Strategic Management of Nonprofits*.

Prior to joining the School of Management at Yale, Professor Oster taught for a number of years in Yale's Department of Economics. In the department, Professor Oster taught introductory and intermediate microeconomics to undergraduates as well as several graduate courses in industrial organization. Since 1982, Professor Oster has taught primarily in the Management School, where she teaches the core microeconomics class for MBA students and a course in the area of competitive strategy. Professor Oster also consults widely for businesses and nonprofit organizations and has served on the boards of several publicly traded companies and nonprofit organizations.

Brief Contents

PART I Introduction to Economics 29

- 1** The Scope and Method of Economics 29
- 2** The Economic Problem: Scarcity and Choice 51
- 3** Demand, Supply, and Market Equilibrium 71
- 4** Demand and Supply Applications 102
- 5** Elasticity 120

PART II The Market System 141

- 6** Household Behavior and Consumer Choice 144
- 7** The Production Process: The Behavior of Profit-Maximizing Firms 173
- 8** Short-Run Costs and Output Decisions 196
- 9** Long-Run Costs and Output Decisions 216
- 10** Input Demand: The Labor and Land Markets 240
- 11** Input Demand: The Capital Market and the Investment Decision 256
- 12** General Equilibrium and the Efficiency of Perfect Competition 277

PART III Market Imperfections and the Role of Government 292

- 13** Monopoly and Antitrust Policy 292
- 14** Oligopoly 317

- 15** Monopolistic Competition 340

- 16** Externalities, Public Goods, and Common Resources 355

- 17** Uncertainty and Asymmetric Information 378

- 18** Income Distribution and Poverty 394

- 19** Public Finance: The Economics of Taxation 418

PART IV The World Economy 440

- 20** International Trade, Comparative Advantage, and Protectionism 440

- 21** Economic Growth in Developing Economies 464

PART V Methodology 481

- 22** Critical Thinking about Research 481

Glossary 496

Index 505

Photo Credits 523

Contents

PART I Introduction to Economics 29

1 The Scope and Method of Economics 29

Why Study Economics? 30

To Learn a Way of Thinking 30

ECONOMICS IN PRACTICE Rainfall and Schooling in India 31

ECONOMICS IN PRACTICE Majoring in Economics Makes You Less Vulnerable to a Recession! 32

To Understand Society 32

To Be an Informed Citizen 33

The Scope of Economics 33

Microeconomics and Macroeconomics 33

ECONOMICS IN PRACTICE How Italian Is a Ferrari? 34

The Diverse Fields of Economics 35

The Method of Economics 36

Theories and Models 36

ECONOMICS IN PRACTICE Does Your Part-Time Job Affect Your Academic Performance? 38

Economic Policy 38

An Invitation 40

Economic Skills and Economics as a Career 40

Summary 40 Review Terms and Concepts 41

Problems 41 Appendix: How to Read and Understand Graphs 43

2 The Economic Problem: Scarcity and Choice 51

Scarcity, Choice, and Opportunity Cost 52

Scarcity and Choice in a One-Person Economy 52

Scarcity and Choice in an Economy of Two or More 53

ECONOMICS IN PRACTICE Frozen Foods and Opportunity Costs 54

The Production Possibility Frontier 57

The Economic Problem 63

ECONOMICS IN PRACTICE Changing Consumption Patterns in China 64

Economic Systems and the Role of Government 64

Command Economies 64

Laissez-Faire Economies: The Free Market 65

Mixed Systems, Markets, and Governments 66

Looking Ahead 66

Summary 66 Review Terms and Concepts 67 Problems 67

3 Demand, Supply, and Market Equilibrium 71

Firms and Households: The Basic

Decision-Making Units 72

Input Markets and Output Markets: The Circular Flow 72

Demand in Product/Output Markets 74

Changes in Quantity Demanded versus Changes in Demand 74

Price and Quantity Demanded: The Law of Demand 75

Other Determinants of Household Demand 78

ECONOMICS IN PRACTICE Have You Bought This Textbook? 79

ECONOMICS IN PRACTICE People Drink Tea on Rainy Days 80

Shift of Demand versus Movement along a Demand Curve 81

From Household Demand to Market Demand 82

Supply in Product/Output Markets 84

Price and Quantity Supplied: The Law of Supply 85

Other Determinants of Supply 86

Shift of Supply versus Movement along a Supply Curve 87

From Individual Supply to Market Supply 88

Market Equilibrium 89

Excess Demand 89

Excess Supply 91

Market Equilibrium with Equations 92

Changes in Equilibrium 92

ECONOMICS IN PRACTICE Quinoa 95

Demand and Supply in Product Markets: A Review 95

ECONOMICS IN PRACTICE “Shrinkflation” during Festive Seasons 96

Looking Ahead: Markets and the Allocation of Resources 97

Summary 97 Review Terms and Concepts 98 Problems 99

4 Demand and Supply Applications 102

The Price System: Rationing and Allocating Resources 103

Price Rationing 103

Constraints on the Market and Alternative Rationing Mechanisms 105

ECONOMICS IN PRACTICE Why Do I Have to Pay More for My Food? The Truth behind the Flood Crises 107

Prices and the Allocation of Resources 109

Price Floor 109

Supply and Demand Analysis: Tariffs (Tax) 110

ECONOMICS IN PRACTICE The Price Mechanism at Work for Shakespeare 111

Supply and Demand and Market Efficiency 112

Consumer Surplus 112

Producer Surplus 113

Competitive Markets Maximize the Sum of Producer and Consumer Surplus 114

Potential Causes of Deadweight Loss from Under- and Overproduction 115

Looking Ahead 116

Summary 116 Review Terms and Concepts 116 Problems 117

5 Elasticity 120

Price Elasticity of Demand 121

Slope and Elasticity 121

Types of Elasticity 122

Calculating Elasticities 123

Calculating Percentage Changes 123

Elasticity Is a Ratio of Percentages 124

The Midpoint Formula 124

Elasticity Changes along a Straight-Line Demand Curve 125

Elasticity and Total Revenue 128

The Determinants of Demand Elasticity 129

Availability of Substitutes 129

The Importance of Being Unimportant 129

Luxuries versus Necessities 129

ECONOMICS IN PRACTICE Elasticities at a Delicatessen in the Short Run and Long Run 130

The Time Dimension 130

Other Important Elasticities 131

Income Elasticity of Demand 131

Cross-Price Elasticity of Demand 131

Elasticity of Supply 132

ECONOMICS IN PRACTICE Brexit and EU Student Enrolment in the United Kingdom 133

What Happens When We Raise Taxes: Using Elasticity 133

Looking Ahead 135

Summary 135 Review Terms and Concepts 136 Problems 136

PART II The Market System 141

6 Household Behavior and Consumer Choice 144

Household Choice in Output Markets 145

The Determinants of Household Demand 145

The Budget Constraint 145

The Equation of the Budget Constraint 148

The Basis of Choice: Utility 149

Diminishing Marginal Utility 149

Allocating Income to Maximize Utility 150

The Utility-Maximizing Rule 152

ECONOMICS IN PRACTICE Sugar Tax in Chile 153

Diminishing Marginal Utility and

Downward-Sloping Demand 153

Income and Substitution Effects 154

The Income Effect 154

The Substitution Effect 155

Household Choice in Input Markets 156

The Labor Supply Decision 156

ECONOMICS IN PRACTICE Substitution and Market Baskets 157

The Price of Leisure 157

Income and Substitution Effects of a Wage Change 158

ECONOMICS IN PRACTICE Part-Time Employment for Students 159

Saving and Borrowing: Present versus Future Consumption 160

A Review: Households in Output and Input Markets 161

Summary 161 Review Terms and Concepts 162

Problems 162 Appendix: Indifference Curves 166

7 The Production Process: The Behavior of Profit-Maximizing Firms 173

The Behavior of Profit-Maximizing Firms 174

Profits and Economic Costs 175

Short-Run versus Long-Run Decisions 176

The Bases of Decisions: Market Price of Outputs,
Available Technology, and Input Prices 177

The Production Process 178

Production Functions: Total Product, Marginal
Product, and Average Product 178

Production Functions with Two Variable Factors of
Production 181

ECONOMICS IN PRACTICE Gains from Modern
Management 182

Choice of Technology 182

ECONOMICS IN PRACTICE How Soon Should
Preventive Maintenance Be Employed? 183

Looking Ahead: Cost and Supply 184

Summary 184 Review Terms and Concepts 185

Problems 185 Appendix: Isoquants and Isocosts 189

8 Short-Run Costs and Output Decisions 196

Costs in the Short Run 197

Fixed Costs 197

Variable Costs 199

ECONOMICS IN PRACTICE How Much Do
Phantom Tickets Cost Their Producers? 204

Total Costs 204

Short-Run Costs: A Review 206

Output Decisions: Revenues, Costs, and Profit Maximization 207

Perfect Competition 207

Total Revenue and Marginal Revenue 208

Comparing Costs and Revenues to Maximize
Profit 208

The Short-Run Supply Curve 210

Looking Ahead 211

Summary 212 Review Terms and Concepts 213 Problems 213

9 Long-Run Costs and Output Decisions 216

Short-Run Conditions and Long-Run Directions 217

Maximizing Profits 217

Minimizing Losses 220

The Short-Run Industry Supply Curve 220

Long-Run Directions: A Review 222

Long-Run Costs: Economies and Diseconomies of Scale 222

Increasing Returns to Scale 223

ECONOMICS IN PRACTICE Economies of Scale in
Mobile Services 224

Constant Returns to Scale 224

Diseconomies of Scale 225

ECONOMICS IN PRACTICE Diseconomies of Scale
in Secondary School Education 225

U-Shaped Long-Run Average Costs 226

ECONOMICS IN PRACTICE The Long-Run Average
Cost Curve: Flat or U-Shaped? 226

Long-Run Adjustments to Short-Run Conditions 227

Short-Run Profits: Moves In and Out
of Equilibrium 227

The Long-Run Adjustment Mechanism:
Investment Flows Toward Profit
Opportunities 229

Output Markets: A Final Word 230

ECONOMICS IN PRACTICE Why Is Food so
Expensive at an Airport? 231

Summary 231 Review Terms and Concepts 232

Problems 232 Appendix: External Economies and
Diseconomies 236

10 Input Demand: The Labor and Land Markets 240

Input Markets: Basic Concepts 241

Demand for Inputs: A *Derived* Demand 241

Marginal Revenue Product 241

ECONOMICS IN PRACTICE MBA or Not for the
Greek Youth? 242

ECONOMICS IN PRACTICE How Much Is Flexibility
Worth? 244

Labor Supply 244

Labor Markets 245

The Firm's Labor Market Decision 245

ECONOMICS IN PRACTICE What Does Your
Favorite La Liga Player Make? 246

Many Labor Markets 247

Land Markets 247

Rent and the Value of Output Produced
on Land 248

ECONOMICS IN PRACTICE Land Valuation 249

Input Demand Curves 249

Shifts in Factor Demand Curves 249

Profit-Maximizing Condition in Input Markets 251

Looking Ahead 251

Summary 252 Review Terms and Concepts 252 Problems 253

11 Input Demand: The Capital Market and the Investment Decision 256

Capital and Investment 257

Capital 257

The Demand for New Capital and the Investment Decision 258

Forming Expectations 259

Comparing Costs and Expected Returns 260

The Capital Market 262

ECONOMICS IN PRACTICE Saudi Arabia's Vision 2030 263

Capital Income: Interest and Profits 264

Financial Markets in Action 265

ECONOMICS IN PRACTICE The Stock Market 266

ECONOMICS IN PRACTICE Do Children Learn or Inherit Investing Strategies from Their Parents? 267

Capital Accumulation and Allocation 267

A Final Word on Capital 267

Summary 268 Review Terms and Concepts 269

Problems 269 Appendix: Calculating Present Value 271

12 General Equilibrium and the Efficiency of Perfect Competition 277

Market Adjustment to Changes in Demand 278

Allocative Efficiency and Competitive Equilibrium 280

Pareto Efficiency 280

ECONOMICS IN PRACTICE Cutting Rice Cultivation and Water Rationing in Egypt 281

The Efficiency of Perfect Competition 282

Perfect Competition versus Real Markets 285

The Sources of Market Failure 286

Imperfect Competition 286

Public Goods 286

Externalities 287

Imperfect Information 287

Evaluating the Market Mechanism 288

Summary 288 Review Terms and Concepts 289 Problems 289

PART III Market Imperfections and the Role of Government 292

13 Monopoly and Antitrust Policy 292

Imperfect Competition and Market Power: Core Concepts 293

Forms of Imperfect Competition and Market Boundaries 293

Price and Output Decisions in Pure Monopoly Markets 294

Demand in Monopoly Markets 294

ECONOMICS IN PRACTICE Figuring Out the Right Price 295

Perfect Competition and Monopoly Compared 300

Monopoly in the Long Run: Barriers to Entry 301

ECONOMICS IN PRACTICE Is Being a Monopolist Always Good? 302

The Social Costs of Monopoly 304

Inefficiency and Consumer Loss 304

Rent-Seeking Behavior 306

Price Discrimination 307

Examples of Price Discrimination 308

ECONOMICS IN PRACTICE Price Discrimination at Work: The Uffizi Gallery 309

Remedies for Monopoly: Antitrust Policy 310

Major Antitrust Legislation 310

ECONOMICS IN PRACTICE What Tesla Does with Near-Monopoly Power 311

Imperfect Markets: A Review and a Look Ahead 312

Summary 312 Review Terms and Concepts 313

Problems 314

14 Oligopoly 317

Market Structure in an Oligopoly 318

ECONOMICS IN PRACTICE Patents in the Smartphone Industry 320

Oligopoly Models 321

The Collusion Model 321

The Price-Leadership Model 322

ECONOMICS IN PRACTICE The Philippines' Rice Cartel 322

The Cournot Model 323

ECONOMICS IN PRACTICE The Economics of Treating Cancer 325

Game Theory 326

Repeated Games 328

ECONOMICS IN PRACTICE Confusing Prices 330

A Game with Many Players: Collective Action Can Be Blocked by a Prisoner's Dilemma 330

Oligopoly and Economic Performance 331

Industrial Concentration and Technological Change 332

The Role of Government 333

Regulation of Mergers 333

ECONOMICS IN PRACTICE Brazil's Pulp
Giant 334

A Proper Role for Government? 335

Summary 336 Review Terms and Concepts 337 Problems 337

15 Monopolistic Competition 340

Industry Characteristics 341

Product Differentiation and Advertising 342

How Many Varieties? 342

How Do Firms Differentiate Products? 343

ECONOMICS IN PRACTICE Rational Excess Variety
or Diversification Bias? 344

ECONOMICS IN PRACTICE Even Your Hair Needs
Coaching 346

Advertising 346

ECONOMICS IN PRACTICE Oprah Winfrey's
Celebrity Endorsements Sell Books! 348

Price and Output Determination in
Monopolistic Competition 349

Product Differentiation and Demand Elasticity 349

Price/Output Determination in the Short
Run 349

Price/Output Determination in the Long Run 350

Economic Efficiency and Resource
Allocation 351

Summary 352 Review Terms and Concepts 353 Problems 353

16 Externalities, Public Goods, and Common Resources 355

Externalities and Environmental
Economics 356

Marginal Social Cost and Marginal Cost
Pricing 356

ECONOMICS IN PRACTICE Adjusting to the
Environmental Effects of Globalization 358

Costs and Benefits of Pollution 359

Internalizing Externalities 361

ECONOMICS IN PRACTICE The Cost of
Emissions 366

ECONOMICS IN PRACTICE Emissions and
Electricity Prices 368

Public (Social) Goods 369

The Characteristics of Public Goods 369

Public Provision of Public Goods 370

Optimal Provision of Public Goods 370

Local Provision of Public Goods: Tiebout
Hypothesis 373

Common Resources 373

Summary 374 Review Terms and Concepts 374 Problems 375

17 Uncertainty and Asymmetric Information 378

Decision Making under Uncertainty: The
Tools 379

Expected Value 379

Expected Utility 379

Attitudes toward Risk 381

Asymmetric Information 383

Adverse Selection 383

ECONOMICS IN PRACTICE Adverse Selection in the
Healthcare Market 385

Market Signaling 386

ECONOMICS IN PRACTICE The Health Care
Mandate 387

ECONOMICS IN PRACTICE How to Read
Advertisements 388

Moral Hazard 389

Incentives 389

ECONOMICS IN PRACTICE Independent Reviews
and Wanderlust 390

Labor Market Incentives 390

Summary 391 Review Terms and Concepts 392 Problems 392

18 Income Distribution and Poverty 394

The Sources of Household Income 395

Wages and Salaries 395

Income from Property 395

Income from the Government: Transfer
Payments 395

The Distribution of Market Income 395

Income Inequality in the United States 395

Causes of Inequality in Market Income 397

Inequality in Wage Income 398

ECONOMICS IN PRACTICE Inclusive Growth in
South Africa 399

ECONOMICS IN PRACTICE Social Identity and Tech
Jobs 400

Inequality in Property Income 401

ECONOMICS IN PRACTICE The Egyptian Revolution
of Dignity 402

Arguments for and against Reducing Market-Income Inequality 403
 Arguments against Redistribution 403
 Arguments in Favor of Redistribution 404
 Redistribution of Income Through Taxes and Transfers 405

The Tax System 406
 The Transfer System 407
 Redistribution Effects of Taxes and Transfers in 2013 409
 Change in U.S. Inequality over Time: 1979–2013 409

Poverty 410

The Minimum Wage 411

The Distribution of Wealth 412

Income Inequality in Other Countries 412

Government or the Market? A Review 413

Summary 414 Review Terms and Concepts 415 Problems 415

19 Public Finance: The Economics of Taxation 418

The Basics of Taxation 419

Taxes: Basic Concepts 419

ECONOMICS IN PRACTICE Residential Property Taxes in Singapore 421

Tax Incidence: Who Pays? 422

The Incidence of Payroll Taxes 422

The Incidence of Corporate Profits Taxes 425

ECONOMICS IN PRACTICE Economists Argue about the Incidence of the Corporate Profits Tax 427

The Overall Incidence of Taxes in the United States: Empirical Evidence 427

Excess Burdens and the Principle of Neutrality 427

Measuring Excess Burdens 428

Excess Burdens and the Degree of Distortion 429

The Principle of Second Best 430

Optimal Taxation 430

Tax Equity 430

What Is the “Best” Tax Base? 431

Social Choice 433

The Voting Paradox 433

Government Inefficiency: Theory of Public Choice 435

Rent-Seeking Revisited 436

Summary 436 Review Terms and Concepts 437 Problems 437

PART IV The World Economy 440

20 International Trade, Comparative Advantage, and Protectionism 440

Trade Surpluses and Deficits 441

The Economic Basis for Trade: Comparative Advantage 441

Absolute Advantage versus Comparative Advantage 442

Terms of Trade 446

Exchange Rates 447

The Sources of Comparative Advantage 449

The Heckscher-Ohlin Theorem 449

Other Explanations for Observed Trade Flows 450

Trade Barriers: Tariffs, Export Subsidies, and Quotas 450

ECONOMICS IN PRACTICE Globalization Improves Firm Productivity 451

U.S. Trade Policies, GATT, and the WTO 452

ECONOMICS IN PRACTICE What Happens When We Lift a Quota? 452

Free Trade or Protection? 454

The Case for Free Trade 454

The Case for Protection 456

ECONOMICS IN PRACTICE Reshaping the Global Trade Order 458

An Economic Consensus 460

Summary 460 Review Terms and Concepts 461 Problems 461

21 Economic Growth in Developing Economies 464

Life in the Developing Nations: Population and Poverty 465

ECONOMICS IN PRACTICE What Can We Learn from the Height of Children? 466

Economic Development: Sources and Strategies 466

The Sources of Economic Development 467

ECONOMICS IN PRACTICE Corruption 469

Strategies for Economic Development 470

ECONOMICS IN PRACTICE Who You Marry May Depend on the Rain 472

Two Examples of Development: China and India 474

ECONOMICS IN PRACTICE Boosting Agricultural Income through Digital Finance 475

Development Interventions 475

- Random and Natural Experiments: Some New Techniques in Economic Development 476
- Education Ideas 476
- Health Improvements 477

Summary 478 Review Terms and Concepts 478 Problems 479

PART V Methodology 481

22 Critical Thinking about Research 481

Selection Bias 482

Causality 483

- Correlation versus Causation 483
- Random Experiments 484
- Regression Discontinuity 485

ECONOMICS IN PRACTICE Moving to Opportunity 486

ECONOMICS IN PRACTICE Control Groups and Experimental Economics 487

Difference-in-Differences 488

ECONOMICS IN PRACTICE Using Difference-in-Differences to Study the Efficacy of Medical Insurance in Japan 489

Statistical Significance 490

Regression Analysis 491

Summary 493 Review Terms and Concepts 493 Problems 494

Glossary 496

Index 505

Photo Credits 523

Preface

New to this Edition

Updates for this edition of *Principles of Microeconomics* include:

- It is our hope that students will come to see both how broad the tools of economics are and how exciting is much of the new research in the field. The 13th edition has continued the changes in the *Economics in Practice* boxes that we began several editions ago. In these boxes, we aim to bring economic thinking to the concerns of the typical student. In many cases, we do this by spotlighting recent research, much of it by young scholars. Here are some examples of the topics we cover in the new boxes:
 - Research on the role weather plays in reducing school achievement in rural India by changing the importance of child labor in agriculture (Chapter 1, “The Scope and Method of Economics”).
 - The strength of the economics major in helping students avoid unemployment in a recession, showing how the skills students learn in an economics class can benefit them regardless of the career path they choose (Chapter 1, “The Scope and Method of Economics”).
 - The role of sugar taxes in determining a customer’s response to price changes in sugary drinks (Chapter 6, “Household Behavior and Consumer Choice”). This is one of the several new behavioral economics boxes we have in the new edition.
 - The Marshall Plan’s effects on managerial training and company productivity (Chapter 7, “The Production Process: The Behavior of Profit-Maximizing Firms”).
 - How researchers can use data on adopted children to explore whether generationally-correlated investing patterns are learned behavior or have some genetic component reflecting risk preference (Chapter 11, “Input Demand: The Capital Market and the Investment Decision”).
 - Most coders are men. How much does this have to do with gender identity? We discuss an experiment in Peru by a nonprofit to see if more women can be encouraged to go into this lucrative field (Chapter 18, “Income Distribution and Poverty”).
 - Whether shareholders or workers benefit from the 2017 Trump tax package’s big reduction in the corporate income tax (Chapter 19, “Public Finance: The Economics of Taxation”).
- We have reworked some of the chapters to streamline them and to improve readability. In the discussions of supply and demand and the discussions of perfect and imperfect competition, we have added simple algebraic material to the graphical, numeric and verbal explanations to aid in clarity of understanding.
 - Chapter 11, “Input Demand: The Capital Market and the Investment Decision,” has been considerably reworked to include a more thorough discussion of finance, that should be especially interesting to students who anticipate a career in the financial sector.
 - Chapter 18, “Income Distribution and Poverty,” has also been substantially reworked to reflect the increased worldwide concern with issues of inequality and economic mobility.
- Many end-of-chapter problems have been revised.
- We have added Critical Thinking questions to most Economics in Practice boxes and each end-of-chapter section, to reinforce the underlying economic principles and to give students practical application of what they’ve learned.

The *Principles of Microeconomics* Program

Our goal in the 13th edition, as it was in the first edition, is to instill in students a fascination with both the functioning of the economy and the power and breadth of economics. The first line of every edition of our book has been “The study of economics should begin with a sense of wonder.” We hope that readers come away from our book with a basic understanding of how market economies function, an appreciation for the things they do well, and a sense of the things they do poorly. We also hope that readers begin to learn the art and science of economic thinking and begin to look at some policy, and, even personal decisions, in a different way. We have prepared this edition of the text and MyLab Economics with this in mind. To improve student results, we recommend pairing the text content with **MyLab Economics**, which is the teaching and learning platform that empowers you to reach every student. By combining trusted author content with digital tools and a flexible platform, MyLab personalizes the learning experience and will help your students learn and retain key course concepts while developing skills that future employers are seeking in their candidates. From **Digital Interactives** to **Real-Time Data Analysis Exercises**, MyLab Economics helps you teach your course, your way. Learn more at www.pearson.com/mylab/economics.

Solving Teaching and Learning Challenges

As authors and teachers, we understand the challenges of the principles of economics course. The foundational themes of *Principles of Microeconomics*, 13th edition, are to introduce the discipline of economics and to provide a basic understanding of how economies function. This requires a blend of economic theory, institutional material, and real-world applications. We have maintained a balance between these ingredients in every chapter. There is such volume of material for teachers to cover, and for students to understand. We address this learning challenge through: (1) A three-tiered approach of explaining key concepts through relevant stories, graphs and equations (2) Pedagogical features in the text and accompanying digital resources in MyLab Economics that illustrate and reinforce key concepts through real-world examples and applications that are relevant to students; (3) Graphs and animations; and (4) A wide variety of questions and problems.

Three-Tiered Explanations: Stories-Graphs-Equations

Professors who teach principles of economics are faced with a classroom of students with different abilities, backgrounds, and learning styles. For some students, analytical material is difficult no matter how it is presented; for others, graphs and equations seem to come naturally. The problem facing instructors and textbook authors alike is how to convey the core principles of the discipline to as many students as possible without selling the better students short. Our approach to this problem is to present most core concepts in the following three ways.

First, we present each concept in the context of a simple intuitive **story** or example in words often followed by a table. Second, we use a **graph** in most cases to illustrate the story or example. And finally, in many cases where appropriate, we use an **equation** to present the concept with a mathematical formula. In this edition, we have strengthened this element without greatly increasing mathematical levels needed for the class. For students who would benefit from a math review, MyLab Economics offers math skills review Chapter R, accessible from the assignment manager and containing over 150 graphing, algebra, and calculus exercises for homework, quiz, and test use.

Economics in Practice

We know that students are best motivated when they see the relevance of what they’re learning to the world they live in. We’ve created *Economics in Practice* with a focus on recent research or events that support a key concept in the chapter and help students think about the broad and exciting applications of economics to their lives and the world around them. Each box contains a Critical Thinking question or two to further connect the material they are learning with their lives.


ECONOMICS IN PRACTICE

Changing Consumption Patterns in China

In all societies, for all people, resources are limited relative to people’s demands. Scarcity of resources is the primary reason we face trade-offs. However, as an economy grows, more resources become available and the trade-offs it faces change.

China is the world’s second largest economy and it has been driving global growth for a decade. At the turn of the century, the average Chinese household spent around one-third of its income on food. Since 2015, this proportion has declined to roughly 28 percent as the Chinese are increasingly moving toward the consumption of non-food products. At the same time, the proportion of expenditure on housing in consumer income rose from 13.2 percent to 15.4 percent, health care spending from 10 percent to 11.3 percent, and communications and transport from 10.4 percent to almost 12 percent.¹

You can see that as an economy grows and consumer income increases, food becomes a smaller component of the budget. The change in the pattern of consumption has also had its mark on prices. As the Chinese economy is utilizing more inputs, the cost of each unit of output is becoming more expensive. In 2017, food inflation was much lower than non-food inflation, primarily due to the increase in expenditure on healthcare, communications, clothing, education, and entertainment. This also includes expenditure on additional commodities such as financial services and pets as domestic and foreign firms try to



CRITICAL THINKING

1. How does the change in the pattern of consumption expenditure in China relate to the law of increasing opportunity cost?

¹China National Bureau of Statistics, *China Statistical Yearbook – 2016*. Beijing: China Statistics Press.

capitalize on the changes in the consumption patterns of the largest consumer market in the world.

To further promote the relevance of economics, *Current News Exercises* provide a turn-key way to assign gradable news-based exercises in MyLab Economics. Each week, Pearson scours the news, finds a current microeconomics and macroeconomics news article or video, creates exercises around these news articles, and then automatically adds them to MyLab Economics. Assigning and grading current news-based exercises that deal with the latest micro and macro events and policy issues has never been more convenient.

Pearson Economic News Home About

Macroeconomic Weekly News Update August 25, 2018 – August 31, 2018

What’s Really Going On With China’s Economy?

China / economic growth / exports / GDP / international trade

Microeconomic Weekly News Update August 25, 2018 – August 31, 2018

Inside the High-Stakes Business of Tracking Space Junk

externalities / market failure / public goods / space trash / tragedy of the commons

SEARCH

CATEGORIES

- 01. Introductory Concepts (scarcity, opportunity cost, comparative advantage, and economic models)
- 02. Supply Demand and Market Equilibrium (applications of supply/demand model)
- 03. Market Efficiency and Surplus; Market Failure and Public Goods
- 04. Factors of Production, Labor, Technology and Costs
- 05. Market Structure (pricing, advertising, and game theory)
- 06. Macroeconomic Variables and Policy Goals
- 07. Growth, Development, and Financial Markets (long run)
- 08. Monetary Policy (short-run fluctuations)
- 09. Fiscal Policy (short-run fluctuations)
- 10. International Economics (trade and finance)

Concept Checks

Giving students the opportunity to practice what they are learning along the way is critical to their success in the principles of economics course. New for this edition, each section and subsection of each learning objective, and select key figures, is reinforced with a Concept Check in the eText of MyLab Economics that contains one or two multiple choice, true/false, or fill-in questions. These checks act as “speed bumps” that encourage students to stop and check their understanding of fundamental terms and concepts before moving on to the next section. The goal is to help students assess their progress on a section-by-section basis, so they can be better prepared for homework, quizzes, and exams.

The screenshot shows a homework page titled "Homework: Homework" with a "Save" button. The score is 0 of 1 pt, and the HW Score is 0% of 3 pts. The question is "Concept Check 2.3" and asks: "Assuming it chooses to produce, a profit-maximizing firm in a perfectly competitive industry will produce output where". The options are:

- A. marginal cost equals average total cost.
- B. the difference between marginal revenue and marginal cost is the greatest.
- C. marginal revenue equals marginal cost.
- D. marginal revenue equals average total cost.

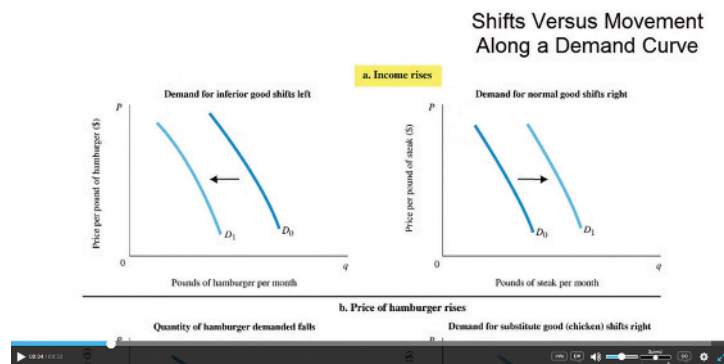
 At the bottom, there is a progress bar for "1 part remaining", a "Clear All" button, and a "Check Answer" button.

Graphing Animations

Graphs are the backbone of introductory economics, but many students struggle to understand and work with them. The Chapter 1 Appendix, “How to Read and Understand Graphs,” shows readers how to interpret the over 200 graphs featured in this book. To make interpreting graphs easier for students, we use red curves to illustrate the behavior of firms, blue curves to show the behavior of households, and a different shade of red and blue to signify a shift in a curve.

The figures in the book are also an integral part of our three-tiered approach to explain concepts in words, equations and graphs. They promote learning as students read an example or story, followed by a mathematical representation, and then see a graphical representation.

Select numbered figures in the text have a supporting animated version in MyLab Economics. The goal is to help students understand shifts in curves, movements along curves, and changes in equilibrium values by bringing graphs to life. Having an animated version of a graph helps students who have difficulty interpreting the static version in the printed text. Graded practice exercises are included with the animations to give students practice reading and interpreting graphs.



Real-Time Data

Currency is imperative in economics, particularly macroeconomics. We achieve this with real-time data analysis figures and exercises. Many of the key figures in the text have been updated in the MyLab with real-time data from the Federal Reserve's Economic Data (FRED™) — a comprehensive, up-to-date data set maintained by the Federal Reserve Bank of St. Louis. These animated graphs help students understand shifts in curves, movements along curves, and changes in equilibrium values. Easy to assign and automatically graded, Real-Time Data Analysis exercises use up-to-the-minute, real-time macroeconomic data. These exercises communicate directly with the Federal Reserve Bank of St. Louis's FRED™ site, so every time FRED posts new data, students see it.

The screenshot shows a homework question interface. At the top, it says 'Homework: Homework' with a 'Save' button. Below that, the score is '1 of 1 pt' and the progress is '2 of 3 (1 complete)'. The 'HW Score' is '33.33%, 1 of 3 pts'. The question title is 'RTDA+: Unemployment' with a green checkmark icon. There are 'Question Help' and 'Settings' icons. The question text reads: 'Click the following link to view unemployment data from FRED*. Then use that data to answer the following questions. *Real-time data provided by Federal Reserve Economic Data (FRED), Federal Reserve Bank of Saint Louis. The data in the table below shows employment data for August 01, 2018. Using the link above, correctly identify the title for each series listed in the table below.' A table follows with three columns: Title, Series ID, and Value. The table contains three rows: 'Unemployed' (UNEMPLOY, 6,234), 'Civilian Labour force' (CLF16OV, 161,776), and 'Employment level-part-time for economic reasons...' (LNS12032195, 2,551). Below the table, it says 'Using FRED, the series above are reported monthly, and the values are in thousands of persons.' Then it asks to calculate two unemployment rates, with the first rate shown as 3.89% and the second as 5.43%. At the bottom, it says 'Question is complete.' and 'All parts showing' with a 'Try Again' button and navigation arrows.

Title	Series ID	Value
Unemployed	UNEMPLOY	6,234
Civilian Labour force	CLF16OV	161,776
Employment level-part-time for economic reasons...	LNS12032195	2,551

Critical Thinking Questions

Throughout the course, and after graduation, students need to demonstrate critical thinking skills in their work and careers. To help develop these essential skills, we've added a new section of Critical Thinking questions to give students practice in higher-order thinking. Available in MyLab Economics, each end-of-chapter problem set ends with a *Critical Thinking Questions* section. These questions ask students to think more deeply about the concepts they've learned in the chapter when answering them. These assignable essay questions can be used on homework, tests, or quizzes. They require manual scoring; however, each essay question includes a sample correct answer to make grading easy.

CRITICAL THINKING QUESTIONS

QUESTION 1 When an unemployed individual gives up looking for work and leaves the labor force, she is no longer considered unemployed. What happens to the unemployment rate as a result? Does this mean that the unemployment rate understates or overstates the problem of joblessness?

QUESTION 2 According to the Efficiency Wage Theory, employers occasionally pay workers more than the equilibrium wage in the market in order to increase productivity. Explain how this would lead to reduced turnover.

Problems and Solutions

Each chapter and appendix ends with a problem set that asks students to think about and apply what they've learned in the chapter. These problems are not simple memorization questions. Rather, they ask students to perform graphical analysis or to apply economics to a

real-world situation or policy decision. More challenging problems are indicated by an asterisk. Many problems have been updated. These problems can be assigned and auto-graded in MyLab Economics and are available with optional just-in-time learning aids to help students when they need it the most. Students can also practice these problems in the Study Plan. The Study Plan gives students personalized recommendations, practice opportunities, and learning aids to help them stay on track.

Developing Employability Skills

For students to succeed in a rapidly changing job market, they should be aware of their career options and how to go about developing the many skills they will need to do so. We focus on developing these skills in a variety of ways.

In the text, the *Economics in Practice* boxes help students think deeply about concepts and make connections between what they learn in class and how it can apply to their job in the real world. Chapter 1's *Economics in Practice* box explores how majoring in economics can help make students less vulnerable to recession. Chapter 11's *Economics in Practice* boxes highlight investment banking, the stock market, and investing strategies, topics of particular interest and relevance to students studying economics and finance.

In MyLab Economics, the *Critical Thinking Questions* and *Current News* exercises encourage application of skills that will contribute toward success in this course and in the future, regardless of each student's career path.

Table of Contents Overview

Microeconomic Structure

The organization of the microeconomic chapters continues to reflect our belief that the best way to understand how market economies operate—and the best way to understand basic economic theory—is to work through the perfectly competitive model first, including discussions of output markets (goods and services) and input markets (land, labor, and capital), and the connections between them before turning to noncompetitive market structures such as monopoly and oligopoly. When students understand how a simple, perfectly competitive system works, they can start thinking about how the pieces of the economy “fit together.” We think this is a better approach to teaching economics than some of the more traditional approaches, which encourage students to think of economics as a series of disconnected alternative market models. We also make extensive use of concrete examples, designed to help students see the power of the simple economic model. A mastery of this material is invaluable to students interested in careers in business and the public sector. Our core interest is in helping students to think about the world using economics.

Learning perfect competition first also enables students to see the power of the market system. It is impossible for students to discuss the efficiency of markets as well as the problems that arise from markets until they have seen how a simple, perfectly competitive market system produces and distributes goods and services. This is our purpose in Chapters 6 through 11.

Chapter 12, “General Equilibrium and the Efficiency of Perfect Competition,” is a pivotal chapter that links simple, perfectly competitive markets with a discussion of market imperfections and the role of government. Chapters 13 through 15 cover three noncompetitive market structures—monopoly, monopolistic competition, and oligopoly. Chapter 16 covers externalities, public goods, and social choice. Chapter 17 covers uncertainty and asymmetric information. Chapters 18 and 19 cover income distribution as well as taxation and government finance. Figure II.2 from page 142 gives you an overview of our structure.