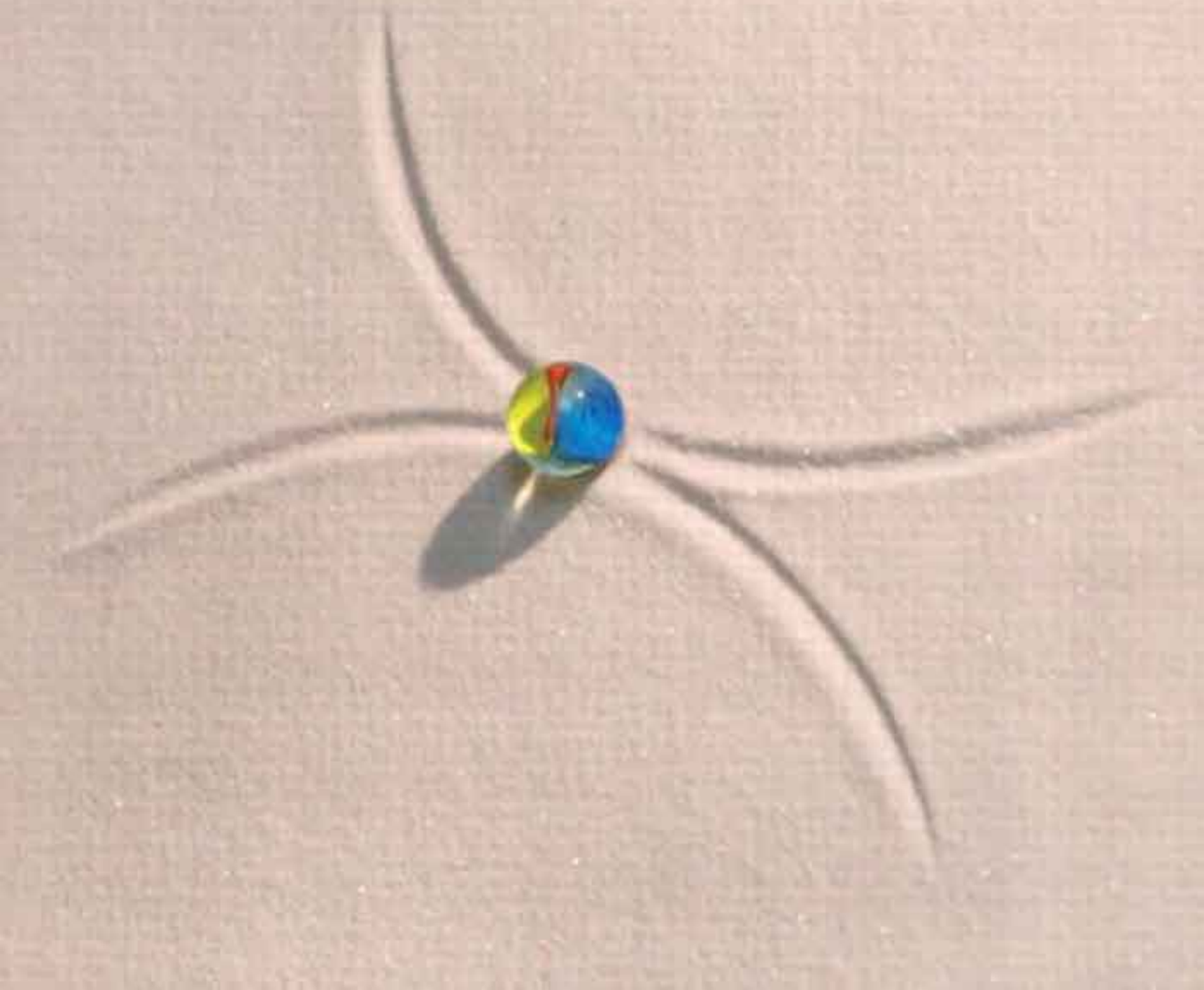
Microeconomics

SEVENTH EDITION

Jeffrey M. Perloff



MICROECONOMICS

SEVENTH 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

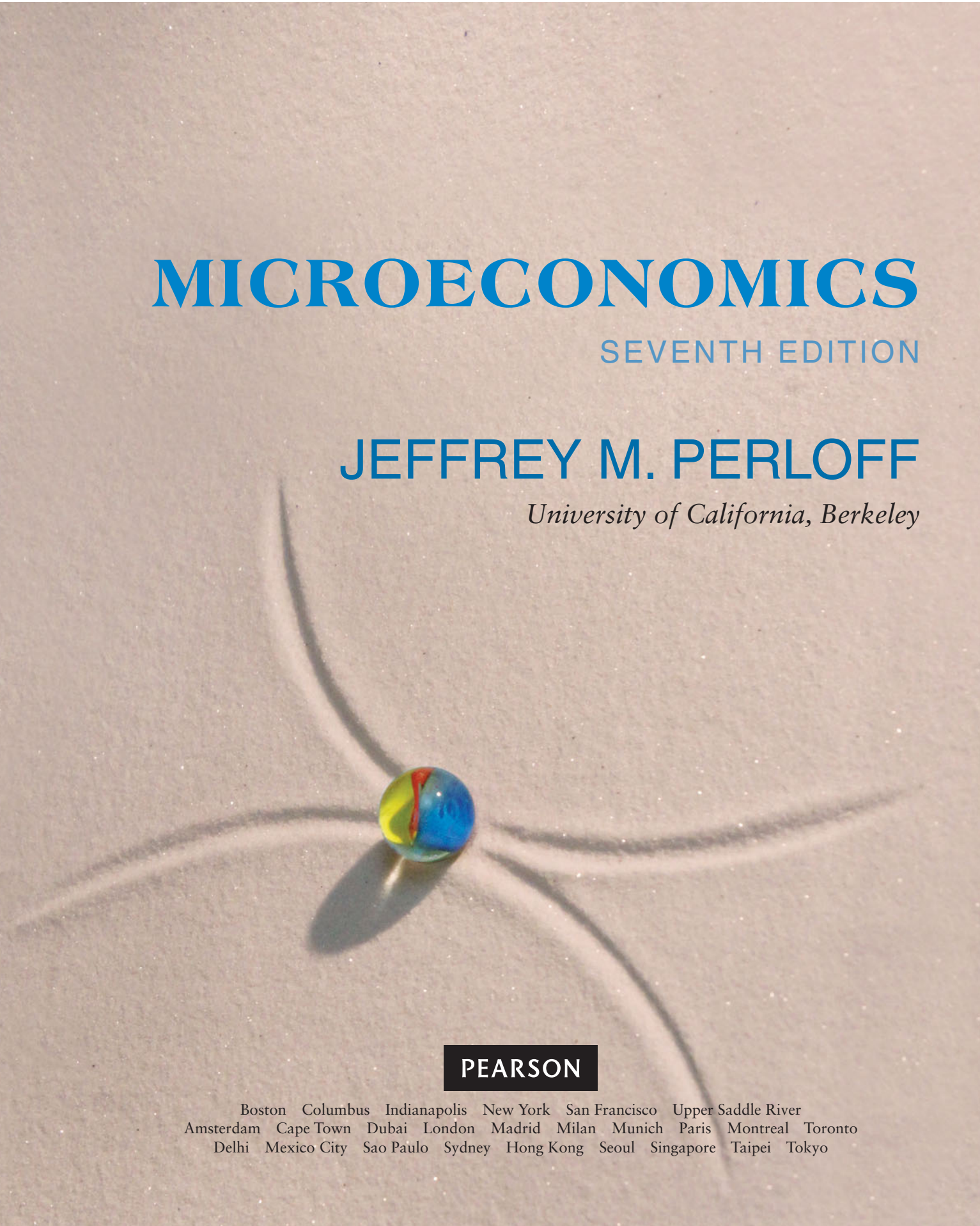
***denotes MyEconLab titles** **Visit www.myeconlab.com to learn more.**

MICROECONOMICS

SEVENTH EDITION

JEFFREY M. PERLOFF

University of California, Berkeley



PEARSON

Boston Columbus Indianapolis New York San Francisco Upper Saddle River
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
Digital Publisher: Denise Clinton
Editorial Project Manager: Sarah Dumouchelle
Editorial Assistant: Patrick Henning
Executive Marketing Manager: Lori DeShazo
Managing Editor: Jeff Holcomb
Senior Production Project Manager: Meredith Gertz
Senior Manufacturing Buyer: Carol Melville
Art Director and Cover Designer: Jonathan Boylan
Cover Photo: Pearson Education, Inc.
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
Full-Service Project Management and Text Design: Gillian Hall, The Aardvark Group
Copyeditor: Rebecca Greenberg
Proofreader: Holly McLean-Aldis
Indexer: John Lewis
Composition and Illustrations: Laserwords Maine
Printer/Binder: RR Donnelley, Willard
Cover Printer: Lehigh Phoenix
Text Font: Sabon

Credits and acknowledgments borrowed from other sources and reproduced, with permission, in this textbook appear on appropriate page within the text and on page A-96.

Copyright © 2015, 2012, 2009 Pearson Education, Inc., publishing as Addison-Wesley, 75 Arlington Street, Boston, MA 02116. All rights reserved. Manufactured in the United States of America. This publication is protected by Copyright, and permission should be obtained from the publisher prior to any prohibited reproduction, storage in a retrieval system, or transmission in any form or by any means, electronic, mechanical, photocopying, recording, or likewise. To obtain permission(s) to use material from this work, please submit a written request to Pearson Education, Inc., Permissions Department, One Lake Street, Upper Saddle River, New Jersey 07458, or you may fax your request to 201-236-3290.

Many of the designations by manufacturers and seller to distinguish their products are claimed as trademarks. Where those designations appear in this book, and the publisher was aware of a trademark claim, the designations have been printed in initial caps or all caps.

Library of Congress Cataloging-in-Publication Data

Perloff, Jeffrey M.
Microeconomics / Jeffrey Perloff.—7th edition.
p. cm.
Includes bibliographical references and index.
ISBN 978-0-13-345691-2
1. Microeconomics. I. Title.
HB172.P39 2015
338.5–dc22

2013050602

10 9 8 7 6 5 4 3 2 1

PEARSON

www.pearsonhighered.com

ISBN-13: 978-0-13-345691-2
ISBN-10: 0-13-345691-9

Brief Contents

Preface	xiv	
Chapter 1	Introduction	1
Chapter 2	Supply and Demand	8
Chapter 3	Applying the Supply-and-Demand Model	42
Chapter 4	Consumer Choice	72
Chapter 5	Applying Consumer Theory	107
Chapter 6	Firms and Production	147
Chapter 7	Costs	179
Chapter 8	Competitive Firms and Markets	220
Chapter 9	Applying the Competitive Model	262
Chapter 10	General Equilibrium and Economic Welfare	308
Chapter 11	Monopoly	344
Chapter 12	Pricing and Advertising	384
Chapter 13	Oligopoly and Monopolistic Competition	424
Chapter 14	Game Theory	468
Chapter 15	Factor Markets	505
Chapter 16	Interest Rates, Investments, and Capital Markets	530
Chapter 17	Uncertainty	561
Chapter 18	Externalities, Open-Access, and Public Goods	595
Chapter 19	Asymmetric Information	623
Chapter 20	Contracts and Moral Hazards	651
Chapter Appendixes		A-1
Answers to Selected Questions and Problems		A-29
Sources for Challenges and Applications		A-46
References		A-56
Definitions		A-64
Index		A-69
Credits		A-96

Contents

Preface xiv

Chapter 1 Introduction 1

1.1 **Microeconomics: The Allocation of Scarce Resources** 1
Trade-Offs 2
Who Makes the Decisions 2
Prices Determine Allocations 2
1.2 **Models** 3
APPLICATION *Income Threshold Model and China* 3
Simplifications by Assumption 3
Testing Theories 4
Positive Versus Normative 5
1.3 **Uses of Microeconomic Models** 6
Summary 7

Chapter 2 Supply and Demand 8

CHALLENGE *Quantities and Prices of Genetically Modified Foods* 8
2.1 **Demand** 9
The Demand Curve 10
APPLICATION *Calorie Counting at Starbucks* 13
The Demand Function 14
Solved Problem 2.1 15
Summing Demand Curves 16
APPLICATION *Aggregating Corn Demand Curves* 16
2.2 **Supply** 17
The Supply Curve 17
The Supply Function 19
Summing Supply Curves 20
Effects of Government Import Policies on Supply Curves 20
Solved Problem 2.2 21
2.3 **Market Equilibrium** 22
Using a Graph to Determine the Equilibrium 22
Using Math to Determine the Equilibrium 22
Forces That Drive the Market to Equilibrium 23
2.4 **Shocking the Equilibrium** 24
Effects of a Shift in the Demand Curve 24
Solved Problem 2.3 25
Effects of a Shift in the Supply Curve 26
2.5 **Equilibrium Effects of Government Interventions** 26
Policies That Shift Supply Curves 27
APPLICATION *Occupational Licensing* 27
Solved Problem 2.4 28
Policies That Cause Demand to Differ from Supply 29
APPLICATION *Price Controls Kill* 31
Solved Problem 2.5 33
Why Supply Need Not Equal Demand 33
2.6 **When to Use the Supply-and-Demand Model** 34
CHALLENGE SOLUTION *Quantities and Prices of Genetically Modified Foods* 35
Summary 36 ■ *Questions 37*

Chapter 3 Applying the Supply-and-Demand Model 42

CHALLENGE *Who Pays the Gasoline Tax?* 42
3.1 **How Shapes of Supply and Demand Curves Matter** 43
3.2 **Sensitivity of the Quantity Demanded to Price** 44
Price Elasticity of Demand 45
Solved Problem 3.1 46
Elasticity Along the Demand Curve 46
Demand Elasticity and Revenue 49
Solved Problem 3.2 49
APPLICATION *Do Farmers Benefit from a Major Drought?* 50
Demand Elasticities over Time 51
Other Demand Elasticities 51
3.3 **Sensitivity of the Quantity Supplied to Price** 53
Elasticity of Supply 53
Elasticity Along the Supply Curve 54
Supply Elasticities over Time 55
APPLICATION *Oil Drilling in the Arctic National Wildlife Refuge* 55
Solved Problem 3.3 56
3.4 **Effects of a Sales Tax** 58
Equilibrium Effects of a Specific Tax 58
The Equilibrium Is the Same No Matter Who Is Taxed 60
Solved Problem 3.4 60
Firms and Customers Share the Burden of the Tax 61
APPLICATION *Taxes to Prevent Obesity* 62

Solved Problem 3.5 63
Ad Valorem and Specific Taxes Have Similar Effects 63
Solved Problem 3.6 64
Subsidies 65
APPLICATION *The Ethanol Subsidy* 66
CHALLENGE SOLUTION *Who Pays the Gasoline Tax?* 66
Summary 67 ■ *Questions 68*

Chapter 4 Consumer Choice 72

CHALLENGE *Why Americans Buy More E-Books Than Do Germans* 72
4.1 Preferences 74
Properties of Consumer Preferences 74
APPLICATION *You Can't Have Too Much Money* 75
Preference Maps 76
Solved Problem 4.1 78
APPLICATION *Indifference Curves Between Food and Clothing* 82
4.2 Utility 82
Utility Function 82
Ordinal Preferences 83
Utility and Indifference Curves 83
Marginal Utility 85
Utility and Marginal Rates of Substitution 86
4.3 Budget Constraint 86
Slope of the Budget Constraint 88
Solved Problem 4.2 88
Effect of a Change in Price on the Opportunity Set 89
Effect of a Change in Income on the Opportunity Set 90
Solved Problem 4.3 90
4.4 Constrained Consumer Choice 90
The Consumer's Optimal Bundle 91
APPLICATION *Substituting Alcohol for Marijuana* 92
Solved Problem 4.4 93
★ Optimal Bundles on Convex Sections of Indifference Curves 94
Buying Where More Is Better 95
Food Stamps 96
APPLICATION *Benefiting from Food Stamps* 98
4.5 Behavioral Economics 98
Tests of Transitivity 98
Endowment Effect 99
APPLICATION *Opt In Versus Opt Out* 100
Salience and Bounded Rationality 100
APPLICATION *Unaware of Taxes* 101
CHALLENGE SOLUTION *Why Americans Buy More E-Books Than Do Germans* 101
Summary 102 ■ *Questions 103*

Chapter 5 Applying Consumer Theory 107

CHALLENGE *Per-Hour Versus Lump-Sum Childcare Subsidies* 107
5.1 Deriving Demand Curves 108
Indifference Curves and a Rotating Budget Line 109
Price-Consumption Curve 110
APPLICATION *Smoking Versus Eating and Phoning* 111
The Demand Curve Corresponds to the Price-Consumption Curve 112
Solved Problem 5.1 112
5.2 How Changes in Income Shift Demand Curves 113
Effects of a Rise in Income 113
Solved Problem 5.2 115
Consumer Theory and Income Elasticities 116
APPLICATION *Fast-Food Engel Curve* 119
5.3 Effects of a Price Change 120
Income and Substitution Effects with a Normal Good 120
Solved Problem 5.3 122
Solved Problem 5.4 123
APPLICATION *Shipping the Good Stuff Away* 124
Income and Substitution Effects with an Inferior Good 124
Solved Problem 5.5 125
★ Compensating Variation and Equivalent Variation 126
APPLICATION *What's the Value of Using the Internet?* 126
5.4 Cost-of-Living Adjustments 126
Inflation Indexes 127
Effects of Inflation Adjustments 129
APPLICATION *Paying Employees to Relocate* 130
5.5 Deriving Labor Supply Curves 132
Labor-Leisure Choice 132
Income and Substitution Effects 135
Solved Problem 5.6 136
★ Shape of the Labor Supply Curve 137
APPLICATION *Working After Winning the Lottery* 138
Income Tax Rates and Labor Supply 139
CHALLENGE SOLUTION *Per-Hour Versus Lump-Sum Childcare Subsidies* 141
Summary 142 ■ *Questions 143*

Chapter 6 Firms and Production 147

CHALLENGE *Labor Productivity During Recessions* 147
6.1 The Ownership and Management of Firms 148
Private, Public, and Nonprofit Firms 148

APPLICATION *Chinese State-Owned Enterprises* 149
The Ownership of For-Profit Firms 149
The Management of Firms 150
What Owners Want 150
6.2 **Production Function** 151
6.3 **Short-Run Production** 153
Total Product 153
Marginal Product of Labor 154
Solved Problem 6.1 154
Average Product of Labor 155
Graphing the Product Curves 155
Law of Diminishing Marginal Returns 157
APPLICATION *Malthus and the Green Revolution* 158
6.4 **Long-Run Production** 159
Isoquants 160
APPLICATION *A Semiconductor Integrated Circuit Isoquant* 162
Substituting Inputs 163
Solved Problem 6.2 165
6.5 **Returns to Scale** 166
Constant, Increasing, and Decreasing Returns to Scale 166
Solved Problem 6.3 167
APPLICATION *Returns to Scale in Various Industries* 168
Varying Returns to Scale 169
6.6 **Productivity and Technical Change** 171
Relative Productivity 171
APPLICATION *A Good Boss Raises Productivity* 171
Innovations 171
APPLICATION *Tata Nano's Technical and Organizational Innovations* 173
CHALLENGE SOLUTION *Labor Productivity During Recessions* 173
Summary 175 ■ *Questions 175*

Chapter 7 Costs 179

CHALLENGE *Technology Choice at Home Versus Abroad* 179
7.1 **The Nature of Costs** 180
Opportunity Costs 180
APPLICATION *The Opportunity Cost of an MBA* 181
Solved Problem 7.1 181
Costs of Durable Inputs 182
Sunk Costs 183
7.2 **Short-Run Costs** 183
Short-Run Cost Measures 184
Short-Run Cost Curves 186
Production Functions and the Shape of Cost Curves 187
APPLICATION *Short-Run Cost Curves for a Beer Manufacturer* 190
Effects of Taxes on Costs 191
Solved Problem 7.2 192
Short-Run Cost Summary 193
7.3 **Long-Run Costs** 193
All Costs Are Avoidable in the Long Run 193
Minimizing Cost 193
Isocost Line 194
Combining Cost and Production Information 196
Solved Problem 7.3 198
Factor Price Changes 199
Solved Problem 7.4 199
The Long-Run Expansion Path and the Long-Run Cost Function 200
Solved Problem 7.5 202
The Shape of Long-Run Cost Curves 202
APPLICATION *Economies of Scale in Nuclear Power Plants* 205
Estimating Cost Curves Versus Introspection 206
7.4 **Lower Costs in the Long Run** 206
Long-Run Average Cost as the Envelope of Short-Run Average Cost Curves 207
APPLICATION *Long-Run Cost Curves in Beer Manufacturing* 208
APPLICATION *Choosing an Inkjet or a Laser Printer* 208
Short-Run and Long-Run Expansion Paths 209
The Learning Curve 209
APPLICATION *Learning by Drilling* 211
7.5 **Cost of Producing Multiple Goods** 212
APPLICATION *Economies of Scope* 213
CHALLENGE SOLUTION *Technology Choice at Home Versus Abroad* 214
Summary 215 ■ *Questions 216*

Chapter 8 Competitive Firms and Markets 220

CHALLENGE *The Rising Cost of Keeping On Truckin'* 220
8.1 **Perfect Competition** 221
Price Taking 221
Why the Firm's Demand Curve Is Horizontal 222
Deviations from Perfect Competition 223
Derivation of a Competitive Firm's Demand Curve 224
Solved Problem 8.1 225
Why We Study Perfect Competition 226
8.2 **Profit Maximization** 226
Profit 226
Two Steps to Maximizing Profit 227
8.3 **Competition in the Short Run** 230
Short-Run Output Decision 231
Solved Problem 8.2 233
Short-Run Shutdown Decision 234
APPLICATION *Oil, Oil Sands, and Oil Shale Shutdowns* 236
Solved Problem 8.3 237
Short-Run Firm Supply Curve 237

Short-Run Market Supply Curve 238
Short-Run Competitive Equilibrium 240
Solved Problem 8.4 242
8.4 **Competition in the Long Run** 243
Long-Run Competitive Profit Maximization 243
Long-Run Firm Supply Curve 243
APPLICATION *The Size of Ethanol Processing Plants* 244
Long-Run Market Supply Curve 244
APPLICATION *Fast-Food Firms' Entry in Russia* 245
APPLICATION *Upward-Sloping Long-Run Supply Curve for Cotton* 248
APPLICATION *Reformulated Gasoline Supply Curves* 252
Solved Problem 8.5 253
Long-Run Competitive Equilibrium 254
CHALLENGE SOLUTION *The Rising Cost of Keeping On Truckin'* 255
Summary 256 ■ *Questions 257*

Chapter 9 Applying the Competitive Model 262

CHALLENGE *"Big Dry" Water Restrictions* 262
9.1 **Zero Profit for Competitive Firms in the Long Run** 263
Zero Long-Run Profit with Free Entry 263
Zero Long-Run Profit When Entry Is Limited 264
APPLICATION *Tiger Woods' Rent* 266
The Need to Maximize Profit 266
9.2 **Consumer Welfare** 267
Measuring Consumer Welfare Using a Demand Curve 267
APPLICATION *Willingness to Pay and Consumer Surplus on eBay* 269
Effect of a Price Change on Consumer Surplus 270
APPLICATION *Goods with a Large Consumer Surplus Loss from Price Increases* 271
Solved Problem 9.1 272
9.3 **Producer Welfare** 273
Measuring Producer Surplus Using a Supply Curve 273
Using Producer Surplus 274
Solved Problem 9.2 275
Competition Maximizes Welfare 276
Solved Problem 9.3 278
APPLICATION *Deadweight Loss of Christmas Presents* 279
9.5 **Policies That Shift Supply and Demand Curves** 280
Restricting the Number of Firms 281
APPLICATION *Licensing Cabs* 283
Raising Entry and Exit Costs 284
9.6 **Policies That Create a Wedge Between Supply and Demand** 285
Welfare Effects of a Sales Tax 285
APPLICATION *The Deadweight Cost of Raising Gasoline Tax Revenue* 286
Solved Problem 9.4 287
Welfare Effects of a Subsidy 288
Solved Problem 9.5 288
Welfare Effects of a Price Floor 289
Solved Problem 9.6 291
APPLICATION *How Big Are Farm Subsidies and Who Gets Them?* 292
Welfare Effects of a Price Ceiling 293
Solved Problem 9.7 294
APPLICATION *The Social Cost of a Natural Gas Price Ceiling* 295
9.7 **Comparing Both Types of Policies: Imports** 295
Free Trade Versus a Ban on Imports 296
Free Trade Versus a Tariff 297
Free Trade Versus a Quota 299
APPLICATION *The Chicken Tax Trade War* 300
Rent Seeking 300
CHALLENGE SOLUTION *"Big Dry" Water Restrictions* 301
Summary 303 ■ *Questions 303*

Chapter 10 General Equilibrium and Economic Welfare 308

CHALLENGE *Anti-Price Gouging Laws* 308
10.1 **General Equilibrium** 310
Feedback Between Competitive Markets 311
Solved Problem 10.1 313
Minimum Wages with Incomplete Coverage 314
Solved Problem 10.2 316
APPLICATION *Urban Flight* 317
10.2 **Trading Between Two People** 317
Endowments 317
Mutually Beneficial Trades 319
Solved Problem 10.3 321
Bargaining Ability 321
10.3 **Competitive Exchange** 321
Competitive Equilibrium 322
The Efficiency of Competition 323
Obtaining Any Efficient Allocation Using Competition 323
10.4 **Production and Trading** 324
Comparative Advantage 324
Solved Problem 10.4 326
Efficient Product Mix 328
Competition 328
10.5 **Efficiency and Equity** 330
Role of the Government 330
APPLICATION *The Wealth and Income of the 1%* 331
Efficiency 332
Equity 334
APPLICATION *How You Vote Matters* 336
Efficiency Versus Equity 338

CHALLENGE SOLUTION *Anti-Price Gouging Laws* 339
Summary 340 ■ *Questions 341*

Chapter 11 Monopoly 344

CHALLENGE *Brand-Name and Generic Drugs* 344
11.1 Monopoly Profit Maximization 346
Marginal Revenue 346
Solved Problem 11.1 348
Choosing Price or Quantity 350
Graphical Approach 351
Mathematical Approach 352
APPLICATION *Apple's iPad* 353
Solved Problem 11.2 353
Effects of a Shift of the Demand Curve 354
11.2 Market Power 355
Market Power and the Shape of the Demand Curve 355
APPLICATION *Cable Cars and Profit Maximization* 357
Lerner Index 358
Solved Problem 11.3 358
Sources of Market Power 358
11.3 Market Failure Due to Monopoly Pricing 359
Solved Problem 11.4 361
11.4 Causes of Monopoly 362
Cost-Based Monopoly 362
Solved Problem 11.5 364
Government Creation of a Monopoly 364
APPLICATION *Botox Patent Monopoly* 366
11.5 Government Actions That Reduce Market Power 367
Regulating Monopolies 367
Solved Problem 11.6 370
APPLICATION *Natural Gas Regulation* 371
Increasing Competition 372
APPLICATION *Generic Competition for Apple's iPod* 373
Solved Problem 11.7 373
11.6 Networks, Dynamics, and Behavioral Economics 374
Network Externalities 375
Network Externalities and Behavioral Economics 375
Network Externalities as an Explanation for Monopolies 376
APPLICATION *Critical Mass and eBay* 376
A Two-Period Monopoly Model 377
CHALLENGE SOLUTION *Brand-Name and Generic Drugs* 378
Summary 379 ■ *Questions 379*

Chapter 12 Pricing and Advertising 384

CHALLENGE *Sale Prices* 384
12.1 Conditions for Price Discrimination 386
Why Price Discrimination Pays 386
APPLICATION *Disneyland Pricing* 388
Which Firms Can Price Discriminate 388
Preventing Resale 389
APPLICATION *Preventing Resale of Designer Bags* 390
Not All Price Differences Are Price Discrimination 390
Types of Price Discrimination 390
12.2 Perfect Price Discrimination 391
How a Firm Perfectly Price Discriminates 391
APPLICATION *Google Uses Bidding for Ads to Price Discriminate* 392
Perfect Price Discrimination Is Efficient but Harms Some Consumers 393
APPLICATION *Botox Revisited* 395
Solved Problem 12.1 396
Transaction Costs and Perfect Price Discrimination 396
12.3 Group Price Discrimination 396
APPLICATION *Warner Brothers Sets Prices for a* Harry Potter *DVD* 397
Group Price Discrimination with Two Groups 397
Solved Problem 12.2 398
APPLICATION *Reselling Textbooks* 399
Solved Problem 12.3 400
Identifying Groups 402
APPLICATION *Buying Discounts* 402
Welfare Effects of Group Price Discrimination 403
12.4 Nonlinear Price Discrimination 404
12.5 Two-Part Pricing 406
Two-Part Pricing with Identical Customers 407
Two-Part Pricing with Nonidentical Consumers 408
APPLICATION *iTunes for a Song* 410
12.6 Tie-In Sales 410
Requirement Tie-In Sale 410
APPLICATION *Ties That Bind* 411
Bundling 411
Solved Problem 12.4 413
12.7 Advertising 414
The Decision Whether to Advertise 414
How Much to Advertise 415
APPLICATION *Super Bowl Commercials* 416
CHALLENGE SOLUTION *Sale Prices* 417
Summary 418 ■ *Questions 419*

Chapter 13 Oligopoly and Monopolistic Competition 424

CHALLENGE *Government Aircraft Subsidies* 424
13.1 Market Structures 426
13.2 Cartels 427
Why Cartels Form 427
Laws Against Cartels 429
APPLICATION *Catwalk Cartel* 431

Why Cartels Fail 432
Maintaining Cartels 432
APPLICATION *Casket Entry* 433
Mergers 434
APPLICATION *Hospital Mergers: Market Power Versus Efficiency* 434
13.3 **Cournot Oligopoly** 435
The Duopoly Nash-Cournot Equilibrium 436
An Airlines Market Example 436
Equilibrium, Elasticity, and the Number of Firms 440
APPLICATION *Mobile Number Portability* 442
Nonidentical Firms 442
Solved Problem 13.1 443
Solved Problem 13.2 445
APPLICATION *Bottled Water* 446
13.4 **Stackelberg Oligopoly** 447
Graphical Model 447
Solved Problem 13.3 449
Why Moving Sequentially Is Essential 450
Comparison of Competitive, Stackelberg, Cournot, and Collusive Equilibria 450
13.5 **Bertrand Oligopoly** 451
Identical Products 452
Differentiated Products 453
APPLICATION *Welfare Gain from More Toilet Paper* 455
13.6 **Monopolistic Competition** 456
APPLICATION *Monopolistically Competitive Food Truck Market* 456
Equilibrium 457
Solved Problem 13.4 458
Fixed Costs and the Number of Firms 458
Solved Problem 13.5 460
APPLICATION *Zoning Laws as a Barrier to Entry by Hotel Chains* 460
CHALLENGE SOLUTION *Government Aircraft Subsidies* 461
Summary 462 ■ *Questions 463*

Chapter 14 Game Theory 468

CHALLENGE *Competing E-book Standards* 468
14.1 **Static Games** 470
Normal-Form Games 470
Predicting a Game's Outcome 471
Multiple Nash Equilibria, No Nash Equilibrium, and Mixed Strategies 474
APPLICATION *Tough Love* 477
Solved Problem 14.1 477
Cooperation 478
APPLICATION *Strategic Advertising* 479
14.2 **Repeated Dynamic Games** 480
Strategies and Actions in Dynamic Games 481
Cooperation in a Repeated Prisoner's Dilemma Game 481
Solved Problem 14.2 483
14.3 **Sequential Dynamic Games** 483
Game Tree 483
Subgame Perfect Nash Equilibrium 484
Credibility 486
Dynamic Entry Game 487
APPLICATION *Dominant Airlines* 488
Solved Problem 14.3 489
14.4 **Auctions** 490
Elements of Auctions 491
Bidding Strategies in Private-Value Auctions 492
Winner's Curse 493
APPLICATION *Bidder's Curse* 494
14.5 **Behavioral Game Theory** 494
APPLICATION *GM's Ultimatum* 495
CHALLENGE SOLUTION *Competing E-book Standards* 496
Summary 497 ■ *Questions 498*

Chapter 15 Factor Markets 505

CHALLENGE *Athletes' Salaries and Ticket Prices* 505
15.1 **Competitive Factor Market** 506
Short-Run Factor Demand of a Firm 507
Solved Problem 15.1 509
Solved Problem 15.2 510
Long-Run Factor Demand 511
Factor Market Demand 512
Competitive Factor Market Equilibrium 514
15.2 **Effects of Monopolies on Factor Markets** 515
Market Structure and Factor Demands 515
A Model of Market Power in Input and Output Markets 516
APPLICATION *Unions and Profits* 519
Solved Problem 15.3 520
15.3 **Monopsony** 521
Monopsony Profit Maximization 521
APPLICATION *Walmart's Monopsony Power* 523
Welfare Effects of Monopsony 524
Solved Problem 15.4 525
CHALLENGE SOLUTION *Athletes' Salaries and Ticket Prices* 525
Summary 526 ■ *Questions 527*

Chapter 16 Interest Rates, Investments, and Capital Markets 530

CHALLENGE *Should You Go to College?* 530
16.1 **Comparing Money Today to Money in the Future** 531
Interest Rates 531
Using Interest Rates to Connect the Present and Future 534
APPLICATION *Power of Compounding* 534
Stream of Payments 536
Solved Problem 16.1 537
APPLICATION *Saving for Retirement* 538

Inflation and Discounting 539
APPLICATION *Winning the Lottery* 540
16.2 **Choices over Time** 541
Investing 541
Solved Problem 16.2 543
Solved Problem 16.3 544
Rate of Return on Bonds 544
★ Behavioral Economics: Time-Varying Discounting 545
APPLICATION *Falling Discount Rates and Self-Control* 546
16.3 **Exhaustible Resources** 546
When to Sell an Exhaustible Resource 547
Price of a Scarce Exhaustible Resource 547
APPLICATION *Redwood Trees* 550
Why Price May Be Constant or Fall 551
16.4 **Capital Markets, Interest Rates, and Investments** 553
Solved Problem 16.4 554
CHALLENGE SOLUTION *Should You Go to College?* 555
Summary 557 ■ *Questions 557*

Chapter 17 Uncertainty 561

CHALLENGE *BP and Limited Liability* 561
17.1 **Assessing Risk** 563
Probability 563
Expected Value 565
Solved Problem 17.1 565
Variance and Standard Deviation 566
17.2 **Attitudes Toward Risk** 567
Expected Utility 567
Risk Aversion 568
Solved Problem 17.2 570
APPLICATION *Stocks' Risk Premium* 571
Risk Neutrality 572
Risk Preference 573
APPLICATION *Gambling* 573
17.3 **Reducing Risk** 574
Obtain Information 575
Diversify 575
APPLICATION *Diversifying Retirement Funds* 577
Buy Insurance 577
Solved Problem 17.3 578
APPLICATION *Flight Insurance* 580
APPLICATION *Limited Insurance for Natural Disasters* 581
17.4 **Investing Under Uncertainty** 582
Risk-Neutral Investing 582
Risk-Averse Investing 582
Solved Problem 17.4 583
17.5 **Behavioral Economics of Uncertainty** 584
Biased Assessment of Probabilities 584
APPLICATION *Biased Estimates* 585
Violations of Expected Utility Theory 586
Prospect Theory 587
CHALLENGE SOLUTION *BP and Limited Liability* 589
Summary 590 ■ *Questions 591*

Chapter 18 Externalities, Open-Access, and Public Goods 595

CHALLENGE *Trade and Pollution* 595
18.1 **Externalities** 596
APPLICATION *Negative Externalities from Spam* 597
18.2 **The Inefficiency of Competition with Externalities** 597
18.3 **Regulating Externalities** 600
APPLICATION *Pulp and Paper Mill Pollution and Regulation* 602
Solved Problem 18.1 603
APPLICATION *Why Tax Drivers* 603
Benefits Versus Costs from Controlling Pollution 604
APPLICATION *Protecting Babies* 604
18.4 **Market Structure and Externalities** 605
Monopoly and Externalities 605
Monopoly Versus Competitive Welfare with Externalities 606
Solved Problem 18.2 606
Taxing Externalities in Noncompetitive Markets 607
18.5 **Allocating Property Rights to Reduce Externalities** 607
Coase Theorem 607
APPLICATION *Buying a Town* 609
Markets for Pollution 609
APPLICATION *Acid Rain Program* 610
Markets for Positive Externalities 610
18.6 **Rivalry and Exclusion** 610
Open-Access Common Property 611
Club Goods 612
APPLICATION *Piracy* 613
Public Goods 613
Solved Problem 18.3 614
APPLICATION *Radiohead's "Public Good" Experiment* 615
APPLICATION *What's Their Beef?* 616
CHALLENGE SOLUTION *Trade and Pollution* 617
Summary 619 ■ *Questions 620*

Chapter 19 Asymmetric Information 623

CHALLENGE *Dying to Work* 623
19.1 **Adverse Selection** 625
Adverse Selection in Insurance Markets 626
Products of Unknown Quality 626
Solved Problem 19.1 629

Solved Problem 19.2 629
19.2 Reducing Adverse Selection 630
Restricting Opportunistic Behavior 630
Equalizing Information 631
APPLICATION *Changing a Firm's Name* 632
APPLICATION *Adverse Selection on eBay Motors* 633
19.3 Price Discrimination Due to False Beliefs About Quality 634
APPLICATION *Reducing Consumers' Information* 635
19.4 Market Power from Price Ignorance 636
Tourist-Trap Model 636
Solved Problem 19.3 638
Advertising and Prices 638
19.5 Problems Arising from Ignorance When Hiring 638
Cheap Talk 639
Education as a Signal 640
Solved Problem 19.4 642
Screening in Hiring 644
CHALLENGE SOLUTION *Dying to Work* 646
Summary 647 ■ *Questions* 648

Chapter 20 Contracts and Moral Hazards 651
CHALLENGE *Changing Bankers' Incentives* 651
20.1 The Principal-Agent Problem 653
Efficiency 654
Symmetric Information 654
Asymmetric Information 655
APPLICATION *Selfless or Selfish Doctors?* 656
Solved Problem 20.1 657
20.2 Using Contracts to Reduce Moral Hazard 657
Fixed-Fee Contracts 658
Contingent Contracts 659
Solved Problem 20.2 659
Solved Problem 20.3 661
Solved Problem 20.4 663
APPLICATION *Contracts and Productivity in Agriculture* 664
Choosing the Best Contract 664
APPLICATION *Music Contracts: Changing Their Tunes* 665
20.3 Monitoring to Reduce Moral Hazard 666
Bonding 667
Solved Problem 20.5 668
Deferred Payments 669
Efficiency Wages 669
Monitoring Outcomes 670
APPLICATION *Abusing Leased Cars* 671
20.4 Checks on Principals 671
APPLICATION *Layoffs Versus Pay Cuts* 672
20.5 Contract Choice 674
CHALLENGE SOLUTION *Changing Bankers' Incentives* 675
Summary 676 ■ *Questions* 677

Chapter Appendixes A-1
Appendix 2A: Regressions A-1
Appendix 3A: Effects of a Specific Tax on Equilibrium A-3
Appendix 4A: Utility and Indifference Curves A-4
Appendix 4B: Maximizing Utility A-6
Appendix 5A: The Slutsky Equation A-8
Appendix 5B: Labor-Leisure Model A-9
Appendix 6A: Properties of Marginal and Average Product Curves A-10
Appendix 6B: The Slope of an Isoquant A-10
Appendix 6C: Cobb-Douglas Production Function A-10
Appendix 7A: Minimum of the Average Cost Curve A-11
Appendix 7B: Japanese Beer Manufacturer's Short-Run Cost Curves A-11
Appendix 7C: Minimizing Cost A-12
Appendix 8A: The Elasticity of the Residual Demand Curve A-14
Appendix 8B: Profit Maximization A-15
Appendix 9A: Demand Elasticities and Surplus A-15
Appendix 11A: Relationship Between a Linear Demand Curve and Its Marginal Revenue Curve A-16
Appendix 11B: Incidence of a Specific Tax on a Monopoly A-16
Appendix 12A: Perfect Price Discrimination A-17
Appendix 12B: Group Price Discrimination A-18
Appendix 12C: Block Pricing A-18
Appendix 12D: Two-Part Pricing A-19
Appendix 12E: Profit-Maximizing Advertising and Production A-19
Appendix 13A: Nash-Cournot Equilibrium A-20
Appendix 13B: Nash-Stackelberg Equilibrium A-22
Appendix 13C: Nash-Bertrand Equilibrium A-23
Appendix 15A: Factor Demands A-24
Appendix 15B: Monopsony A-25
Appendix 16A: Perpetuity A-26
Appendix 18A: Welfare Effects of Pollution in a Competitive Market A-26
Appendix 20A: Nonshirking Condition A-28

Answers to Selected Questions and Problems A-29
Sources for Challenges and Applications A-46
References A-56
Definitions A-64
Index A-69
Credits A-96

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.
- Enhanced 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.
- Temporary Access for students who are awaiting financial aid provides a grace period of temporary access.

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.

- All of the end-of-chapter questions are available for assignment and auto-grading.
- All of the Solved Problems are available for assignment and auto-grading.
- 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, which is available for Windows and Macintosh. 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.pearsonhighered.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.

Many people were very generous in providing me with data, models, and examples, including among others: Thomas Bauer (University of Bochum), Peter Berck (University of California, Berkeley), James Brander (University of British Columbia), Leemore Dafny (Northwestern University), Lucas Davis (University of California, Berkeley), James Dearden (Lehigh University), Farid Gasmi (Université des Sciences Sociales), Avi Goldfarb (University of Toronto), Claudia Goldin (Harvard University), Rachel Goodhue (University of California, Davis), William Greene (New York University), Nile Hatch (University of Illinois), Larry Karp (University of California, Berkeley), Ryan Kellogg (University of Michigan), Arthur Kennickell (Federal Reserve, Washington), Fahad Khalil (University of Washington), Lutz Kilian (University of Michigan), Christopher Knittel (University of California, Davis), Jean-Jacques Laffont (deceased), Ulrike Malmendier (University of California, Berkeley), Karl D. Meilke (University of Guelph), Eric Muehlegger (Harvard University), Giancarlo Moschini (Iowa State University), Michael Roberts (North Carolina State University), Wolfram Schlenker (Columbia University), Junichi Suzuki (University of Toronto), Catherine Tucker (MIT), Harald Uhlig (University of Chicago), Quang Vuong (Université des Sciences Sociales, Toulouse, and University of Southern California), and Joel Waldfogel (University of Minnesota).

Writing a textbook is hard work for everyone involved. I am grateful to the many teachers of microeconomics who spent untold hours reading and commenting on proposals and chapters. Many of the best ideas in this book are due to them.

I am particularly grateful to Jim Brander of the University of British Columbia who provided material for Chapters 13 and 14, has given me many deep and insightful comments on many editions of this book, and with whom I wrote another, related book. Much of the new material in this edition was jointly written with him. My other biggest debt is to James Dearden, Lehigh University, who has made extremely insightful comments on all prior editions and wrote some of the end-of-chapter questions.

In earlier editions, Peter Berck made major contributions to Chapter 16. Charles F. Mason made particularly helpful comments on many chapters. Larry Karp helped me to develop two of the sections and carefully reviewed the content of several others. Robert Whaples, Wake Forest University, read many chapters in earlier editions and offered particularly useful comments. He also wrote the first draft of one of my favorite Applications.

I am grateful to the following people who reviewed the book or sent me valuable suggestions at various stages:

M. Shahid Alam, Northeastern University
Anne Alexander, University of Wyoming
Samson Alva, Boston College
Richard K. Anderson, Texas A & M University
Niels Anthonisen, University of Western Ontario
Wilma Anton, University of Central Florida
Emrah Arbak, State University of New York at Albany
Scott E. Atkinson, University of Georgia
Talia Bar, Cornell University
Raymond G. Batina, Washington State University
Anthony Becker, St. Olaf College
Robert A. Berman, American University
Gary Biglaiser, University of North Carolina, Chapel Hill
S. Brock Blomberg, Wellesley College
Hein Bogaard, George Washington University
Vic Brajer, California State University, Fullerton
Jurgen Brauer, Augusta State University
Bruce Brown, Cal Polytech Pomona and UCLA
Cory S. Capps, University of Illinois, Urbana-Champaign
John Cawley, Cornell University
Indranil Chakraborty, University of Oklahoma
Leo Chan, University of Kansas
Joni S. Charles, Southwest Texas State University
Kwang Soo Cheong, University of Hawaii at Manoa
Joy L. Clark, Auburn University, Montgomery
Dean Croushore, Federal Reserve Bank of Philadelphia
Douglas Dalenberg, University of Montana
Andrew Daughety, Vanderbilt University
Carl Davidson, Michigan State University
Ronald Deiter, Iowa State University
Manfred Dix, Tulane University
John Edgren, Eastern Michigan University

Patrick Emerson, University of Colorado, Denver
Xin Fang, Hawai'i Pacific University
Bernard Fortin, Université Laval
Tom Friedland, Rutgers University
Roy Gardner, Indiana University
Rod Garratt, University of California, Santa Barbara
Wei Ge, Bucknell University
Lisa Giddings, University of Wisconsin, La Crosse
J. Fred Giertz, University of Illinois, Urbana-Champaign
Haynes Goddard, University of Cincinnati
Steven Goldman, University of California, Berkeley
Julie Gonzalez, University of California, Santa Cruz
Rachel Goodhue, University of California, Davis
Srihari Govindan, University of Western Ontario
Gareth Green, Seattle University
Thomas A. Gresik, Pennsylvania State University
Jonathan Gruber, MIT
Steffan Habermalz, University of Nebraska, Kearney
Claire Hammond, Wake Forest University
John A. Hansen, State University of New York, Fredonia
Philip S. Heap, James Madison University
L. Dean Hiebert, Illinois State University
Kathryn Ierulli, University of Illinois, Chicago
Mike Ingham, University of Salford, U.K.
Samia Islam, Boise State University
D. Gale Johnson, University of Chicago
Erik Jonasson, Lund University, Sweden
Charles Kahn, University of Illinois, Urbana-Champaign
Vibha Kapuria-Foreman, Colorado College
Paula M. Kazi, Bucknell University
Carrie Kerekes, Florida Gulf Coast University
Alan Kessler, Providence College
Kristin Kiesel, California State University, Sacramento
Kate Krause, University of New Mexico
Robert Lemke, Lake Forest College
Jing Li, University of Pennsylvania
Qihong Liu, University of Oklahoma
Zhou Lu, City College of New York
Fred Luk, University of California, Los Angeles
Robert Main, Butler University
David Malueg, Tulane University
Steve Margolis, North Carolina State University
Kate Matraves, Michigan State University
James Meehan, Colby College
Claudio Mezzetti, University of North Carolina, Chapel Hill
Chun-Hui Miao, University of South Carolina
Janet Mitchell, Cornell University
Felix Munoz-Garcia, Washington State University
Babu Nahata, University of Louisville
Kathryn Nantz, Fairfield University
Jawwad Noor, Boston University
Yuka Ohno, Rice University
Patrick B. O'Neil, University of North Dakota
John Palmer, University of Western Ontario
Christos Papahristodoulou, Uppsala University
Silve Parviainen, University of Illinois, Urbana-Champaign
Sharon Pearson, University of Alberta
Anita Alves Pena, Colorado State University
Ingrid Peters-Fransen, Wilfrid Laurier University
Jaishankar Raman, Valparaiso University
Sunder Ramaswamy, Middlebury College
Lee Redding, University of Michigan, Dearborn
David Reitman, Department of Justice
Luca Rigotti, Tillburg University
S. Abu Turab Rizvi, University of Vermont
Bee Yan Aw Roberts, Pennsylvania State University
Richard Rogers, Ashland University
Nancy Rose, Sloan School of Business, MIT
Joshua Rosenbloom, University of Kansas
Roy Ruffin, University of Houston
Matthew Rutledge, Boston College
Alfonso Sanchez-Penalver, University of Massachusetts, Boston
George Santopietro, Radford College
David Sappington, University of Florida
Rich Sexton, University of California, Davis
Quazi Shahriar, San Diego State University
Jacques Siegers, Utrecht University, The Netherlands
Alasdair Smith, University of Sussex
William Doyle Smith, University of Texas at El Paso
Philip Sorenson, Florida State University
Peter Soule, Park College
Robert Stearns, University of Maryland
Jennifer Lynn Steele, Washington State University
Shankar Subramanian, Cornell University
Albert J. Sumell, Youngstown State University
Beck A. Taylor, Baylor University
Scott Templeton, Clemson University
Mark L. Tendall, Stanford University
Justin Tevie, University of New Mexico
Wade Thomas, State University of New York, Oneonta
Judith Thornton, University of Washington
Vitor Trindade, Syracuse University
Nora Underwood, University of California, Davis
Burcin Unel, University of Florida
Kay Unger, University of Montana
Alan van der Hilst, University of Washington
Bas van der Klaauw, Free University Amsterdam and Tinbergen Institute
Andrew Vassallo, Rutgers University
Jacob L. Vigdor, Duke University
Peter von Allmen, Moravian College
Eleanor T. von Ende, Texas Tech University
Curt Wells, Lund University
Lawrence J. White, New York University
John Whitehead, East Carolina University
Colin Wright, Claremont McKenna College
Bruce Wydick, University of San Francisco
Peter Zaleski, Villanova University
Artie Zillante, Florida State University
Mark Zupan, University of Arizona

In addition, I thank Bob Solow, the world's finest economics teacher, who showed me how to simplify models without losing their essence. I've also learned a great deal over the years about economics and writing from my coauthors on other projects, especially Dennis Carlton (my coauthor on *Modern Industrial Organization*), Jackie Persons, Steve Salop, Michael Wachter, Larry Karp, Peter Berck, Amos Golan, and Dan Rubinfeld (whom I thank for still talking to me despite my decision to write this book).

It was a pleasure to work with the good people at Pearson, who were incredibly helpful in producing this book. Marjorie Williams and Barbara Rifkin signed me to write it. I would like to thank Donna Battista, Editor-in-Chief for Business Publishing, and Denise Clinton, Publisher for MyEconLab, who were instrumental in making the entire process work. Meredith Gertz did her usual outstanding job of supervising the production process, assembling the extended publishing team, and managing the design of the handsome interior. She makes the entire process as smooth as possible.

I thank Jonathan Boylan for the cover design. I also want to acknowledge, with appreciation, the efforts of Melissa Honig, Noel Lotz, and Courtney Kamauf in developing MyEconLab, the online assessment and tutorial system for the book.

Gillian Hall and the rest of the team at The Aardvark Group Publishing Services have my sincere gratitude for designing the book and keeping the project on track and on schedule. As always, I'm particularly thankful to work with Gillian, who is wonderfully flexible and committed to producing the best book possible. Rebecca Greenberg did a superior copyediting for this edition—and made many important contributions to the content.

Finally, and most importantly, I thank my wife, Jackie Persons, and daughter, Lisa Perloff, for their great patience and support during the nearly endless writing process. And I apologize for misusing their names—and those of my other relatives and friends—in the book!

J. M. P.

This page intentionally left blank

Introduction

1

An Economist's Theory of Reincarnation: If you're good, you come back on a higher level. Cats come back as dogs, dogs come back as horses, and people—if they've been really good like George Washington—come back as money.

If each of us could get all the food, clothing, and toys we wanted without working, no one would study economics. Unfortunately, most of the good things in life are scarce—we can't all have as much as we want. Thus, scarcity is the mother of economics.

Microeconomics is the study of how individuals and firms make themselves as well off as possible in a world of scarcity and the consequences of those individual decisions for markets and the entire economy. In studying microeconomics, we examine how individual consumers and firms make decisions and how the interaction of many individual decisions affects markets and the entire economy.

microeconomics the study of how individuals and firms make themselves as well off as possible in a world of scarcity and the consequences of those individual decisions for markets and the entire economy

Microeconomics is often called *price theory* to emphasize the important role that prices play. Microeconomics explains how the actions of all buyers and sellers determine prices and how prices influence the decisions and actions of individual buyers and sellers.

In this chapter, we examine three main topics

1. **Microeconomics: The Allocation of Scarce Resources.** Microeconomics is the study of the allocation of scarce resources.
2. **Models.** Economists use models to make testable predictions.
3. **Uses of Microeconomic Models.** Individuals, governments, and firms use microeconomic models and predictions in decision making.

1.1 Microeconomics: The Allocation of Scarce Resources

Individuals and firms allocate their limited resources to make themselves as well off as possible. Consumers pick the mix of goods and services that makes them as happy as possible given their limited wealth. Firms decide which goods to produce, where to produce them, how much to produce to maximize their profits, and how to produce those levels of output at the lowest cost by using more or less of various inputs such as labor, capital, materials, and energy. The owners of a depletable natural resource such as oil decide when to use it. Government decision makers—to

benefit consumers, firms, or government bureaucrats—decide which goods and services the government produces and whether to subsidize, tax, or regulate industries and consumers.

Trade-Offs

People make trade-offs because they can't have everything. A society faces three key trade-offs:

- **Which goods and services to produce:** If a society produces more cars, it must produce fewer of other goods and services, because there are only so many *resources*—workers, raw materials, capital, and energy—available to produce goods.
- **How to produce:** To produce a given level of output, a firm must use more of one input if it uses less of another input. For example, cracker and cookie manufacturers switch between palm oil and coconut oil, depending on which is less expensive.
- **Who gets the goods and services:** The more of society's goods and services you get, the less someone else gets.

Who Makes the Decisions

These three allocation decisions may be made explicitly by the government or may reflect the interaction of independent decisions by many individual consumers and firms. In the former Soviet Union, the government told manufacturers how many cars of each type to make and which inputs to use to make them. The government also decided which consumers would get a car.

In most other countries, how many cars of each type are produced and who gets them are determined by how much it costs to make cars of a particular quality in the least expensive way and how much consumers are willing to pay for them. More consumers would own a handmade Rolls-Royce and fewer would buy a mass-produced Ford Taurus if a Rolls were not 13 times more expensive than a Taurus.

Prices Determine Allocations

Prices link the decisions about *which goods and services to produce*, *how to produce them*, and *who gets them*. Prices influence the decisions of individual consumers and firms, and the interactions of these decisions by consumers, firms, and the government determine price.

market
an exchange mechanism that allows buyers to trade with sellers

Interactions between consumers and firms take place in a **market**, which is an exchange mechanism that allows buyers to trade with sellers. A market may be a town square where people go to trade food and clothing, or it may be an international telecommunications network over which people buy and sell financial securities. Typically, when we talk about a single market, we refer to trade in a single good or group of goods that are closely related, such as soft drinks, movies, novels, or automobiles.

Most of this book concerns how prices are determined within a market. We show that the *number of buyers and sellers* in a market and the amount of *information* they have help determine whether the price equals the cost of production. We also show that if there is no market—and hence no market price—serious problems, such as high levels of pollution, result.

1.2 Models

Everything should be made as simple as possible, but not simpler.
—Albert Einstein

model
a description of the relationship between two or more economic variables

To *explain* how individuals and firms allocate resources and how market prices are determined, economists use a **model**: a description of the relationship between two or more economic variables. Economists also use models to *predict* how a change in one variable will affect another.

Application

Income Threshold Model and China

According to an *income threshold model*, no one who has an income level below a particular threshold buys a particular consumer durable, such as a refrigerator or car. The theory also holds that almost everyone whose income is above that threshold buys the product.

If this theory is correct, we predict that, as most people's incomes rise above the threshold in emergent economies, consumer durable purchases will increase from near zero to large numbers virtually overnight. This prediction is consistent with evidence from Malaysia, where the income threshold for buying a car is about $4,000.

In China, incomes have risen rapidly and now exceed the threshold levels for many types of durable goods. As a result, many experts correctly predicted that the greatest consumer durable goods sales boom in history would take place there. Anticipating this boom, many companies have greatly increased their investments in durable goods manufacturing plants in China. Annual foreign direct investments have gone from $916 million a year in 1983 to $116 billion in 2011. In expectation of this growth potential, even traditional political opponents of the People's Republic—Taiwan, South Korea, and Russia—are investing in China.

One of the most desirable durable goods is a car. Li Rifu, a 46-year-old Chinese farmer and watch repairman, thought that buying a car would improve the odds that his 22- and 24-year-old sons would find girlfriends, marry, and produce grandchildren. Soon after Mr. Li purchased his Geely King Kong for the equivalent of $9,000, both sons met girlfriends, and his older son got married. Four-fifths of all new cars sold in China are bought by first-time customers. An influx of first-time buyers was responsible for China's ninefold increase in car sales from 2000 to 2009. By 2010, China became the second largest producer of automobiles in the world, trailing only Germany. In addition, foreign automobile companies built Chinese plants. For example, Ford invested $600 million in its Chongqing factory in 2012.[1]

Simplifications by Assumption

We stated the income threshold model in words, but we could have presented it using graphs or mathematics. Regardless of how the model is described, an economic model is a simplification of reality that contains only its most important features. Without simplifications, it is difficult to make predictions because the real world is too complex to analyze fully.

By analogy, if the manual accompanying your new TiVo recorder has a diagram showing the relationships between all the parts in the TiVo, the diagram will be overwhelming and useless. In contrast, if it shows a photo of the lights on the front

[1]The sources for Applications are available at the back of this book.

of the machine with labels describing the significance of each light, the manual is useful and informative.

Economists make many *assumptions* to simplify their models.[2] When using the income threshold model to explain car purchasing behavior in China, we *assume* that factors other than income, such as the color of cars, are irrelevant to the decision to buy cars. Therefore, we ignore the color of cars that are sold in China in describing the relationship between average income and the number of cars consumers want. If this assumption is correct, by ignoring color, we make our analysis of the auto market simpler without losing important details. If we're wrong and these ignored issues are important, our predictions may be inaccurate.

Throughout this book, we start with strong assumptions to simplify our models. Later, we add complexities. For example, in most of the book, we assume that consumers know the price each firm charges. In many markets, such as the New York Stock Exchange, this assumption is realistic. It is not realistic in other markets, such as the market for used automobiles, in which consumers do not know the prices each firm charges. To devise an accurate model for markets in which consumers have limited information, we add consumer uncertainty about price into the model in Chapter 19.

Testing Theories

Blore's Razor: *When given a choice between two theories, take the one that is funnier*.

Economic *theory* is the development and use of a model to test *hypotheses*, which are predictions about cause and effect. We are interested in models that make clear, testable predictions, such as "If the price rises, the quantity demanded falls." A theory that said "People's behavior depends on their tastes, and their tastes change randomly at random intervals" is not very useful because it does not lead to testable predictions.

Economists test theories by checking whether predictions are correct. If a prediction does not come true, they may reject the theory.[3] Economists use a model until it is refuted by evidence or until a better model is developed.

A good model makes sharp, clear predictions that are consistent with reality. Some very simple models make sharp predictions that are incorrect, and other more complex models make ambiguous predictions—any outcome is possible—which are untestable. The skill in model building is to chart a middle ground.

The purpose of this book is to teach you how to think like an economist in the sense that you can build testable theories using economic models or apply existing models to new situations. Although economists think alike in that they develop and use testable models, they often disagree. One may present a logically consistent argument that prices will go up next quarter. Another, using a different but equally logical theory, may contend that prices will fall. If the economists are reasonable, they agree that pure logic alone cannot resolve their dispute. Indeed, they agree that they'll have to use empirical evidence—facts about the real world—to find out which prediction is correct.

---

[2]An economist, an engineer, and a physicist are stranded on a desert island with a can of beans but no can opener. How should they open the can? The engineer proposes hitting the can with a rock. The physicist suggests building a fire under it to build up pressure and burst the can open. The economist thinks for a while and then says, "*Assume* that we have a can opener. . . ."

[3]We can use evidence on whether a theory's predictions are correct to *refute* the theory but not to *prove* it. If a model's prediction is inconsistent with what actually happened, the model must be wrong, so we reject it. Even if the model's prediction is consistent with reality, however, the model's prediction may be correct for the wrong reason. Hence we cannot prove that the model is correct—we can only fail to reject it.

Although one economist's model may differ from another's, a key assumption in most microeconomic models is that individuals allocate their scarce resources so as to make themselves as well off as possible. Of all affordable combinations of goods, consumers pick the bundle of goods that gives them the most possible enjoyment. Firms try to maximize their profits given limited resources and existing technology. That resources are limited plays a crucial role in these models. Were it not for scarcity, people could consume unlimited amounts of goods and services, and sellers could become rich beyond limit.

As we show throughout this book, the maximizing behavior of individuals and firms determines society's three main allocation decisions: which goods are produced, how they are produced, and who gets them. For example, diamond-studded pocket combs will be sold only if firms find it profitable to sell them. The firms will make and sell these combs only if consumers value the combs at least as much as it costs the firm to produce them. Consumers will buy the combs only if they get more pleasure from the combs than they would from the other goods they could buy with the same resources.

Positive Versus Normative

The use of models of maximizing behavior sometimes leads to predictions that seem harsh or heartless. For instance, a World Bank economist predicted that if an African government used price controls to keep the price of food low during a drought, food shortages would occur and people would starve. The predicted outcome is awful, but the economist was not heartless. The economist was only making a scientific prediction about the relationship between cause and effect: Price controls (cause) lead to food shortages and starvation (effect).

positive statement
a testable hypothesis about cause and effect

Such a scientific prediction is known as a **positive statement**: a testable hypothesis about cause and effect. "Positive" does not mean that we are certain about the truth of our statement—it only indicates that we can test the truth of the statement.

If the World Bank economist is correct, should the government control prices? If the government believes the economist's predictions, it knows that the low prices help those consumers who are lucky enough to be able to buy as much food as they want while hurting both the firms that sell food and the people who are unable to buy as much food as they want, some of whom may die. As a result, the government's decision whether to use price controls turns on whether the government cares more about the winners or the losers. In other words, to decide on its policy, the government makes a value judgment.

Instead of first making a prediction and testing it before making a value judgment to decide whether to use price controls, the government could make a value judgment directly. The value judgment could be based on the belief that "because people *should* have prepared for the drought, the government *should not* try to help them by keeping food prices low." Alternatively, the judgment could be based on the view that "people *should* be protected against price gouging during a drought, so the government *should* use price controls."

normative statement
a conclusion as to whether something is good or bad

These two statements are *not* scientific predictions. Each is a value judgment or **normative statement**: a conclusion as to whether something is good or bad. A normative statement cannot be tested because a value judgment cannot be refuted by evidence. It is a prescription rather than a prediction. A normative statement concerns what somebody believes *should* happen; a positive statement concerns what *will* happen.

Although a normative conclusion can be drawn without first conducting a positive analysis, a policy debate will be more informed if positive analyses are conducted

first.[4] For instance, if your normative belief is that the government should help the poor, should you vote for a candidate who advocates a higher minimum wage (a law that requires that firms pay wages at or above a specified level)? One who believes in a European-style welfare system (guaranteeing health care, housing, and other basic goods and services)? A politician who wants an end to our current welfare system? Someone who wants to implement a negative income tax (in which the less income a person has, the more the government gives that person)? Or a candidate who favors job training programs? Positive economic analysis can be used to predict whether these programs will benefit poor people but not whether they are good or bad. Using these predictions and your value judgment, you can decide for whom to vote.

Economists' emphasis on positive analysis has implications for what we study and even our use of language. For example, many economists stress that they study people's *wants* rather than their *needs*. Although people need certain minimum levels of food, shelter, and clothing to survive, most people in developed economies have enough money to buy goods well in excess of the minimum levels necessary to maintain life. Consequently, in wealthy countries, calling something a "need" is often a value judgment. You almost certainly have been told by some elder that "you *need* a college education." That person was probably making a value judgment—"you *should* go to college"—rather than a scientific prediction that you will suffer terrible economic deprivation if you do not go to college. We can't test such value judgments, but we can test a hypothesis such as "One-third of the college-age population *wants* to go to college at current prices."

1.3 Uses of Microeconomic Models

Because microeconomic models *explain* why economic decisions are made and allow us to make *predictions*, they can be very useful for individuals, governments, and firms in making decisions. Throughout this book, we consider examples of how microeconomics aids in actual decision making.

Individuals can use microeconomics to make purchasing and other decisions (Chapters 4 and 5). Consumers' purchasing and investing decisions are affected by inflation and cost of living adjustments (Chapter 5). Whether it pays financially to go to college depends, in part, on interest rates (Chapter 16). Consumers decide for whom to vote based on candidates' views on economic issues.

Firms must decide which production methods to use to minimize cost (Chapter 7) and maximize profit (starting with Chapter 8). They may choose a complex pricing scheme or advertise to raise profits (Chapter 12). They select strategies to maximize profit when competing with a small number of other firms (Chapters 13 and 14). Some firms reduce consumer information to raise profits (Chapter 19). Firms use economic principles to structure contracts with other firms (Chapter 20).

Your government's elected and appointed officials use (or could use) economic models in many ways. Recent administrations have placed increased emphasis on economic analysis. Today, economic and environmental impact studies are required before many projects can commence. The President's Council of Economic Advisers and other federal economists analyze and advise national government agencies on the likely economic effects of all major policies.

---

[4]Some economists draw the normative conclusion that, as social scientists, economists *should* restrict ourselves to positive analyses. Others argue that we shouldn't give up our right to make value judgments just like the next person (who happens to be biased, prejudiced, and pigheaded, unlike us).

One major use of microeconomic models by governments is to predict the probable impact of a policy before it is adopted. For example, economists predict the likely impact of a tax on the prices consumers pay and on the tax revenues raised (Chapter 3), whether a price control will create a shortage (Chapter 2), the differential effects of tariffs and quotas on trade (Chapter 9), and the effects of regulation on monopoly price and the quantity sold (Chapter 11).

Summary

1. **Microeconomics: The Allocation of Scarce Resources.** Microeconomics is the study of the allocation of scarce resources. Consumers, firms, and governments must make allocation decisions. The three key trade-offs a society faces are which goods and services to produce, how to produce them, and who gets them. These decisions are interrelated and depend on the prices that consumers and firms face and on government actions. Market prices affect the decisions of individual consumers and firms, and the interaction of the decisions of individual consumers and firms determines market prices. The organization of the market, especially the number of firms in the market and the information consumers and firms have, plays an important role in determining whether the market price is equal to or higher than marginal cost.
2. **Models.** Models based on economic theories are used to predict the future or to answer questions about how some change, such as a tax increase, affects various sectors of the economy. A good theory is simple to use and makes clear, testable predictions that are not refuted by evidence. Most microeconomic models are based on maximizing behavior. Economists use models to construct *positive* hypotheses concerning how a cause leads to an effect. These positive questions can be tested. In contrast, *normative* statements, which are value judgments, cannot be tested.
3. **Uses of Microeconomic Models.** Individuals, governments, and firms use microeconomic models and predictions to make decisions. For example, to maximize its profits, a firm needs to know consumers' decision-making criteria, the trade-offs between various ways of producing and marketing its product, government regulations, and other factors. For large companies, beliefs about how a firm's rivals will react to its actions play a critical role in how it forms its business strategies.

2 Supply and Demand

Talk is cheap because supply exceeds demand.

Challenge

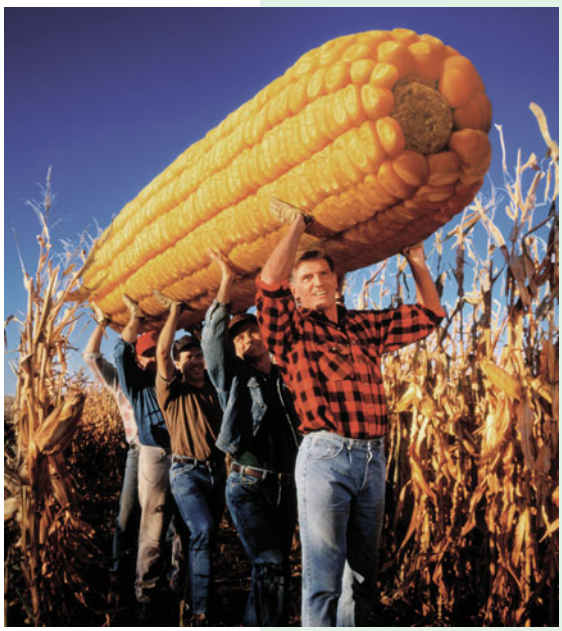
Quantities and Prices of Genetically Modified Foods

Countries around the globe are debating whether to permit firms to grow or sell genetically modified (GM) foods, which have their DNA altered through genetic engineering rather than through conventional breeding.[1] The introduction of GM techniques can affect both the quantity of a crop farmer's supply and whether consumers want to buy that crop.

The first commercial GM food was Calgene's Flavr Savr tomato, which the company claimed resisted rotting and could stay on the vine longer to ripen to full flavor. It was first marketed in 1994 without any special labeling. Other common GM crops include canola, corn, cotton, rice, soybean, and sugar cane. Using GM techniques, farmers can produce more output at a given cost.

As of 2012, GM food crops, which are mostly insect-resistant, herbicide-tolerant, or stacked gene (has several traits) varieties of corn, soybean, and canola oilseed, were grown in 29 countries, but over 40% of the acreage was in the United States. In the United States in 2012, the share of crops that were GM was 88% for corn, 93% for soybean, and 94% for cotton.

Some scientists and consumer groups have raised safety concerns about GM crops. In some countries, certain GM foods have been banned. In 2008, the European Union (EU) was forced to end its de facto ban on GM crop imports when the World Trade Organization ruled that the ban lacked scientific merit and hence violated international trade rules. As of 2013, most of the EU still banned planting most GM crops. In the EU, Australia, and several other countries, governments have required that GM products be labeled. Although Japan has not approved the cultivation of GM crops, it is the nation with the greatest GM food consumption and does not require labeling.



According to some polls, 70% of consumers in Europe object to GM foods. Fears cause some consumers to refuse to buy a GM crop (or the entire crop if GM products cannot be distinguished). Consumers in other countries, such as the United States, are less concerned about GM foods.

Whether a country approves GM crops turns on questions of safety and of economics. Will the use of GM seeds lead to lower prices and more food sold? What happens to prices and quantities sold if many consumers refuse to buy GM crops? (We will return to these questions at the end of this chapter.)

[1]Sources for Challenges, which appear at the beginning of chapters, and Applications, which appear throughout the chapters, are listed at the end of the book.

To analyze questions concerning the price and quantity responses from introducing new products or technologies, imposing government regulations or taxes, or other events, economists may use the *supply-and-demand model*. When asked, "What is the most important thing you know about economics?" a common reply is, "Supply equals demand." This statement is a shorthand description of one of the simplest yet most powerful models of economics. The supply-and-demand model describes how consumers and suppliers interact to determine the quantity of a good or service sold in a market and the price at which it is sold. To use the model, you need to determine three things: buyers' behavior, sellers' behavior, and how they interact.

After reading this chapter, you should be adept enough at using the supply-and-demand model to analyze some of the most important policy questions facing your country today, such as those concerning international trade, minimum wages, and price controls on health care.

After reading that grandiose claim, you may ask, "Is that all there is to economics? Can I become an expert economist that fast?" The answer to both these questions is no, of course. In addition, you need to learn the limits of this model and what other models to use when this one does not apply. (You must also learn the economists' secret handshake.)

Even with its limitations, the supply-and-demand model is the most widely used economic model. It provides a good description of how competitive markets function. *Competitive markets* are those with many buyers and sellers, such as most agriculture markets, labor markets, and stock and commodity markets. Like all good theories, the supply-and-demand model can be tested—and possibly shown to be false. But in competitive markets, where it works well, it allows us to make accurate predictions easily.

In this chapter, we examine six main topics

1. **Demand.** The quantity of a good or service that consumers demand depends on price and other factors such as consumers' incomes and the price of related goods.
2. **Supply.** The quantity of a good or service that firms supply depends on price and other factors such as the cost of inputs firms use to produce the good or service.
3. **Market Equilibrium.** The interaction between consumers' demand and firms' supply determines the market price and quantity of a good or service that is bought and sold.
4. **Shocking the Equilibrium.** Changes in a factor that affect demand (such as consumers' incomes), supply (such as a rise in the price of inputs), or a new government policy (such as a new tax) alter the market price and quantity of a good.
5. **Equilibrium Effects of Government Interventions.** Government policies may alter the equilibrium and cause the quantity supplied to differ from the quantity demanded.
6. **When to Use the Supply-and-Demand Model**. The supply-and-demand model applies only to competitive markets.

2.1 Demand

Potential consumers decide how much of a good or service to buy on the basis of its price and many other factors, including their own tastes, information, prices of other goods, income, and government actions. Before concentrating on the role of price in determining demand, let's look briefly at some of the other factors.

Consumers' *tastes* determine what they buy. Consumers do not purchase foods they dislike, artwork they hate, or clothes they view as unfashionable or uncomfortable. Advertising may influence people's tastes.