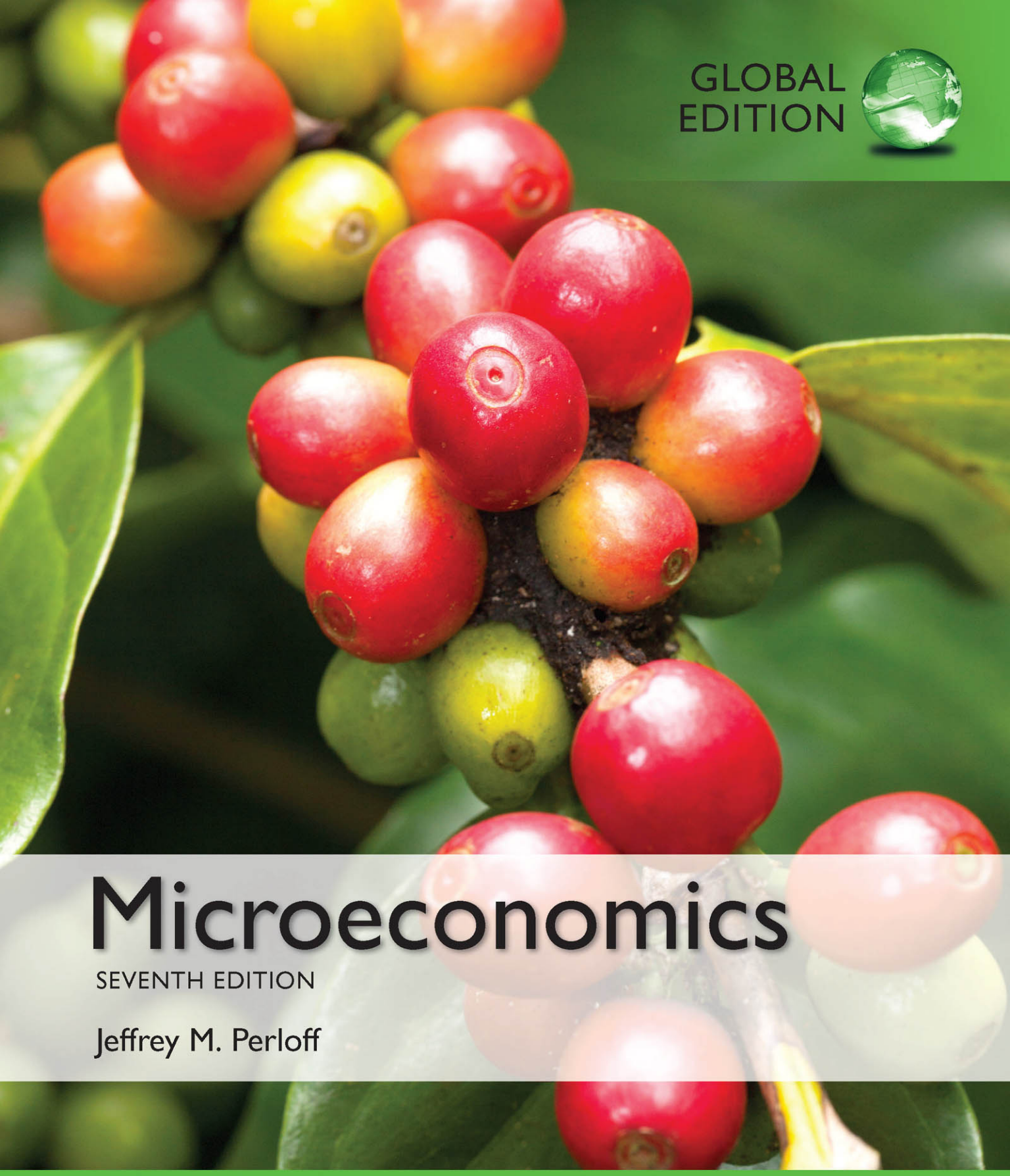


Microeconomics

SEVENTH EDITION

Jeffrey M. Perloff

ALWAYS LEARNING

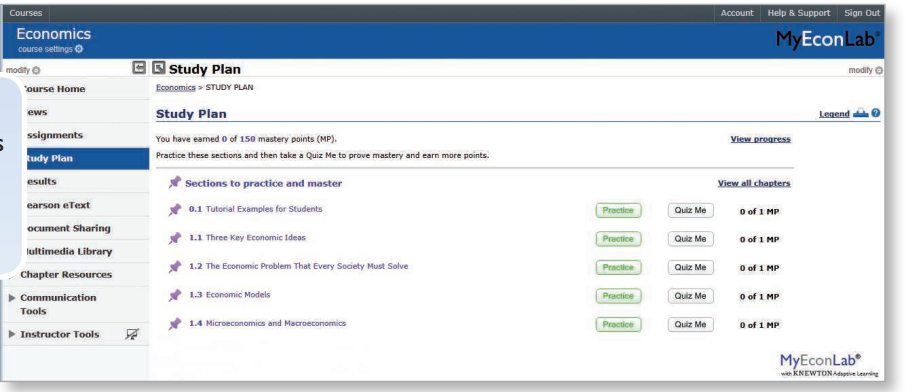
PEARSON

MyEconLab® Provides the Power of Practice

Optimize your study time with **MyEconLab**, the online assessment and tutorial system. When you take a sample test online, **MyEconLab** gives you targeted feedback and a personalized Study Plan to identify the topics you need to review.

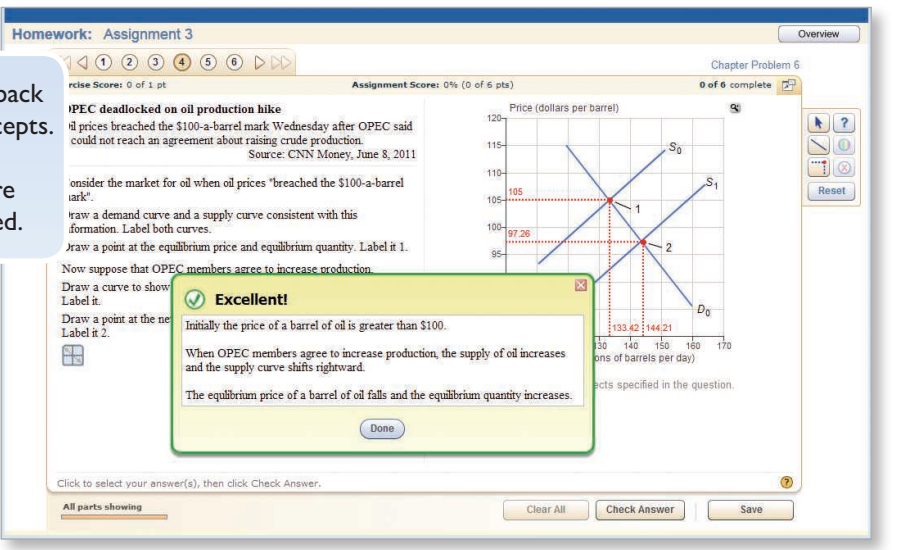
Study Plan

The Study Plan shows you the sections you should study next, gives easy access to practice problems, and provides you with an automatically generated quiz to prove mastery of the course material.



Unlimited Practice

As you work each exercise, instant feedback helps you understand and apply the concepts. Many Study Plan exercises contain algorithmically generated values to ensure that you get as much practice as you need.



Learning Resources

Study Plan problems link to learning resources that further reinforce concepts you need to master.

- **Help Me Solve This** learning aids help you break down a problem much the same way as an instructor would do during office hours. Help Me Solve This is available for select problems.
- **eText links** are specific to the problem at hand so that related concepts are easy to review just when they are needed.
- A **graphing tool** enables you to build and manipulate graphs to better understand how concepts, numbers, and graphs connect.

MyEconLab®

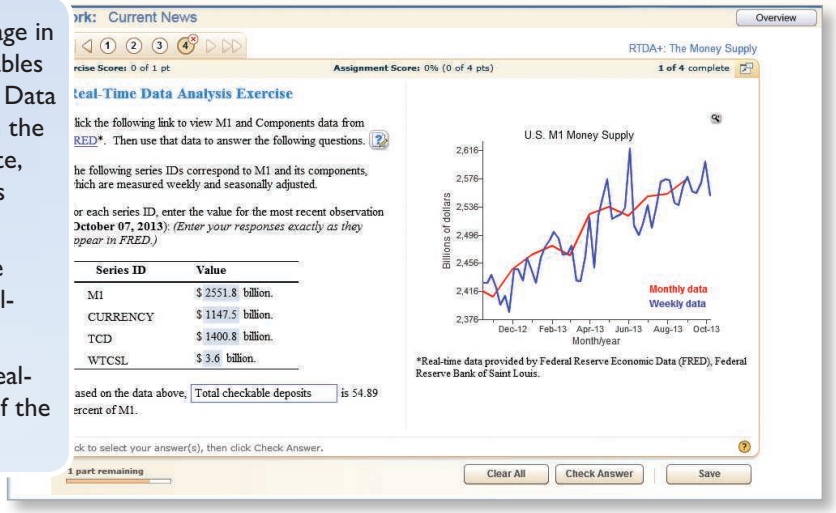
Find out more at www.myeconlab.com

Real-Time Data Analysis Exercises

Up-to-date macro data is a great way to engage in and understand the usefulness of macro variables and their impact on the economy. Real-Time Data Analysis exercises communicate directly with the Federal Reserve Bank of St. Louis's FRED® site, so every time FRED posts new data, students see new data.

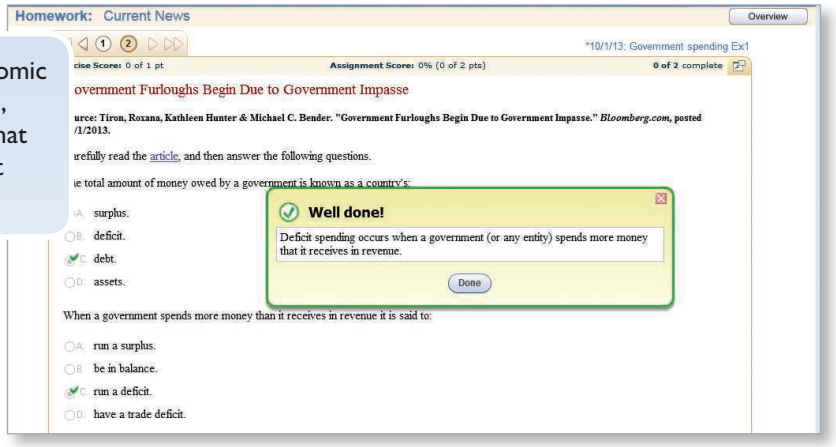
End-of-chapter exercises accompanied by the Real-Time Data Analysis icon include Real-Time Data versions in **MyEconLab**.

Select in-text figures labeled **MyEconLab** Real-Time Data update in the electronic version of the text using FRED data.



Current News Exercises

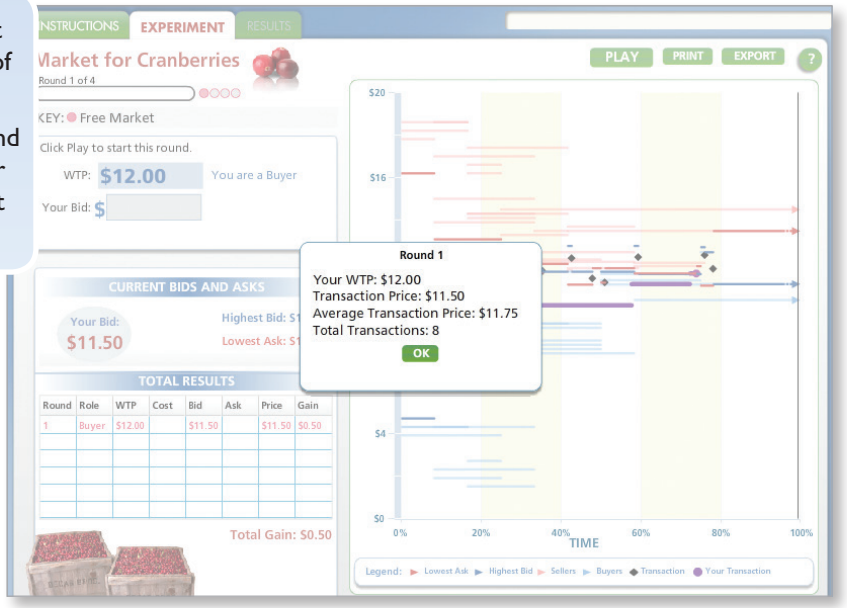
Posted weekly, we find the latest microeconomic and macroeconomic news stories, post them, and write auto-graded multi-part exercises that illustrate the economic way of thinking about the news.



Interactive Homework Exercises

Participate in a fun and engaging activity that helps promote active learning and mastery of important economic concepts.

Pearson's experiments program is flexible and easy for instructors and students to use. For a complete list of available experiments, visit *www.myeconlab.com*.



MICROECONOMICS

SEVENTH EDITION

GLOBAL EDITION

THE PEARSON SERIES IN ECONOMICS

Abel/Bernanke/Croushore
*Macroeconomics**

Bade/Parkin
*Foundations of Economics**

Berck/Helfand
The Economics of the Environment

Bierman/Fernandez
Game Theory with Economic Applications

Blanchard
*Macroeconomics**

Blau/Ferber/Winkler
The Economics of Women, Men, and Work

Boardman/Greenberg/Vining/Weimer
Cost-Benefit Analysis

Boyer
Principles of Transportation Economics

Branson
Macroeconomic Theory and Policy

Bruce
Public Finance and the American Economy

Carlton/Perloff
Modern Industrial Organization

Case/Fair/Oster
*Principles of Economics**

Chapman
Environmental Economics: Theory, Application, and Policy

Cooter/Ulen
Law & Economics

Daniels/VanHoose
International Monetary & Financial Economics

Downs
An Economic Theory of Democracy

Ehrenberg/Smith
Modern Labor Economics

Farnham
Economics for Managers

Folland/Goodman/Stano
The Economics of Health and Health Care

Fort
Sports Economics

Froyen
Macroeconomics

Fusfeld
The Age of the Economist

Gerber
*International Economics**

González-Rivera
Forecasting for Economics and Business

Gordon
*Macroeconomics**

Greene
Econometric Analysis

Gregory
Essentials of Economics

Gregory/Stuart
Russian and Soviet Economic Performance and Structure

Hartwick/Olewiler
The Economics of Natural Resource Use

Heilbroner/Milberg
The Making of the Economic Society

Heyne/Boettke/Prychitko
The Economic Way of Thinking

Holt
Markets, Games, and Strategic Behavior

Hubbard/O'Brien
*Economics**

*Money, Banking, and the Financial System**

Hubbard/O'Brien/Rafferty
*Macroeconomics**

Hughes/Cain
American Economic History

Husted/Melvin
International Economics

Jehle/Reny
Advanced Microeconomic Theory

Johnson-Lans
A Health Economics Primer

Keat/Young/Erfle
Managerial Economics

Klein
Mathematical Methods for Economics

Krugman/Obstfeld/Melitz
*International Economics: Theory & Policy**

Laidler
The Demand for Money

Leeds/von Allmen
The Economics of Sports

Leeds/von Allmen/Schiming
*Economics**

Lynn
Economic Development: Theory and Practice for a Divided World

Miller
*Economics Today**

Understanding Modern Economics

Miller/Benjamin
The Economics of Macro Issues

Miller/Benjamin/North
The Economics of Public Issues

Mills/Hamilton
Urban Economics

Mishkin
*The Economics of Money, Banking, and Financial Markets**

*The Economics of Money, Banking, and Financial Markets, Business School Edition**

*Macroeconomics: Policy and Practice**

Murray
Econometrics: A Modern Introduction

O'Sullivan/Sheffrin/Perez
*Economics: Principles, Applications, and Tools**

Parkin
*Economics**

Perloff
*Microeconomics**

*Microeconomics: Theory and Applications with Calculus**

Perloff/Brander
*Managerial Economics and Strategy**

Phelps
Health Economics

Pindyck/Rubinfeld
*Microeconomics**

Riddell/Shackelford/Stamos/Schneider
Economics: A Tool for Critically Understanding Society

Roberts
The Choice: A Fable of Free Trade and Protection

Rohlf
Introduction to Economic Reasoning

Roland
Development Economics

Scherer
Industry Structure, Strategy, and Public Policy

Schiller
The Economics of Poverty and Discrimination

Sherman
Market Regulation

Stock/Watson
Introduction to Econometrics

Studenmund
Using Econometrics: A Practical Guide

Tietenberg/Lewis
Environmental and Natural Resource Economics

Environmental Economics and Policy

Todaro/Smith
Economic Development

Waldman/Jensen
Industrial Organization: Theory and Practice

Walters/Walters/Appel/Callahan/Centanni/Maex/O'Neill
Econversations: Today's Students Discuss Today's Issues

Weil
Economic Growth

Williamson
Macroeconomics

***denotes MyEconLab titles** **Visit www.myeconlab.com to learn more.**

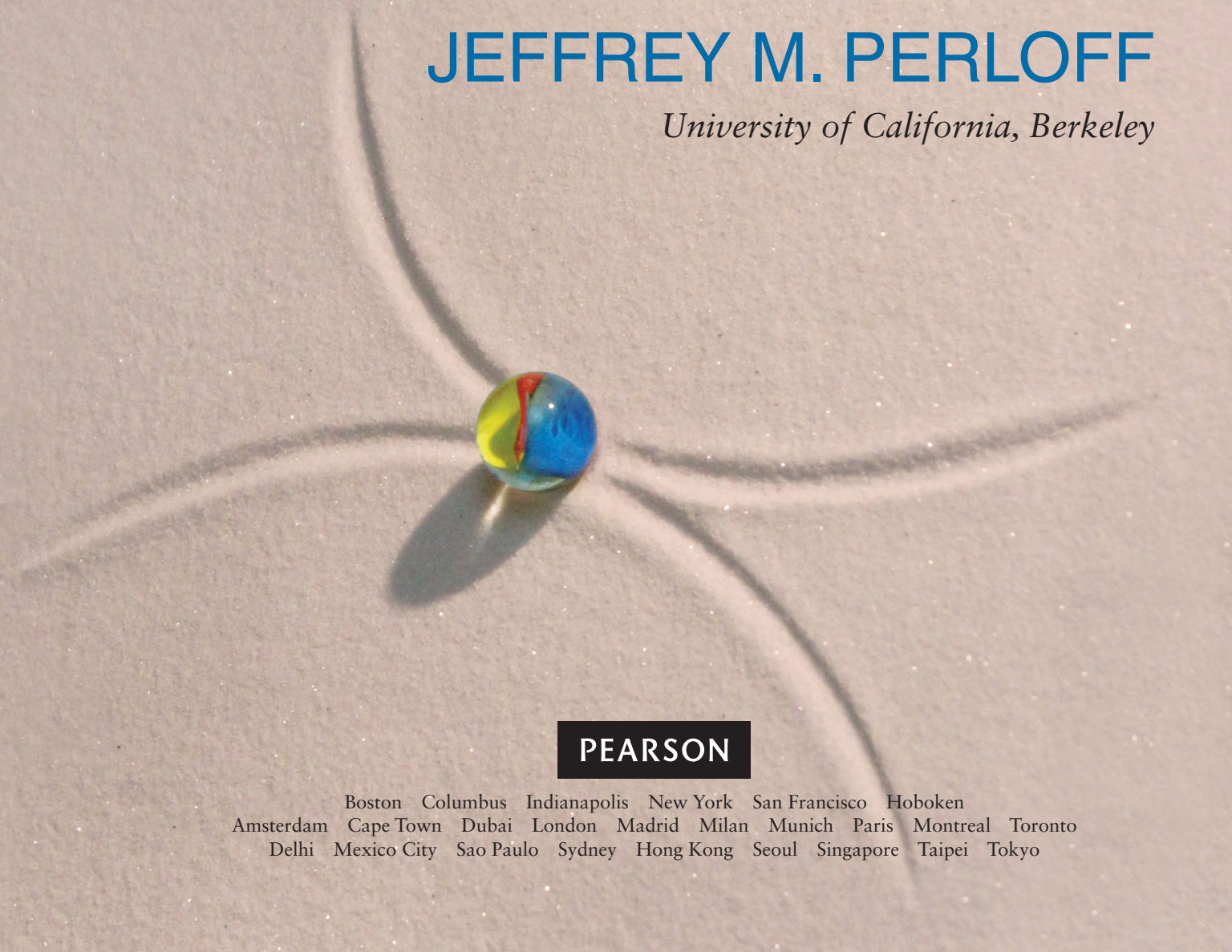
MICROECONOMICS

SEVENTH EDITION

GLOBAL EDITION

JEFFREY M. PERLOFF

University of California, Berkeley



PEARSON

Boston Columbus Indianapolis New York San Francisco Hoboken
Amsterdam Cape Town Dubai London Madrid Milan Munich Paris Montreal Toronto
Delhi Mexico City Sao Paulo Sydney Hong Kong Seoul Singapore Taipei Tokyo

For Alexx, Gregg, Laura, and Spenser

Editor in Chief: Donna Battista
Executive Acquisitions Editor: Adrienne D'Ambrosio
Senior Acquisitions Editor, Global Editions: Steven Jackson
Associate Editor, Global Editions: Paromita Banerjee
Project Editor, Global Editions: Binita Roy
Project Editor, Global Editions: Suchismita Ukil
Digital Publisher: Denise Clinton
Editorial Project Manager: Sarah Dumouchelle
Project Manager, Global Editions: Vamanan Namboodiri
Editorial Assistant: Patrick Henning
Executive Marketing Manager: Lori DeShazo
Managing Editor: Jeff Holcomb
Senior Production Project Manager: Meredith Gertz
Senior Manufacturing Buyer: Carol Melville
Senior Manufacturing Controller, Global Editions: Trudy Kimber
Art Director and Cover Designer: Jonathan Boylan
Cover Photo: © c sa bum / Shutterstock
Image Manager: Rachel Youdelman
Photo Research: Integra Software Services, Ltd.
Associate Project Manager—Text Permissions: Samantha Blair Graham
Text Permissions Research: Electronic Publishing Services
Director of Media: Susan Schoenberg
Executive Media Producer: Melissa Honig
MyEconLab Content Lead: Courtney Kamauf
Media Production Manager, Global Editions: Vikram Kumar
Full-Service Project Management and Text Design: Gillian Hall, The Aardvark Group
Full-Service Project Management and Text Design, Global Editions: SPi Global
Copyeditor: Rebecca Greenberg
Proofreader: Holly McLean-Aldis
Indexer: John Lewis
Composition and Illustrations: Laserwords Maine

Credits and acknowledgments borrowed from other sources and reproduced, with permission, in this textbook appear on appropriate page within the text and on page 800.

Pearson Education Limited
Edinburgh Gate
Harlow
Essex CM20 2JE
England

and Associated Companies throughout the world

Visit us on the World Wide Web at: www.pearsonglobaleditions.com

© Pearson Education Limited 2016

The rights of Jeffrey M. Perloff to be identified as the author of this work have been asserted by him in accordance with the Copyright, Designs and Patents Act 1988.

Authorized adaptation from the United States edition, entitled Microeconomics, 7th Edition, ISBN 978-0-13-345691-2 by Jeffrey M. Perloff*, published by Pearson Education © 2015.*

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without either the prior written permission of the publisher or a license permitting restricted copying in the United Kingdom issued by the Copyright Licensing Agency Ltd, Saffron House, 6–10 Kirby Street, London EC1N 8TS.

All trademarks used herein are the property of their respective owners. The use of any trademark in this text does not vest in the author or publisher any trademark ownership rights in such trademarks, nor does the use of such trademarks imply any affiliation with or endorsement of this book by such owners.

ISBN 10: 1-29-205653-3
ISBN 13: 978-1-292-05653-1

British Library Cataloguing-in-Publication Data
A catalogue record for this book is available from the British Library

10 9 8 7 6 5 4 3 2 1

Typeset in Sabon by
Printed and bound by Vivar in Malaysia

Brief Contents

Preface		14
Chapter 1	Introduction	25
Chapter 2	Supply and Demand	32
Chapter 3	Applying the Supply-and-Demand Model	66
Chapter 4	Consumer Choice	96
Chapter 5	Applying Consumer Theory	131
Chapter 6	Firms and Production	171
Chapter 7	Costs	203
Chapter 8	Competitive Firms and Markets	244
Chapter 9	Applying the Competitive Model	286
Chapter 10	General Equilibrium and Economic Welfare	332
Chapter 11	Monopoly	368
Chapter 12	Pricing and Advertising	408
Chapter 13	Oligopoly and Monopolistic Competition	448
Chapter 14	Game Theory	492
Chapter 15	Factor Markets	529
Chapter 16	Interest Rates, Investments, and Capital Markets	554
Chapter 17	Uncertainty	585
Chapter 18	Externalities, Open-Access, and Public Goods	619
Chapter 19	Asymmetric Information	647
Chapter 20	Contracts and Moral Hazards	675
Chapter Appendixes		705
Answers to Selected Questions and Problems		733
Sources for Challenges and Applications		750
References		760
Definitions		768
Index		773
Credits		800

Contents

Preface 14

Chapter 1 Introduction 25

1.1 **Microeconomics: The Allocation of Scarce Resources** 25
Trade-Offs 26
Who Makes the Decisions 26
Prices Determine Allocations 26
1.2 **Models** 27
APPLICATION *Income Threshold Model and China* 27
Simplifications by Assumption 27
Testing Theories 28
Positive Versus Normative 29
1.3 **Uses of Microeconomic Models** 30
Summary 31

Chapter 2 Supply and Demand 32

CHALLENGE *Quantities and Prices of Genetically Modified Foods* 32
2.1 **Demand** 33
The Demand Curve 34
APPLICATION *Calorie Counting at Starbucks* 37
The Demand Function 38
Solved Problem 2.1 39
Summing Demand Curves 40
APPLICATION *Aggregating Corn Demand Curves* 40
2.2 **Supply** 41
The Supply Curve 41
The Supply Function 43
Summing Supply Curves 44
Effects of Government Import Policies on Supply Curves 44
Solved Problem 2.2 45
2.3 **Market Equilibrium** 46
Using a Graph to Determine the Equilibrium 46
Using Math to Determine the Equilibrium 46
Forces That Drive the Market to Equilibrium 47
2.4 **Shocking the Equilibrium** 48
Effects of a Shift in the Demand Curve 48
Solved Problem 2.3 49
Effects of a Shift in the Supply Curve 50
2.5 **Equilibrium Effects of Government Interventions** 50
Policies That Shift Supply Curves 51
APPLICATION *Occupational Licensing* 51
Solved Problem 2.4 52
Policies That Cause Demand to Differ from Supply 53
APPLICATION *Price Controls Kill* 55
Solved Problem 2.5 57
Why Supply Need Not Equal Demand 57
2.6 **When to Use the Supply-and-Demand Model** 58
CHALLENGE SOLUTION *Quantities and Prices of Genetically Modified Foods* 59
Summary 60 ■ *Questions 61*

Chapter 3 Applying the Supply-and-Demand Model 66

CHALLENGE *Who Pays the Gasoline Tax?* 66
3.1 **How Shapes of Supply and Demand Curves Matter** 67
3.2 **Sensitivity of the Quantity Demanded to Price** 68
Price Elasticity of Demand 69
Solved Problem 3.1 70
Elasticity Along the Demand Curve 70
Demand Elasticity and Revenue 73
Solved Problem 3.2 73
APPLICATION *Do Farmers Benefit from a Major Drought?* 74
Demand Elasticities over Time 75
Other Demand Elasticities 75
3.3 **Sensitivity of the Quantity Supplied to Price** 77
Elasticity of Supply 77
Elasticity Along the Supply Curve 78
Supply Elasticities over Time 79
APPLICATION *Oil Drilling in the Arctic National Wildlife Refuge* 79
Solved Problem 3.3 80
3.4 **Effects of a Sales Tax** 82
Equilibrium Effects of a Specific Tax 82
The Equilibrium Is the Same No Matter Who Is Taxed 84
Solved Problem 3.4 84
Firms and Customers Share the Burden of the Tax 85
APPLICATION *Taxes to Prevent Obesity* 86

Solved Problem 3.5 87
Ad Valorem and Specific Taxes Have Similar Effects 87
Solved Problem 3.6 88
Subsidies 89
APPLICATION *The Ethanol Subsidy* 90
CHALLENGE SOLUTION *Who Pays the Gasoline Tax?* 90
Summary 91 ■ *Questions 92*

Chapter 4 Consumer Choice 96

CHALLENGE *Why Americans Buy More E-Books Than Do Germans* 96
4.1 Preferences 98
Properties of Consumer Preferences 98
APPLICATION *You Can't Have Too Much Money* 99
Preference Maps 100
Solved Problem 4.1 102
APPLICATION *Indifference Curves Between Food and Clothing* 106
4.2 Utility 106
Utility Function 106
Ordinal Preferences 107
Utility and Indifference Curves 107
Marginal Utility 109
Utility and Marginal Rates of Substitution 110
4.3 Budget Constraint 110
Slope of the Budget Constraint 112
Solved Problem 4.2 112
Effect of a Change in Price on the Opportunity Set 113
Effect of a Change in Income on the Opportunity Set 114
Solved Problem 4.3 114
4.4 Constrained Consumer Choice 114
The Consumer's Optimal Bundle 115
APPLICATION *Substituting Alcohol for Marijuana* 116
Solved Problem 4.4 117
★ Optimal Bundles on Convex Sections of Indifference Curves 118
Buying Where More Is Better 119
Food Stamps 120
APPLICATION *Benefiting from Food Stamps* 122
4.5 Behavioral Economics 122
Tests of Transitivity 122
Endowment Effect 123
APPLICATION *Opt In Versus Opt Out* 124
Salience and Bounded Rationality 124
APPLICATION *Unaware of Taxes* 125
CHALLENGE SOLUTION *Why Americans Buy More E-Books Than Do Germans* 125
Summary 126 ■ *Questions 127*

Chapter 5 Applying Consumer Theory 131

CHALLENGE *Per-Hour Versus Lump-Sum Childcare Subsidies* 131
5.1 Deriving Demand Curves 132
Indifference Curves and a Rotating Budget Line 133
Price-Consumption Curve 134
APPLICATION *Smoking Versus Eating and Phoning* 135
The Demand Curve Corresponds to the Price-Consumption Curve 136
Solved Problem 5.1 136
5.2 How Changes in Income Shift Demand Curves 137
Effects of a Rise in Income 137
Solved Problem 5.2 139
Consumer Theory and Income Elasticities 140
APPLICATION *Fast-Food Engel Curve* 143
5.3 Effects of a Price Change 144
Income and Substitution Effects with a Normal Good 144
Solved Problem 5.3 146
Solved Problem 5.4 147
APPLICATION *Shipping the Good Stuff Away* 148
Income and Substitution Effects with an Inferior Good 148
Solved Problem 5.5 149
★ Compensating Variation and Equivalent Variation 150
APPLICATION *What's the Value of Using the Internet?* 150
5.4 Cost-of-Living Adjustments 150
Inflation Indexes 151
Effects of Inflation Adjustments 153
APPLICATION *Paying Employees to Relocate* 154
5.5 Deriving Labor Supply Curves 156
Labor-Leisure Choice 156
Income and Substitution Effects 159
Solved Problem 5.6 160
★ Shape of the Labor Supply Curve 161
APPLICATION *Working After Winning the Lottery* 162
Income Tax Rates and Labor Supply 163
CHALLENGE SOLUTION *Per-Hour Versus Lump-Sum Childcare Subsidies* 165
Summary 166 ■ *Questions 167*

Chapter 6 Firms and Production 171

CHALLENGE *Labor Productivity During Recessions* 171
6.1 The Ownership and Management of Firms 172
Private, Public, and Nonprofit Firms 172

APPLICATION *Chinese State-Owned Enterprises* 173
The Ownership of For-Profit Firms 173
The Management of Firms 174
What Owners Want 174
6.2 **Production Function** 175
6.3 **Short-Run Production** 177
Total Product 177
Marginal Product of Labor 178
Solved Problem 6.1 178
Average Product of Labor 179
Graphing the Product Curves 179
Law of Diminishing Marginal Returns 181
APPLICATION *Malthus and the Green Revolution* 182
6.4 **Long-Run Production** 183
Isoquants 184
APPLICATION *A Semiconductor Integrated Circuit Isoquant* 186
Substituting Inputs 187
Solved Problem 6.2 189
6.5 **Returns to Scale** 190
Constant, Increasing, and Decreasing Returns to Scale 190
Solved Problem 6.3 191
APPLICATION *Returns to Scale in Various Industries* 192
Varying Returns to Scale 193
6.6 **Productivity and Technical Change** 195
Relative Productivity 195
APPLICATION *A Good Boss Raises Productivity* 195
Innovations 195
APPLICATION *Tata Nano's Technical and Organizational Innovations* 197
CHALLENGE SOLUTION *Labor Productivity During Recessions* 197
Summary 199 ■ *Questions 199*

Chapter 7 Costs 203

CHALLENGE *Technology Choice at Home Versus Abroad* 203
7.1 **The Nature of Costs** 204
Opportunity Costs 204
APPLICATION *The Opportunity Cost of an MBA* 205
Solved Problem 7.1 205
Costs of Durable Inputs 206
Sunk Costs 207
7.2 **Short-Run Costs** 207
Short-Run Cost Measures 208
Short-Run Cost Curves 210
Production Functions and the Shape of Cost Curves 211
APPLICATION *Short-Run Cost Curves for a Beer Manufacturer* 214
Effects of Taxes on Costs 215
Solved Problem 7.2 216
Short-Run Cost Summary 217
7.3 **Long-Run Costs** 217
All Costs Are Avoidable in the Long Run 217
Minimizing Cost 217
Isocost Line 218
Combining Cost and Production Information 220
Solved Problem 7.3 222
Factor Price Changes 223
Solved Problem 7.4 223
The Long-Run Expansion Path and the Long-Run Cost Function 224
Solved Problem 7.5 226
The Shape of Long-Run Cost Curves 226
APPLICATION *Economies of Scale in Nuclear Power Plants* 229
Estimating Cost Curves Versus Introspection 230
7.4 **Lower Costs in the Long Run** 230
Long-Run Average Cost as the Envelope of Short-Run Average Cost Curves 231
APPLICATION *Long-Run Cost Curves in Beer Manufacturing* 232
APPLICATION *Choosing an Inkjet or a Laser Printer* 232
Short-Run and Long-Run Expansion Paths 233
The Learning Curve 233
APPLICATION *Learning by Drilling* 235
7.5 **Cost of Producing Multiple Goods** 236
APPLICATION *Economies of Scope* 237
CHALLENGE SOLUTION *Technology Choice at Home Versus Abroad* 238
Summary 239 ■ *Questions 240*

Chapter 8 Competitive Firms and Markets 244

CHALLENGE *The Rising Cost of Keeping On Truckin'* 244
8.1 **Perfect Competition** 245
Price Taking 245
Why the Firm's Demand Curve Is Horizontal 246
Deviations from Perfect Competition 247
Derivation of a Competitive Firm's Demand Curve 248
Solved Problem 8.1 249
Why We Study Perfect Competition 250
8.2 **Profit Maximization** 250
Profit 250
Two Steps to Maximizing Profit 251
8.3 **Competition in the Short Run** 254
Short-Run Output Decision 255
Solved Problem 8.2 257
Short-Run Shutdown Decision 258
APPLICATION *Oil, Oil Sands, and Oil Shale Shutdowns* 260
Solved Problem 8.3 261
Short-Run Firm Supply Curve 261

Short-Run Market Supply Curve 262
Short-Run Competitive Equilibrium 264
Solved Problem 8.4 266
8.4 Competition in the Long Run 267
Long-Run Competitive Profit Maximization 267
Long-Run Firm Supply Curve 267
APPLICATION *The Size of Ethanol Processing Plants* 268
Long-Run Market Supply Curve 268
APPLICATION *Fast-Food Firms' Entry in Russia* 269
APPLICATION *Upward-Sloping Long-Run Supply Curve for Cotton* 272
APPLICATION *Reformulated Gasoline Supply Curves* 276
Solved Problem 8.5 277
Long-Run Competitive Equilibrium 278
CHALLENGE SOLUTION *The Rising Cost of Keeping On Truckin'* 279
Summary 280 ■ Questions 281

Chapter 9 Applying the Competitive Model 286
CHALLENGE *"Big Dry" Water Restrictions* 286
9.1 Zero Profit for Competitive Firms in the Long Run 287
Zero Long-Run Profit with Free Entry 287
Zero Long-Run Profit When Entry Is Limited 288
APPLICATION *Tiger Woods' Rent* 290
The Need to Maximize Profit 290
9.2 Consumer Welfare 291
Measuring Consumer Welfare Using a Demand Curve 291
APPLICATION *Willingness to Pay and Consumer Surplus on eBay* 293
Effect of a Price Change on Consumer Surplus 294
APPLICATION *Goods with a Large Consumer Surplus Loss from Price Increases* 295
Solved Problem 9.1 296
9.3 Producer Welfare 297
Measuring Producer Surplus Using a Supply Curve 297
Using Producer Surplus 298
Solved Problem 9.2 299
Competition Maximizes Welfare 300
Solved Problem 9.3 302
APPLICATION *Deadweight Loss of Christmas Presents* 303
9.5 Policies That Shift Supply and Demand Curves 304
Restricting the Number of Firms 305
APPLICATION *Licensing Cabs* 307
Raising Entry and Exit Costs 308
9.6 Policies That Create a Wedge Between Supply and Demand 309
Welfare Effects of a Sales Tax 309
APPLICATION *The Deadweight Cost of Raising Gasoline Tax Revenue* 310
Solved Problem 9.4 311
Welfare Effects of a Subsidy 312
Solved Problem 9.5 312
Welfare Effects of a Price Floor 313
Solved Problem 9.6 315
APPLICATION *How Big Are Farm Subsidies and Who Gets Them?* 316
Welfare Effects of a Price Ceiling 317
Solved Problem 9.7 318
APPLICATION *The Social Cost of a Natural Gas Price Ceiling* 319
9.7 Comparing Both Types of Policies: Imports 319
Free Trade Versus a Ban on Imports 320
Free Trade Versus a Tariff 321
Free Trade Versus a Quota 323
APPLICATION *The Chicken Tax Trade War* 324
Rent Seeking 324
CHALLENGE SOLUTION *"Big Dry" Water Restrictions* 325
Summary 327 ■ Questions 327

Chapter 10 General Equilibrium and Economic Welfare 332
CHALLENGE *Anti-Price Gouging Laws* 332
10.1 General Equilibrium 334
Feedback Between Competitive Markets 335
Solved Problem 10.1 337
Minimum Wages with Incomplete Coverage 338
Solved Problem 10.2 340
APPLICATION *Urban Flight* 341
10.2 Trading Between Two People 341
Endowments 341
Mutually Beneficial Trades 343
Solved Problem 10.3 345
Bargaining Ability 345
10.3 Competitive Exchange 345
Competitive Equilibrium 346
The Efficiency of Competition 347
Obtaining Any Efficient Allocation Using Competition 347
10.4 Production and Trading 348
Comparative Advantage 348
Solved Problem 10.4 350
Efficient Product Mix 352
Competition 352
10.5 Efficiency and Equity 354
Role of the Government 354
APPLICATION *The Wealth and Income of the 1%* 355
Efficiency 356
Equity 358
APPLICATION *How You Vote Matters* 360
Efficiency Versus Equity 362

CHALLENGE SOLUTION *Anti-Price Gouging Laws* 363
Summary 364 ■ *Questions 365*

Chapter 11 Monopoly 368

CHALLENGE *Brand-Name and Generic Drugs* 368
11.1 Monopoly Profit Maximization 370
Marginal Revenue 370
Solved Problem 11.1 372
Choosing Price or Quantity 374
Graphical Approach 375
Mathematical Approach 376
APPLICATION *Apple's iPad* 377
Solved Problem 11.2 377
Effects of a Shift of the Demand Curve 378
11.2 Market Power 379
Market Power and the Shape of the Demand Curve 379
APPLICATION *Cable Cars and Profit Maximization* 381
Lerner Index 382
Solved Problem 11.3 382
Sources of Market Power 382
11.3 Market Failure Due to Monopoly Pricing 383
Solved Problem 11.4 385
11.4 Causes of Monopoly 386
Cost-Based Monopoly 386
Solved Problem 11.5 388
Government Creation of a Monopoly 388
APPLICATION *Botox Patent Monopoly* 390
11.5 Government Actions That Reduce Market Power 391
Regulating Monopolies 391
Solved Problem 11.6 394
APPLICATION *Natural Gas Regulation* 395
Increasing Competition 396
APPLICATION *Generic Competition for Apple's iPod* 397
Solved Problem 11.7 397
11.6 Networks, Dynamics, and Behavioral Economics 398
Network Externalities 399
Network Externalities and Behavioral Economics 399
Network Externalities as an Explanation for Monopolies 400
APPLICATION *Critical Mass and eBay* 400
A Two-Period Monopoly Model 401
CHALLENGE SOLUTION *Brand-Name and Generic Drugs* 402
Summary 403 ■ *Questions 403*

Chapter 12 Pricing and Advertising 408

CHALLENGE *Sale Prices* 408
12.1 Conditions for Price Discrimination 410
Why Price Discrimination Pays 410
APPLICATION *Disneyland Pricing* 412
Which Firms Can Price Discriminate 412
Preventing Resale 413
APPLICATION *Preventing Resale of Designer Bags* 414
Not All Price Differences Are Price Discrimination 414
Types of Price Discrimination 414
12.2 Perfect Price Discrimination 415
How a Firm Perfectly Price Discriminates 415
APPLICATION *Google Uses Bidding for Ads to Price Discriminate* 416
Perfect Price Discrimination Is Efficient but Harms Some Consumers 417
APPLICATION *Botox Revisited* 419
Solved Problem 12.1 420
Transaction Costs and Perfect Price Discrimination 420
12.3 Group Price Discrimination 420
APPLICATION *Warner Brothers Sets Prices for a* Harry Potter *DVD* 421
Group Price Discrimination with Two Groups 421
Solved Problem 12.2 422
APPLICATION *Reselling Textbooks* 423
Solved Problem 12.3 424
Identifying Groups 426
APPLICATION *Buying Discounts* 426
Welfare Effects of Group Price Discrimination 427
12.4 Nonlinear Price Discrimination 428
12.5 Two-Part Pricing 430
Two-Part Pricing with Identical Customers 431
Two-Part Pricing with Nonidentical Consumers 432
APPLICATION *iTunes for a Song* 434
12.6 Tie-In Sales 434
Requirement Tie-In Sale 434
APPLICATION *Ties That Bind* 435
Bundling 435
Solved Problem 12.4 437
12.7 Advertising 438
The Decision Whether to Advertise 438
How Much to Advertise 439
APPLICATION *Super Bowl Commercials* 440
CHALLENGE SOLUTION *Sale Prices* 441
Summary 442 ■ *Questions 443*

Chapter 13 Oligopoly and Monopolistic Competition 448

CHALLENGE *Government Aircraft Subsidies* 448
13.1 Market Structures 450
13.2 Cartels 451
Why Cartels Form 451
Laws Against Cartels 453
APPLICATION *Catwalk Cartel* 455

Why Cartels Fail 456
Maintaining Cartels 456
APPLICATION *Casket Entry* 457
Mergers 458
APPLICATION *Hospital Mergers: Market Power Versus Efficiency* 458
13.3 Cournot Oligopoly 459
The Duopoly Nash-Cournot Equilibrium 460
An Airlines Market Example 460
Equilibrium, Elasticity, and the Number of Firms 464
APPLICATION *Mobile Number Portability* 466
Nonidentical Firms 466
Solved Problem 13.1 467
Solved Problem 13.2 469
APPLICATION *Bottled Water* 470
13.4 Stackelberg Oligopoly 471
Graphical Model 471
Solved Problem 13.3 473
Why Moving Sequentially Is Essential 474
Comparison of Competitive, Stackelberg, Cournot, and Collusive Equilibria 474
13.5 Bertrand Oligopoly 475
Identical Products 476
Differentiated Products 477
APPLICATION *Welfare Gain from More Toilet Paper* 479
13.6 Monopolistic Competition 480
APPLICATION *Monopolistically Competitive Food Truck Market* 480
Equilibrium 481
Solved Problem 13.4 482
Fixed Costs and the Number of Firms 482
Solved Problem 13.5 484
APPLICATION *Zoning Laws as a Barrier to Entry by Hotel Chains* 484
CHALLENGE SOLUTION *Government Aircraft Subsidies* 485
Summary 486 ■ *Questions 487*

Chapter 14 Game Theory 492

CHALLENGE *Competing E-book Standards* 492
14.1 Static Games 494
Normal-Form Games 494
Predicting a Game's Outcome 495
Multiple Nash Equilibria, No Nash Equilibrium, and Mixed Strategies 498
APPLICATION *Tough Love* 501
Solved Problem 14.1 501
Cooperation 502
APPLICATION *Strategic Advertising* 503
14.2 Repeated Dynamic Games 504
Strategies and Actions in Dynamic Games 505
Cooperation in a Repeated Prisoner's Dilemma Game 505
Solved Problem 14.2 507
14.3 Sequential Dynamic Games 507
Game Tree 507
Subgame Perfect Nash Equilibrium 508
Credibility 510
Dynamic Entry Game 511
APPLICATION *Dominant Airlines* 512
Solved Problem 14.3 513
14.4 Auctions 514
Elements of Auctions 515
Bidding Strategies in Private-Value Auctions 516
Winner's Curse 517
APPLICATION *Bidder's Curse* 518
14.5 Behavioral Game Theory 518
APPLICATION *GM's Ultimatum* 519
CHALLENGE SOLUTION *Competing E-book Standards* 520
Summary 521 ■ *Questions 522*

Chapter 15 Factor Markets 529

CHALLENGE *Athletes' Salaries and Ticket Prices* 529
15.1 Competitive Factor Market 530
Short-Run Factor Demand of a Firm 531
Solved Problem 15.1 533
Solved Problem 15.2 534
Long-Run Factor Demand 535
Factor Market Demand 536
Competitive Factor Market Equilibrium 538
15.2 Effects of Monopolies on Factor Markets 539
Market Structure and Factor Demands 539
A Model of Market Power in Input and Output Markets 540
APPLICATION *Unions and Profits* 543
Solved Problem 15.3 544
15.3 Monopsony 545
Monopsony Profit Maximization 545
APPLICATION *Walmart's Monopsony Power* 547
Welfare Effects of Monopsony 548
Solved Problem 15.4 549
CHALLENGE SOLUTION *Athletes' Salaries and Ticket Prices* 549
Summary 550 ■ *Questions 551*

Chapter 16 Interest Rates, Investments, and Capital Markets 554

CHALLENGE *Should You Go to College?* 554
16.1 Comparing Money Today to Money in the Future 555
Interest Rates 555
Using Interest Rates to Connect the Present and Future 558
APPLICATION *Power of Compounding* 558
Stream of Payments 560
Solved Problem 16.1 561
APPLICATION *Saving for Retirement* 562

Inflation and Discounting 563
APPLICATION *Winning the Lottery* 564
16.2 **Choices over Time** 565
Investing 565
Solved Problem 16.2 567
Solved Problem 16.3 568
Rate of Return on Bonds 568
★ Behavioral Economics: Time-Varying Discounting 569
APPLICATION *Falling Discount Rates and Self-Control* 570
16.3 **Exhaustible Resources** 570
When to Sell an Exhaustible Resource 571
Price of a Scarce Exhaustible Resource 571
APPLICATION *Redwood Trees* 574
Why Price May Be Constant or Fall 575
16.4 **Capital Markets, Interest Rates, and Investments** 577
Solved Problem 16.4 578
CHALLENGE SOLUTION *Should You Go to College?* 579
Summary 581 ■ *Questions 581*

Chapter 17 Uncertainty 585

CHALLENGE *BP and Limited Liability* 585
17.1 **Assessing Risk** 587
Probability 587
Expected Value 589
Solved Problem 17.1 589
Variance and Standard Deviation 590
17.2 **Attitudes Toward Risk** 591
Expected Utility 591
Risk Aversion 592
Solved Problem 17.2 594
APPLICATION *Stocks' Risk Premium* 595
Risk Neutrality 596
Risk Preference 597
APPLICATION *Gambling* 597
17.3 **Reducing Risk** 598
Obtain Information 599
Diversify 599
APPLICATION *Diversifying Retirement Funds* 601
Buy Insurance 601
Solved Problem 17.3 602
APPLICATION *Flight Insurance* 604
APPLICATION *Limited Insurance for Natural Disasters* 605
17.4 **Investing Under Uncertainty** 606
Risk-Neutral Investing 606
Risk-Averse Investing 606
Solved Problem 17.4 607
17.5 **Behavioral Economics of Uncertainty** 608
Biased Assessment of Probabilities 608
APPLICATION *Biased Estimates* 609
Violations of Expected Utility Theory 610
Prospect Theory 611
CHALLENGE SOLUTION *BP and Limited Liability* 613
Summary 614 ■ *Questions 615*

Chapter 18 Externalities, Open-Access, and Public Goods 619

CHALLENGE *Trade and Pollution* 619
18.1 **Externalities** 620
APPLICATION *Negative Externalities from Spam* 621
18.2 **The Inefficiency of Competition with Externalities** 621
18.3 **Regulating Externalities** 624
APPLICATION *Pulp and Paper Mill Pollution and Regulation* 626
Solved Problem 18.1 627
APPLICATION *Why Tax Drivers* 627
Benefits Versus Costs from Controlling Pollution 628
APPLICATION *Protecting Babies* 628
18.4 **Market Structure and Externalities** 629
Monopoly and Externalities 629
Monopoly Versus Competitive Welfare with Externalities 630
Solved Problem 18.2 630
Taxing Externalities in Noncompetitive Markets 631
18.5 **Allocating Property Rights to Reduce Externalities** 631
Coase Theorem 631
APPLICATION *Buying a Town* 633
Markets for Pollution 633
APPLICATION *Acid Rain Program* 634
Markets for Positive Externalities 634
18.6 **Rivalry and Exclusion** 634
Open-Access Common Property 635
Club Goods 636
APPLICATION *Piracy* 637
Public Goods 637
Solved Problem 18.3 638
APPLICATION *Radiohead's "Public Good" Experiment* 639
APPLICATION *What's Their Beef?* 640
CHALLENGE SOLUTION *Trade and Pollution* 641
Summary 643 ■ *Questions 644*

Chapter 19 Asymmetric Information 647

CHALLENGE *Dying to Work* 647
19.1 **Adverse Selection** 649
Adverse Selection in Insurance Markets 650
Products of Unknown Quality 650
Solved Problem 19.1 653

Solved Problem 19.2 653
19.2 Reducing Adverse Selection 654
Restricting Opportunistic Behavior 654
Equalizing Information 655
APPLICATION *Changing a Firm's Name* 656
APPLICATION *Adverse Selection on eBay Motors* 657
19.3 Price Discrimination Due to False Beliefs About Quality 658
APPLICATION *Reducing Consumers' Information* 659
19.4 Market Power from Price Ignorance 660
Tourist-Trap Model 660
Solved Problem 19.3 662
Advertising and Prices 662
19.5 Problems Arising from Ignorance When Hiring 662
Cheap Talk 663
Education as a Signal 664
Solved Problem 19.4 666
Screening in Hiring 668
CHALLENGE SOLUTION *Dying to Work* 670
Summary 671 ■ *Questions* 672

Chapter 20 Contracts and Moral Hazards 675

CHALLENGE *Changing Bankers' Incentives* 675
20.1 The Principal-Agent Problem 677
Efficiency 678
Symmetric Information 678
Asymmetric Information 679
APPLICATION *Selfless or Selfish Doctors?* 680
Solved Problem 20.1 681
20.2 Using Contracts to Reduce Moral Hazard 681
Fixed-Fee Contracts 682
Contingent Contracts 683
Solved Problem 20.2 683
Solved Problem 20.3 685
Solved Problem 20.4 687
APPLICATION *Contracts and Productivity in Agriculture* 688
Choosing the Best Contract 688
APPLICATION *Music Contracts: Changing Their Tunes* 689
20.3 Monitoring to Reduce Moral Hazard 690
Bonding 691
Solved Problem 20.5 692
Deferred Payments 693
Efficiency Wages 693
Monitoring Outcomes 694
APPLICATION *Abusing Leased Cars* 695
20.4 Checks on Principals 695
APPLICATION *Layoffs Versus Pay Cuts* 696
20.5 Contract Choice 698
CHALLENGE SOLUTION *Changing Bankers' Incentives* 699
Summary 700 ■ *Questions* 701

Chapter Appendixes 705

Appendix 2A: Regressions 705
Appendix 3A: Effects of a Specific Tax on Equilibrium 707
Appendix 4A: Utility and Indifference Curves 708
Appendix 4B: Maximizing Utility 710
Appendix 5A: The Slutsky Equation 712
Appendix 5B: Labor-Leisure Model 713
Appendix 6A: Properties of Marginal and Average Product Curves 714
Appendix 6B: The Slope of an Isoquant 714
Appendix 6C: Cobb-Douglas Production Function 714
Appendix 7A: Minimum of the Average Cost Curve 715
Appendix 7B: Japanese Beer Manufacturer's Short-Run Cost Curves 715
Appendix 7C: Minimizing Cost 716
Appendix 8A: The Elasticity of the Residual Demand Curve 718
Appendix 8B: Profit Maximization 719
Appendix 9A: Demand Elasticities and Surplus 719
Appendix 11A: Relationship Between a Linear Demand Curve and Its Marginal Revenue Curve 720
Appendix 11B: Incidence of a Specific Tax on a Monopoly 720
Appendix 12A: Perfect Price Discrimination 721
Appendix 12B: Group Price Discrimination 722
Appendix 12C: Block Pricing 722
Appendix 12D: Two-Part Pricing 723
Appendix 12E: Profit-Maximizing Advertising and Production 723
Appendix 13A: Nash-Cournot Equilibrium 724
Appendix 13B: Nash-Stackelberg Equilibrium 726
Appendix 13C: Nash-Bertrand Equilibrium 727
Appendix 15A: Factor Demands 728
Appendix 15B: Monopsony 729
Appendix 16A: Perpetuity 730
Appendix 18A: Welfare Effects of Pollution in a Competitive Market 730
Appendix 20A: Nonshirking Condition 732

Answers to Selected Questions and Problems 733
Sources for Challenges and Applications 750
References 760
Definitions 768
Index 773
Credits 800

Preface

When I was a student, I fell in love with microeconomics because it cleared up many mysteries about the world and provided the means to answer new questions. I wrote this book to illustrate that economic theory has practical, problem-solving uses and is not an empty academic exercise.

This book shows how individuals, policy makers, lawyers and judges, and firms can use microeconomic tools to analyze and resolve problems. For example, students learn that

- individuals can draw on microeconomic theories when deciding about issues such as whether to invest and whether to sign a contract that pegs prices to the government's measure of inflation;
- policy makers (and voters) can employ microeconomics to predict the impact of taxes, regulations, and other measures before they are enacted;
- lawyers and judges use microeconomics in antitrust, discrimination, and contract cases; and
- firms apply microeconomic principles to produce at minimum cost and maximize profit, select strategies, decide whether to buy from a market or to produce internally, and write contracts to provide optimal incentives for employees.

My experience in teaching microeconomics for the departments of economics at MIT; the University of Pennsylvania; and the University of California, Berkeley; the Department of Agricultural and Resource Economics at Berkeley; and the Wharton Business School has convinced me that students prefer this emphasis on real-world issues.

Features

This book differs from other microeconomics texts in three main ways:

- It places greater emphasis than other texts on *modern theories*—such as industrial organization theories, game theory, transaction cost theory, information theory, contract theory, and behavioral economics—that are useful in analyzing actual markets.
- It uses *real-world economic examples* to present the basic theory and offers extensive Applications to a variety of real-world situations.
- It employs step-by-step *problem-based learning* to demonstrate how to use microeconomic theory to solve business problems and analyze policy issues.

Modern Theories

This book has all of the standard economic theory, of course. However, what sets it apart is its emphasis on modern theories that are particularly useful for understanding how firms behave and the effects of public policy.

Industrial Organization. How do firms differentiate their products to increase their profits? When does market outcome depend on whether firms set prices or quantities? What effects do government price regulations have on firms' behavior? These and many other questions are addressed by industrial organization theories.

Game Theory. What's the optimal way to bid in an auction? How do firms set prices to prevent entry of rival firms? What strategy should parents use when their college-graduate child moves back in with them? Game theory provides a way of thinking about strategies and it provides methods to choose optimal strategies.

Contract Theory. What kind of a contract should a firm offer a worker to induce the employee to work hard? How do people avoid being exploited by others who have superior information? Modern contract theory shows how to write contracts to avoid or minimize such problems.

Behavioral Economics. Should a firm allow workers to opt in or opt out of a retirement system? How should people respond to ultimatums? We address questions such as these using behavioral economics—one of the hottest new areas of economic theory—which uses psychological research and theory to explain why people deviate from rational behavior.

Real-World Economics

This book demonstrates that economics is practical and provides a useful way to understand actual markets and firms' and consumers' decisions in two ways. First, it presents the basic theory using models estimated with real-world data. Second, it uses the theory to analyze hundreds of real-world applications.

Using Estimated Models to Illustrate Theory. The basic theory is presented using estimated demand curves, supply curves, production functions, and cost functions in most chapters. For example, students see how imported oil limits pricing by U.S. oil producers using estimated supply and demand curves, derive a Japanese beer manufacturer's cost curve based on an estimated production function, examine regulation of natural gas monopolies using estimated demand and cost curves, and analyze oligopoly firms' strategies using estimated demand curves and cost and profit data from the real-world rivalries between United Airlines and American Airlines and between Coke and Pepsi.

Applications. Applications use economic theory to predict the price effect of allowing drilling in the Arctic National Wildlife Refuge based on estimated demand and supply curves, demonstrate how iTunes price increases affect music downloads using survey data, explain why some top-end designers limit the number of designer bags customers can buy, measure the value of using the Internet, and analyze how a tariff on chickens affects the importation of cars.

Problem-Based Learning

People, firms, and policy makers have to solve economic problems daily. This book uses a problem-solving approach to demonstrate how economic theory can help them make good decisions.

Solved Problems. After the introductory chapter, each chapter provides an average of over five Solved Problems. Each Solved Problem poses a qualitative or quantitative question and then uses a step-by-step approach to model good problem-solving

techniques. These issues range from whether Peter Guber and Joe Lacob should have bought the Golden State Warriors, how to determine Intel's and AMD's profit-maximizing quantities and prices using their estimated demand curves and marginal costs, and how regulating a monopoly's price affects consumers and firms.

Challenges. Starting with Chapter 2, each chapter begins with a Challenge that presents information about an important, current real-world issue and concludes with a series of questions about that material. At the end of the chapter, a Challenge Solution answers these questions using methods presented in that chapter. That is, the Challenge combines the approaches of Applications and Solved Problems to motivate the material in the chapter. The issues covered include the effects from introducing genetically modified foods, why Americans buy more e-books than do Germans, comparing rationing water to raising its price during droughts, whether higher salaries for star athletes raise ticket prices, whether it pays to go to college, and how Heinz can use sales to increase its profit on ketchup.

End-of-Chapter Questions. Starting with Chapter 2, each chapter ends with an extensive set of questions, many of which are based on real-world problems. Each Solved Problem and Challenge has at least one associated end-of-chapter question that references them and asks students to extend or reapply their analyses. Many of the questions are related to the Applications. Answers to selected end-of-chapter questions appear at the end of the book, and all of the end-of-chapter questions are available in MyEconLab for self-assessment, homework, or testing.

What's New in the Seventh Edition

The Seventh Edition is substantially updated and modified based on the extremely helpful suggestions of faculty and students who used the first six editions. Four major changes run throughout the book:

- All chapters are revised, and all but two are substantially revised.
- All the Challenges and almost all the examples and Applications throughout the book are updated or new.
- The book has a significant number of new Solved Problems.
- The end-of-chapter questions are arranged by subject headings, new questions have been added, and many others updated.

Challenges, Solved Problems, and Questions

All of the Challenges are new or updated. Because many users requested more Solved Problems, I increased the number of Solved Problems in this edition to 106 from 94 in the previous edition. In addition, many other Solved Problems are new or substantially updated and revised. Starting in this edition, every Solved Problem has at least one associated Question at the end of the chapter.

About 40% of these Solved Problems are tied to real-world events. Many of these are associated with an adjacent Application or examples in the text. In addition to the Challenges, examples of a paired Application and Solved Problem include an investigation into whether farmers benefit from a major drought, the effect of oil drilling in the Arctic National Wildlife Refuge on prices, the opportunity cost of getting an MBA, the social cost of a natural gas price ceiling, Apple's iPad pricing, and the price effects of reselling textbooks bought abroad in the United States.

Starting with Chapter 2, the end of each chapter has an average of over 40 verbal, graphical, and mathematical Questions. This edition has 769 Questions, 61 more than in the previous edition. Over 27% of the Questions are new or updated. Many of these Questions are based on recent real-life events and issues drawn from newspapers, journal articles, and other sources.

Applications

The Seventh Edition has 131 Applications, 5 more than in the previous edition. Of these, 46% are new and 45% are updated, so that 91% are new or updated. The vast majority of the Applications cover events in 2012 and 2013, a few deal with historical events, and the remaining ones examine timeless material.

To make room for the new Applications, 27 older Applications from the Sixth Edition were moved to MyEconLab. Also, several new ones have been added to the hundreds of Applications and other materials in MyEconLab.

Behavioral Economics

The Seventh Edition has a revised treatment of behavioral economics in the chapters on consumer choice, monopoly, interest rates, and uncertainty. It also adds a new behavioral economics section in the game theory chapter.

New and Revised Material in Chapters

Every chapter is revised—including most sections. Virtually every chapter has updated examples and statistics. Some of the larger changes include:

- Chapters 2 and 3 use two new empirical studies (avocados and corn) to illustrate the basic supply and demand model. They have four new and a number of revised Solved Problems.
- Chapters 4 and 5 have three new Solved Problems and extensive updating of data. Chapter 5 has a new section on compensating and equivalent variations.
- Chapter 6 adds many new estimated production functions and a new discussion of returns to scale as a function of firm size.
- Chapter 7 has substantially revised sections on effects of taxes on costs, long-run costs, and learning by doing. It uses a new Japanese beer empirical example to illustrate the theory, and has a new Solved Problem.
- Chapter 8 has new statistics and a new Solved Problem. Several sections are substantially revised, including an extended treatment of the shutdown decision.
- Chapter 9 updates many statistics and has substantially revised sections on rents, price effects on consumer surplus, and trade, and the Challenge Solution. The trade section uses a new empirical oil example.
- Chapter 10 has a revised Challenge Solution and a new Solved Problem.
- Chapter 11 is reorganized, revised, and updated, particularly the sections on market failure and the causes of monopoly. The chapter has three new Solved Problems, two of which now address the iPad.
- Chapter 12 is completely reorganized and rewritten, particularly the group discrimination section and the nonlinear pricing section, which is expanded. It has a new Challenge.
- Chapter 13 is reorganized. Revised sections include cartel, antitrust laws, mergers, Cournot differentiated products, and Bertrand vs. Cournot.

- Chapter 14's revision removes the discussion of iterative dominance (relying on dominant strategy and best-response approaches), divides the treatment of dynamic games into sections on repeated and sequential games, expands the repeated game material, and adds a new behavioral game theory section.
- Chapter 17's major revision includes new section heads and significant revisions to the sections on probability, attitudes toward risk, and behavioral economics. The material on uncertainty and discounting is now on MyEconLab.
- Chapter 18 updates the pollution data, has a new subsection on the benefits versus costs from controlling pollution, and a new Solved Problem.
- Chapter 19 is extensively revised and reorganized, with new material on insurance markets and a rewritten section on reducing adverse selection.
- Chapter 20 is fundamentally rewritten and has four new Solved Problems. The first half of the chapter is entirely new.

Alternative Organizations

Because instructors differ as to the order in which they cover material, this text has been designed for maximum flexibility. The most common approach to teaching microeconomics is to follow the sequence of the chapters in the first half of this book: supply and demand (Chapters 2 and 3), consumer theory (Chapters 4 and 5), the theory of the firm (Chapters 6 and 7), and the competitive model (Chapters 8 and 9). Many instructors then cover monopoly (Chapter 11), price discrimination (Chapter 12), oligopoly (Chapters 13 and 14), input markets (Chapter 15), uncertainty (Chapter 17), and externalities (Chapter 18).

A common variant is to present uncertainty (Sections 17.1 through 17.3) immediately after consumer theory. Many instructors like to take up welfare issues between discussions of the competitive model and noncompetitive models, as Chapter 10, on general equilibrium and economic welfare, does. Alternatively, that chapter may be covered at the end of the course. Faculty can assign material on factor markets earlier (Section 15.1 could follow the chapters on competition, and the remaining sections could follow Chapter 11). The material in Chapters 14–20 can be presented in a variety of orders, though Chapter 20 should follow Chapter 19 if both are covered, and Section 17.4 should follow Chapter 16.

Many business school courses skip consumer theory (and possibly some aspects of supply and demand, such as Chapter 3) to allow more time for consideration of the topics covered in the second half of this book. Business school faculty may want to place particular emphasis on game and theory strategies (Chapter 14), capital markets (Chapter 16), and modern contract theory (Chapters 19 and 20).

Optional, technically demanding sections are marked with a star (★). Subsequent sections and chapters can be understood even if these sections are skipped.

MyEconLab

MyEconLab's powerful assessment and tutorial system works hand-in-hand with this book.

Features for Students

MyEconLab puts students in control of their learning through a collection of testing, practice, and study tools. Students can study on their own, or they can complete assignments created by their instructor. In MyEconLab's structured environment,

students practice what they learn, test their understanding, and pursue a personalized study plan generated from their performance on sample tests and quizzes. In Homework or Study Plan mode, students have access to a wealth of tutorial features, including the following:

- Instant feedback on exercises taken directly from the text helps students understand and apply the concepts.
- Links to the eText version of this textbook allow the student to quickly revisit a concept or an explanation.
- Pearson eText, available within the online course materials and offline via an iPad/Android app, allows instructors and students to highlight, bookmark, and take notes.
- Learning aids help students analyze a problem in small steps, much the same way an instructor would do during office hours.

Experiments in MyEconLab

Experiments are a fun and engaging way to promote active learning and mastery of important economic concepts. Pearson's Experiment program is flexible and easy for instructors and students to use.

- Single-player experiments, which can be assigned for homework, allow students to play against virtual players from anywhere at any time they have an Internet connection.
- Multiplayer experiments allow instructors to assign and manage a real-time experiment with their classes.
- Pre- and post-questions for each experiment are available for assignment in MyEconLab.

For a complete list of available experiments, visit **www.myeconlab.com**.

Features for Instructors

MyEconLab includes comprehensive homework, quiz, text, and tutorial options, where instructors can manage all assessment needs in one program.

- Select end-of-chapter questions are available for assignment.
- All of the Solved Problems are available for assignment.
- Test Bank questions are available for assignment or testing.
- The Custom Exercise Builder allows instructors the flexibility of creating their own problems for assignments.
- The powerful Gradebook records each student's performance and time spent on the tests, study plan, and homework and can generate reports by student, class, or chapter.
- Advanced Communication Tools enable students and instructors to communicate through email, discussion board, chat, and ClassLive.
- Customization options provide new and enhanced ways to share documents, add content, and rename menu items.
- A prebuilt course option provides a turn-key method for instructors to create a MyEconLab course that includes assignments by chapter.

Supplements

A full range of supplementary materials to support teaching and learning accompanies this book.

- The *Online Instructor's Manual* revised by Jennifer Steele has many useful and creative teaching ideas. It also offers a chapter outline, additional discussion questions, additional questions and problems, and solutions for all additional questions and problems.
- The *Online Solutions Manual* provides solutions for all the end-of-chapter questions in the text.
- The *Online Test Bank* by Shana McDermott of the University of New Mexico, James Swanson of the University of Central Missouri, and Lourenço Paz of Syracuse University features problems of varying levels of complexity, suitable for homework assignments and exams. Many of these multiple-choice questions draw on current events.
- The *Computerized Test Bank* reproduces the Test Bank material in the TestGen software. With TestGen, instructors can easily edit existing questions, add questions, generate tests, and print the tests in a variety of formats.
- The *Online PowerPoint Presentation* by Ting Levy of Florida Atlantic University contains text figures and tables, as well as lecture notes. These slides allow instructors to walk through examples from the text during in-class presentations.

These teaching resources are available online for download at the Instructor Resource Center, **www.pearsonglobaleditions.com/Perloff**, and on the catalog page for *Microeconomics*.

Acknowledgments

My greatest debt is to my students. My students at MIT, the University of Pennsylvania, and the University of California, Berkeley, patiently dealt with my various approaches to teaching them microeconomics and made useful (and generally polite) suggestions.

The various editions have benefited from the early work by the two best development editors in the business, Jane Tufts and Sylvia Mallory. Jane Tufts reviewed drafts of the first edition of this book for content and presentation. By showing me how to present the material as clearly, orderly, and thoroughly as possible, she greatly strengthened this text. Sylvia Mallory worked valiantly to improve my writing style and helped to shape and improve every aspect of the book's contents and appearance in each of the first four editions.

I am extremely grateful to Adrienne D'Ambrosio, Executive Acquisitions Editor, and Sarah Dumouchelle, Editorial Project Manager, at Pearson, who helped me plan this revision and made very valuable suggestions at each stage of the process. Adrienne, as usual, skillfully handled all aspects of planning, writing, and producing this textbook. In addition, Sarah made sure that the new material in this edition is clear, editing all the chapters, and assisted in arranging the supplements program.

Over the years, many excellent research assistants—Hayley Chouinard, R. Scott Hacker, Guojun He, Nancy McCarthy, Enrico Moretti, Lisa Perloff, Asa Sajise, Hugo Salgado, Gautam Sethi, Edward Shen, Klaas van 't Veld, and Ximing Wu—worked hard to collect facts, develop examples and figures, and check material.