

Managerial Economics and Strategy



Jeffrey M. Perloff
James A. Brander

Managerial Economics and Strategy

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
- Brock/Adams**
The Structure of American Industry
- Bruce**
Public Finance and the American Economy
- Carlton/Perloff**
Modern Industrial Organization
- Case/Fair/Oster**
*Principles of Economics**
- Caves/Frankel/Jones**
World Trade and Payments: An Introduction
- Chapman**
Environmental Economics: Theory, Application, and Policy
- Cooter/Ulen**
Law & 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
- Hoffman/Averett**
Women and the Economy: Family, Work, and Pay
- 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**
- Lipsev/Ragan/Storer**
*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
- Nafziger**
The Economics of Developing Countries
- 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
- Ritter/Silber/Udell**
*Principles of Money, Banking & Financial Markets**
- Roberts**
The Choice: A Fable of Free Trade and Protection
- Rohlf**
Introduction to Economic Reasoning
- Ruffin/Gregory**
Principles of Economics
- Sargent**
Rational Expectations and Inflation
- Sawyer/Sprinkle**
International Economics
- Scherer**
Industry Structure, Strategy, and Public Policy
- Schiller**
The Economics of Poverty and Discrimination
- Sherman**
Market Regulation
- Silberberg**
Principles of Microeconomics
- 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**
Microeconomics
- 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.

Managerial Economics and Strategy



Jeffrey M. Perloff

University of California, Berkeley

James A. Brander

Sauder School of Business,
University of British Columbia

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 Jackie, Lisa, Barbara, and Cathy

Editor-in-Chief: Donna Battista
Executive Acquisitions Editor: Adrienne D'Ambrosio
Editorial Project Manager: Sarah Dumouchelle
Editorial Assistant: Elissa Senra-Sargent
Executive Marketing Manager: Lori DeShazo
Managing Editor: Jeff Holcomb
Senior Production Project Manager: Meredith Gertz
Senior Procurement Specialist: Carol Melville
Art Director: Jonathan Boylan
Cover Designer: John Christiana
Cover Image: Artisilense/Shutterstock
Image Manager: Rachel Youdelman
Photo Research: Integra Software Services, Ltd.
Associate Project Manager—Text Permissions: Samantha Blair
Graham

Text Permissions Research: Electronic Publishing Services
Director of Media: Susan Schoenberg
Content Leads, MyEconLab: Noel Lotz and Courtney Kamauf
Executive Media Producer: Melissa Honig
Project Management and Text Design: Gillian Hall,
The Aardvark Group
Composition and Illustrations: Laserwords Maine
Copyeditor: Rebecca Greenberg
Proofreader: Holly McLean-Aldis
Indexer: John Lewis
Printer/Binder: RR Donnelley
Cover Printer: Lehigh Phoenix
Text Font: Palatino

Credits and acknowledgments borrowed from other sources and reproduced, with permission, in this textbook appear on the appropriate page within text or on page E-51.

Copyright © 2014 by Pearson Education, Inc. 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 sellers 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.

Managerial economics and strategy / Jeffrey Perloff, James Brander. — First edition.
pages cm

Includes bibliographical references and index.

ISBN 978-0-321-56644-7

1. Managerial economics. I. Brander, James A. II. Title.

HD30.22.P436 2014

338.5024'658 — dc23

2013022387

10 9 8 7 6 5 4 3 2 1

PEARSON

www.pearsonhighered.com

ISBN 10: 0-321-56644-0

ISBN 13: 978-0-321-56644-7

Brief Contents

Preface	xiii	
Chapter 1	Introduction	1
Chapter 2	Supply and Demand	7
Chapter 3	Empirical Methods for Demand Analysis	42
Chapter 4	Consumer Choice	85
Chapter 5	Production	124
Chapter 6	Costs	154
Chapter 7	Firm Organization and Market Structure	193
Chapter 8	Competitive Firms and Markets	232
Chapter 9	Monopoly	273
Chapter 10	Pricing with Market Power	311
Chapter 11	Oligopoly and Monopolistic Competition	354
Chapter 12	Game Theory and Business Strategy	389
Chapter 13	Strategies over Time	428
Chapter 14	Managerial Decision Making Under Uncertainty	464
Chapter 15	Asymmetric Information	500
Chapter 16	Government and Business	533
Chapter 17	Global Business	573
Answers to Selected Questions		E-1
Definitions		E-13
References		E-18
Sources for Managerial Problems, Mini-Cases, and Managerial Implications		E-24
Index		E-32
Credits		E-51

Contents

Preface	xiii	2.5 Effects of Government Interventions	26
Chapter 1 Introduction	1	Policies That Shift Curves	26
1.1 Managerial Decision Making	1	MINI-CASE Occupational Licensing	26
Profit	2	Price Controls	27
Trade-Offs	2	MINI-CASE Disastrous Price Controls	29
Other Decision Makers	3	Sales Taxes	31
Strategy	3	Q&A 2.3	33
1.2 Economic Models	3	MANAGERIAL IMPLICATION Cost Pass-Through	34
MINI-CASE Using an Income Threshold Model in China	4	2.6 When to Use the Supply-and-Demand Model	34
Simplifying Assumptions	4	MANAGERIAL SOLUTION Carbon Taxes	36
Testing Theories	5	Summary 37 ■ Questions 38	
Positive and Normative Statements	5	Chapter 3 Empirical Methods for Demand Analysis	42
Summary	6	MANAGERIAL PROBLEM Estimating the Effect of an iTunes Price Change	42
Chapter 2 Supply and Demand	7	3.1 Elasticity	43
MANAGERIAL PROBLEM Carbon Taxes	7	The Price Elasticity of Demand	44
2.1 Demand	9	MANAGERIAL IMPLICATION Changing Prices to Calculate an Arc Elasticity	45
The Demand Curve	10	Q&A 3.1	45
The Demand Function	13	USING CALCULUS The Point Elasticity of Demand	47
USING CALCULUS Deriving the Slope of a Demand Curve	14	Q&A 3.2	47
Summing Demand Curves	14	Elasticity Along the Demand Curve	47
MINI-CASE Aggregating the Demand for Broadband Service	15	Other Demand Elasticities	50
2.2 Supply	15	MINI-CASE Substitution May Save Endangered Species	51
The Supply Curve	16	Demand Elasticities over Time	52
The Supply Function	17	Other Elasticities	52
Summing Supply Curves	18	Estimating Demand Elasticities	52
2.3 Market Equilibrium	18	MINI-CASE Turning Off the Faucet	53
Using a Graph to Determine the Equilibrium	18	3.2 Regression Analysis	53
Using Algebra to Determine the Equilibrium	19	A Demand Function Example	54
Forces That Drive the Market to Equilibrium	20	MINI-CASE The Portland Fish Exchange	55
2.4 Shocks to the Equilibrium	21	Multivariate Regression	60
Effects of a Shift in the Demand Curve	21	Q&A 3.3	61
Effects of a Shift in the Supply Curve	21	Goodness of Fit and the R^2 Statistic	61
Q&A 2.1	22	MANAGERIAL IMPLICATION Focus Groups	62
MANAGERIAL IMPLICATION Taking Advantage of Future Shocks	23	3.3 Properties and Statistical Significance of Estimated Coefficients	63
Effects of Shifts in Both Supply and Demand Curves	24	Repeated Samples	63
MINI-CASE Genetically Modified Foods	24	Desirable Properties for Estimated Coefficients	63
Q&A 2.2	25	A Focus Group Example	64
		Confidence Intervals	65

Hypothesis Testing and Statistical Significance	66	MINI-CASE <i>How You Ask the Question Matters</i>	114
3.4 Regression Specification	67	Saliency	115
Selecting Explanatory Variables	67	MANAGERIAL IMPLICATION <i>Simplifying Consumer Choices</i>	116
MINI-CASE <i>Determinants of CEO Compensation</i>	67	MANAGERIAL SOLUTION <i>Paying Employees to Relocate</i>	116
Q&A 3.4	69	Summary 118 ■ Questions 119	
Functional Form	71	Appendix 4A The Marginal Rate of Substitution	122
MANAGERIAL IMPLICATION <i>Experiments</i>	73	Appendix 4B The Consumer Optimum	122
3.5 Forecasting	74	Chapter 5 Production	124
Extrapolation	74	MANAGERIAL PROBLEM <i>Labor Productivity During Recessions</i>	124
Theory-Based Econometric Forecasting	76	5.1 Production Functions	125
MANAGERIAL SOLUTION <i>Estimating the Effect of an iTunes Price Change</i>	77	5.2 Short-Run Production	127
Summary 80 ■ Questions 81		The Total Product Function	127
Appendix 3 The Excel Regression Tool	84	The Marginal Product of Labor	128
Chapter 4 Consumer Choice	85	USING CALCULUS <i>Calculating the Marginal Product of Labor</i>	128
MANAGERIAL PROBLEM <i>Paying Employees to Relocate</i>	85	Q&A 5.1	129
4.1 Consumer Preferences	87	The Average Product of Labor	129
Properties of Consumer Preferences	87	Graphing the Product Curves	129
MINI-CASE <i>You Can't Have Too Much Money</i>	88	The Law of Diminishing Marginal Returns	132
Preference Maps	89	MINI-CASE <i>Malthus and the Green Revolution</i>	133
4.2 Utility	95	5.3 Long-Run Production	134
Utility Functions	95	Isoquants	134
Ordinal and Cardinal Utility	96	MINI-CASE <i>A Semiconductor Isoquant</i>	137
Marginal Utility	96	Substituting Inputs	138
USING CALCULUS <i>Marginal Utility</i>	97	Q&A 5.2	139
Marginal Rates of Substitution	98	USING CALCULUS <i>Cobb-Douglas Marginal Products</i>	141
4.3 The Budget Constraint	98	5.4 Returns to Scale	141
Slope of the Budget Line	100	Constant, Increasing, and Decreasing Returns to Scale	141
USING CALCULUS <i>The Marginal Rate of Transformation</i>	101	Q&A 5.3	143
Effects of a Change in Price on the Opportunity Set	101	MINI-CASE <i>Returns to Scale in U.S. Manufacturing</i>	143
Effects of a Change in Income on the Opportunity Set	102	Varying Returns to Scale	145
Q&A 4.1	102	MANAGERIAL IMPLICATION <i>Small Is Beautiful</i>	146
MINI-CASE <i>Rationing</i>	102	5.5 Productivity and Technological Change	146
Q&A 4.2	102	Relative Productivity	146
4.4 Constrained Consumer Choice	103	MINI-CASE <i>U.S. Electric Generation Efficiency</i>	147
The Consumer's Optimal Bundle	103	Innovation	147
Q&A 4.3	105	MINI-CASE <i>Tata Nano's Technical and Organizational Innovations</i>	148
MINI-CASE <i>Why Americans Buy More E-Books Than Do Germans</i>	106	MANAGERIAL SOLUTION <i>Labor Productivity During Recessions</i>	149
Q&A 4.4	107	Summary 150 ■ Questions 151	
Promotions	108	Chapter 6 Costs	154
MANAGERIAL IMPLICATION <i>Designing Promotions</i>	110	MANAGERIAL PROBLEM <i>Technology Choice at Home Versus Abroad</i>	154
4.5 Deriving Demand Curves	110		
4.6 Behavioral Economics	113		
Tests of Transitivity	113		
Endowment Effects	113		

6.1 The Nature of Costs	155	Profit over Time	204
Opportunity Costs	155	MANAGERIAL IMPLICATION <i>Stock Prices Versus Profit</i>	204
MINI-CASE <i>The Opportunity Cost of an MBA</i>	156		
Q&A 6.1	157	7.3 Owners' Versus Managers' Objectives	205
Costs of Durable Inputs	157	Consistent Objectives	205
Sunk Costs	158	Q&A 7.2	207
MANAGERIAL IMPLICATION <i>Ignoring Sunk Costs</i>	159	Conflicting Objectives	208
		Q&A 7.3	209
6.2 Short-Run Costs	159	MINI-CASE <i>Company Jets</i>	210
Common Measures of Cost	159	Monitoring and Controlling a Manager's Actions	211
USING CALCULUS <i>Calculating Marginal Cost</i>	161	Takeovers and the Market for Corporate Control	212
Cost Curves	161	MINI-CASE <i>The Yahoo! Poison Pill</i>	214
Production Functions and the Shapes of Cost Curves	163	7.4 The Make or Buy Decision	214
USING CALCULUS <i>Calculating Cost Curves</i>	166	Stages of Production	215
Short-Run Cost Summary	167	Vertical Integration	215
6.3 Long-Run Costs	168	Profitability and the Supply Chain Decision	217
Input Choice	168	MINI-CASE <i>Vertical Integration at American Apparel</i>	218
MANAGERIAL IMPLICATION <i>Cost Minimization by Trial and Error</i>	173	MINI-CASE <i>Aluminum</i>	219
MINI-CASE <i>The Internet and Outsourcing</i>	174	Market Size and the Life Cycle of a Firm	221
Q&A 6.2	175	7.5 Market Structure	222
The Shapes of Long-Run Cost Curves	176	The Four Main Market Structures	222
MINI-CASE <i>Economies of Scale in Nuclear Power Plants</i>	178	Comparison of Market Structures	224
Q&A 6.3	179	Road Map to the Rest of the Book	224
Long-Run Average Cost as the Envelope of Short-Run Average Cost Curves	180	MANAGERIAL SOLUTION <i>Clawing Back Bonuses</i>	225
MINI-CASE <i>Long-Run Cost Curves in Beer Manufacturing and Oil Pipelines</i>	181	Summary 226 ■ Questions 227	
6.4 The Learning Curve	182	Appendix 7 Interest Rates, Present Value, and Future Value	230
MINI-CASE <i>Learning by Drilling</i>	183		
6.5 The Costs of Producing Multiple Goods	184	Chapter 8 Competitive Firms and Markets	232
MINI-CASE <i>Scope</i>	185	MANAGERIAL PROBLEM <i>The Rising Cost of Keeping On Truckin'</i>	232
MANAGERIAL SOLUTION <i>Technology Choice at Home Versus Abroad</i>	185	8.1 Perfect Competition	233
Summary 187 ■ Questions 187		Characteristics of a Perfectly Competitive Market	234
Appendix 6 Long-Run Cost Minimization	192	Deviations from Perfect Competition	235
		8.2 Competition in the Short Run	236
Chapter 7 Firm Organization and Market Structure	193	How Much to Produce	236
MANAGERIAL PROBLEM <i>Clawing Back Bonuses</i>	193	Q&A 8.1	239
7.1 Ownership and Governance of Firms	195	USING CALCULUS <i>Profit Maximization with a Specific Tax</i>	240
Private, Public, and Nonprofit Firms	195	Whether to Produce	240
MINI-CASE <i>Chinese State-Owned Enterprises</i>	197	MINI-CASE <i>Oil, Oil Sands, and Oil Shale Shutdowns</i>	242
Ownership of For-Profit Firms	197	The Short-Run Firm Supply Curve	243
Firm Governance	199	The Short-Run Market Supply Curve	244
7.2 Profit Maximization	199	Short-Run Competitive Equilibrium	246
Profit	199	8.3 Competition in the Long Run	247
Two Steps to Maximizing Profit	200	Long-Run Competitive Profit Maximization	247
USING CALCULUS <i>Maximizing Profit</i>	201	The Long-Run Firm Supply Curve	248
Q&A 7.1	202	MINI-CASE <i>The Size of Ethanol Processing Plants</i>	248
MANAGERIAL IMPLICATION <i>Marginal Decision Making</i>	202		

The Long-Run Market Supply Curve	248	9.5 Advertising	298
MINI-CASE <i>Fast-Food Firms' Entry in Russia</i>	249	Deciding Whether to Advertise	299
MINI-CASE <i>Upward-Sloping Long-Run Supply Curve for Cotton</i>	251	How Much to Advertise	299
Long-Run Competitive Equilibrium	252	USING CALCULUS <i>Optimal Advertising</i>	300
Zero Long-Run Profit with Free Entry	254	Q&A 9.5	301
8.4 Competition Maximizes Economic Well-Being	254	MINI-CASE <i>Super Bowl Commercials</i>	301
Consumer Surplus	255	9.6 Networks, Dynamics, and Behavioral Economics	302
MANAGERIAL IMPLICATION <i>Willingness to Pay on eBay</i>	257	Network Externalities	302
Producer Surplus	258	Network Externalities and Behavioral Economics	303
Q&A 8.2	260	Network Externalities as an Explanation for Monopolies	304
Q&A 8.3	261	MINI-CASE <i>Critical Mass and eBay</i>	304
Competition Maximizes Total Surplus	262	MANAGERIAL IMPLICATION <i>Introductory Prices</i>	305
MINI-CASE <i>The Deadweight Loss of Christmas Presents</i>	264	MANAGERIAL SOLUTION <i>Brand-Name and Generic Drugs</i>	305
Effects of Government Intervention	265	<i>Summary 307 ■ Questions 307</i>	
Q&A 8.4	266		
MANAGERIAL SOLUTION <i>The Rising Cost of Keeping On Truckin'</i>	267		
<i>Summary 268 ■ Questions 269</i>		Chapter 10 Pricing with Market Power	311
Chapter 9 Monopoly	273	MANAGERIAL PROBLEM <i>Sale Prices</i>	311
MANAGERIAL PROBLEM <i>Brand-Name and Generic Drugs</i>	273	10.1 Conditions for Price Discrimination	313
9.1 Monopoly Profit Maximization	275	Why Price Discrimination Pays	313
Marginal Revenue	275	MINI-CASE <i>Disneyland Pricing</i>	315
USING CALCULUS <i>Deriving a Monopoly's Marginal Revenue Function</i>	278	Which Firms Can Price Discriminate	315
Q&A 9.1	279	MANAGERIAL IMPLICATION <i>Preventing Resale</i>	316
Choosing Price or Quantity	280	MINI-CASE <i>Preventing Resale of Designer Bags</i>	317
Two Steps to Maximizing Profit	281	Not All Price Differences Are Price Discrimination	317
USING CALCULUS <i>Solving for the Profit-Maximizing Output</i>	283	Types of Price Discrimination	318
Effects of a Shift of the Demand Curve	283	10.2 Perfect Price Discrimination	318
9.2 Market Power	285	How a Firm Perfectly Price Discriminates	318
Market Power and the Shape of the Demand Curve	285	Perfect Price Discrimination Is Efficient but Harms Some Consumers	319
MANAGERIAL IMPLICATION <i>Checking Whether the Firm Is Maximizing Profit</i>	286	MINI-CASE <i>Botox Revisited</i>	321
MINI-CASE <i>Cable Cars and Profit Maximization</i>	286	Q&A 10.1	322
The Lerner Index	287	Individual Price Discrimination	323
MINI-CASE <i>Apple's iPad</i>	288	MINI-CASE <i>Dynamic Pricing at Amazon</i>	324
Q&A 9.2	289	10.3 Group Price Discrimination	324
Sources of Market Power	289	Group Price Discrimination with Two Groups	325
9.3 Market Failure Due to Monopoly Pricing	290	USING CALCULUS <i>Maximizing Profit for a Group Discriminating Monopoly</i>	326
Q&A 9.3	292	MINI-CASE <i>Reselling Textbooks</i>	328
9.4 Causes of Monopoly	293	Q&A 10.2	328
Cost-Based Monopoly	294	Identifying Groups	330
Q&A 9.4	295	MANAGERIAL IMPLICATION <i>Discounts</i>	331
Government Creation of Monopoly	296	Effects of Group Price Discrimination on Total Surplus	332
MINI-CASE <i>Botox</i>	297	10.4 Nonlinear Price Discrimination	333
		10.5 Two-Part Pricing	335
		Two-Part Pricing with Identical Consumers	335
		Two-Part Pricing with Differing Consumers	337
		MINI-CASE <i>Available for a Song</i>	338

10.6 Bundling	339	12.1 Oligopoly Games	392
Pure Bundling	340	Dominant Strategies	393
Mixed Bundling	341	Best Responses	394
Q&A 10.3	343	Failure to Maximize Joint Profits	396
Requirement Tie-In Sales	344	MINI-CASE <i>Strategic Advertising</i>	398
MANAGERIAL IMPLICATION <i>Ties That Bind</i>	344	Q&A 12.1	399
10.7 Peak-Load Pricing	344	12.2 Types of Nash Equilibria	400
MINI-CASE <i>Downhill Pricing</i>	346	Multiple Equilibria	401
MANAGERIAL SOLUTION <i>Sale Prices</i>	347	MINI-CASE <i>Timing Radio Ads</i>	403
Summary 348 ■ Questions 349		Mixed-Strategy Equilibria	403
		MINI-CASE <i>Competing E-Book Formats</i>	406
		Q&A 12.2	407
Chapter 11 Oligopoly and Monopolistic Competition	354	12.3 Information and Rationality	408
<hr/>		Incomplete Information	408
MANAGERIAL PROBLEM <i>Gaining an Edge from Government Aircraft Subsidies</i>	354	MANAGERIAL IMPLICATION <i>Solving Coordination Problems</i>	409
11.1 Cartels	356	Rationality	410
Why Cartels Succeed or Fail	356	MANAGERIAL IMPLICATION <i>Using Game Theory to Make Business Decisions</i>	411
MINI-CASE <i>A Catwalk Cartel</i>	358	12.4 Bargaining	411
Maintaining Cartels	359	Bargaining Games	412
11.2 Cournot Oligopoly	360	The Nash Bargaining Solution	412
Airlines	361	Q&A 12.3	413
USING CALCULUS <i>Deriving a Cournot Firm's Marginal Revenue</i>	365	USING CALCULUS <i>Maximizing the Nash Product</i>	414
The Number of Firms	366	MINI-CASE <i>Nash Bargaining over Coffee</i>	414
MINI-CASE <i>Air Ticket Prices and Rivalry</i>	366	Inefficiency in Bargaining	414
Nonidentical Firms	368	12.5 Auctions	415
Q&A 11.1	369	Elements of Auctions	415
Q&A 11.2	371	Bidding Strategies in Private-Value Auctions	416
MANAGERIAL IMPLICATION <i>Differentiating a Product Through Marketing</i>	372	MINI-CASE <i>Experienced Bidders</i>	417
Mergers	372	MINI-CASE <i>Google Advertising</i>	418
MINI-CASE <i>Acquiring Versus Merging</i>	374	The Winner's Curse	419
11.3 Bertrand Oligopoly	374	MANAGERIAL IMPLICATION <i>Auction Design</i>	420
Identical Products	375	MANAGERIAL SOLUTION <i>Dying to Work</i>	420
Differentiated Products	376	Summary 421 ■ Questions 422	
11.4 Monopolistic Competition	378	Appendix 12 Determining a Mixed Strategy	427
MANAGERIAL IMPLICATION <i>Managing in the Monopolistically Competitive Food Truck Market</i>	378		
Equilibrium	379	Chapter 13 Strategies over Time	428
Q&A 11.3	380	<hr/>	
Profitable Monopolistically Competitive Firms	380	MANAGERIAL PROBLEM <i>Intel and AMD's Advertising Strategies</i>	428
MINI-CASE <i>Zoning Laws as a Barrier to Entry by Hotel Chains</i>	381	13.1 Repeated Games	430
MANAGERIAL SOLUTION <i>Gaining an Edge from Government Aircraft Subsidies</i>	381	Strategies and Actions in Dynamic Games	430
Summary 383 ■ Questions 383		Cooperation in a Repeated Prisoner's Dilemma Game	431
Appendix 11A Cournot Oligopoly with Many Firms	386	MINI-CASE <i>Tit-for-Tat Strategies in Trench Warfare</i>	433
Appendix 11B Nash-Bertrand Equilibrium	387	Implicit Versus Explicit Collusion	434
		Finitely Repeated Games	434
Chapter 12 Game Theory and Business Strategy	389	13.2 Sequential Games	435
<hr/>		Stackelberg Oligopoly	436
MANAGERIAL PROBLEM <i>Dying to Work</i>	389	Credible Threats	439
		Q&A 13.1	440
		13.3 Detering Entry	441
		Exclusion Contracts	441
		MINI-CASE <i>Pay-for-Delay Agreements</i>	442

Limit Pricing	443	MANAGERIAL IMPLICATION <i>Diversifying Retirement Funds</i>	482
MINI-CASE <i>Pfizer Uses Limit Pricing to Slow Entry</i>	444	Insurance	483
Q&A 13.2	444	Q&A 14.3	484
Entry Deterrence in a Repeated Game	445	MINI-CASE <i>Limited Insurance for Natural Disasters</i>	485
13.4 Cost Strategies	446	14.4 Investing Under Uncertainty	487
Investing to Lower Marginal Cost	446	Risk-Neutral Investing	487
Learning by Doing	448	Risk-Averse Investing	488
Raising Rivals' Costs	448	Q&A 14.4	488
Q&A 13.3	448	14.5 Behavioral Economics and Uncertainty	489
MINI-CASE <i>Auto Union Negotiations</i>	449	Biased Assessment of Probabilities	489
13.5 Disadvantages of Moving First	450	MINI-CASE <i>Biased Estimates</i>	490
The Holdup Problem	450	Violations of Expected Utility Theory	491
MINI-CASE <i>Venezuelan Nationalization</i>	451	Prospect Theory	492
MANAGERIAL IMPLICATION <i>Avoiding Holdups</i>	452	MANAGERIAL SOLUTION <i>Risk and Limited Liability</i>	494
Moving Too Quickly	453	<i>Summary 495 ■ Questions 496</i>	
MINI-CASE <i>Advantages and Disadvantages of Moving First</i>	453	Chapter 15 Asymmetric Information	500
13.6 Behavioral Game Theory	454	MANAGERIAL PROBLEM <i>Limiting Managerial Incentives</i>	500
Ultimatum Games	454	15.1 Adverse Selection	502
MINI-CASE <i>GM's Ultimatum</i>	454	Adverse Selection in Insurance Markets	502
Levels of Reasoning	456	Products of Unknown Quality	503
MANAGERIAL IMPLICATION <i>Taking Advantage of Limited Strategic Thinking</i>	457	Q&A 15.1	505
MANAGERIAL SOLUTION <i>Intel and AMD's Advertising Strategies</i>	457	Q&A 15.2	506
<i>Summary 458 ■ Questions 459</i>		MINI-CASE <i>Reducing Consumers' Information</i>	506
Appendix 13 A Mathematical Approach to Stackelberg Oligopoly	463	15.2 Reducing Adverse Selection	507
Chapter 14 Managerial Decision Making Under Uncertainty	464	Restricting Opportunistic Behavior	507
MANAGERIAL PROBLEM <i>Risk and Limited Liability</i>	464	Equalizing Information	508
14.1 Assessing Risk	466	MANAGERIAL IMPLICATION <i>Using Brand Names and Warranties as Signals</i>	510
Probability	466	MINI-CASE <i>Changing a Firm's Name</i>	510
Expected Value	467	MINI-CASE <i>Adverse Selection on eBay Motors</i>	512
Q&A 14.1	469	15.3 Moral Hazard	512
Variance and Standard Deviation	469	Moral Hazard in Insurance Markets	513
MANAGERIAL IMPLICATION <i>Summarizing Risk</i>	470	Moral Hazard in Principal-Agent Relationships	513
14.2 Attitudes Toward Risk	471	MINI-CASE <i>Selfless or Selfish Doctors?</i>	517
Expected Utility	471	Q&A 15.3	517
Risk Aversion	472	15.4 Using Contracts to Reduce Moral Hazard	518
Q&A 14.2	474	Fixed-Fee Contracts	518
USING CALCULUS <i>Diminishing Marginal Utility of Wealth</i>	474	Contingent Contracts	519
MINI-CASE <i>Stocks' Risk Premium</i>	475	MINI-CASE <i>Contracts and Productivity in Agriculture</i>	522
Risk Neutrality	475	Q&A 15.4	522
Risk Preference	476	15.5 Using Monitoring to Reduce Moral Hazard	524
MINI-CASE <i>Gambling</i>	476	Hostages	524
Risk Attitudes of Managers	478	MANAGERIAL IMPLICATION <i>Efficiency Wages</i>	526
14.3 Reducing Risk	478	After-the-Fact Monitoring	526
Obtaining Information	479	MINI-CASE <i>Abusing Leased Cars</i>	526
MINI-CASE <i>Bond Ratings</i>	479	MANAGERIAL SOLUTION <i>Limiting Managerial Incentives</i>	527
Diversification	480	<i>Summary 528 ■ Questions 529</i>	

Chapter 16 Government and Business	533	Chapter 17 Global Business	573
MANAGERIAL PROBLEM <i>Licensing</i>		MANAGERIAL PROBLEM <i>Responding to</i>	
<i>Inventions</i>	533	<i>Exchange Rates</i>	573
16.1 Market Failure and Government Policy	534	17.1 Reasons for International Trade	575
The Pareto Principle	535	Comparative Advantage	575
Cost-Benefit Analysis	536	Q&A 17.1	577
16.2 Regulation of Imperfectly Competitive		MANAGERIAL IMPLICATION <i>Paul Allen's</i>	
Markets	536	<i>Comparative Advantage</i>	578
Regulating to Correct a Market Failure	537	Increasing Returns to Scale	578
Q&A 16.1	539	MINI-CASE <i>Barbie Doll Varieties</i>	579
MINI-CASE <i>Natural Gas Regulation</i>	540	17.2 Exchange Rates	580
Regulatory Capture	542	Determining the Exchange Rate	580
Applying the Cost-Benefit Principle to		Exchange Rates and the Pattern of Trade	581
Regulation	542	MANAGERIAL IMPLICATION <i>Limiting Arbitrage</i>	
16.3 Antitrust Law and Competition Policy	543	<i>and Gray Markets</i>	582
Mergers	545	Managing Exchange Rate Risk	582
MINI-CASE <i>Hospital Mergers: Market Power</i>		17.3 International Trade Policies	583
<i>Versus Efficiency</i>	546	Quotas and Tariffs in Competitive Markets	583
Predatory Actions	546	Q&A 17.2	588
Vertical Relationships	546	MINI-CASE <i>Managerial Responses to the Chicken</i>	
MINI-CASE <i>An Exclusive Contract for a Key</i>		<i>Tax Trade War</i>	589
<i>Ingredient</i>	548	Rent Seeking	589
16.4 Externalities	548	Noncompetitive Reasons for Trade Policy	590
MINI-CASE <i>Negative Externalities from Spam</i>	549	MINI-CASE <i>Dumping and Countervailing Duties</i>	
The Inefficiency of Competition with		<i>for Solar Panels</i>	592
Externalities	549	Trade Liberalization and the World Trading	
Reducing Externalities	552	System	593
MINI-CASE <i>Pulp and Paper Mill Pollution and</i>		Trade Liberalization Problems	594
<i>Regulation</i>	553	17.4 Multinational Enterprises	595
Q&A 16.2	554	Becoming a Multinational	596
MINI-CASE <i>Why Tax Drivers</i>	555	MINI-CASE <i>What's an American Car?</i>	596
The Coase Theorem	556	International Transfer Pricing	597
MANAGERIAL IMPLICATION <i>Buying a Town</i>	557	Q&A 17.3	598
16.5 Open-Access, Club, and Public Goods	557	MINI-CASE <i>Profit Repatriation</i>	600
Open-Access Common Property	558	17.5 Outsourcing	601
MINI-CASE <i>For Whom the Bridge Tolls</i>	559	MANAGERIAL SOLUTION <i>Responding to</i>	
Club Goods	560	<i>Exchange Rates</i>	603
MINI-CASE <i>Piracy</i>	560	<i>Summary 604 ■ Questions 605</i>	
Public Goods	560	Answers to Selected Questions	E-1
16.6 Intellectual Property	563	Definitions	E-13
Patents	563	References	E-18
Q&A 16.3	564	Sources for Managerial Problems, Mini-Cases,	
MANAGERIAL IMPLICATION <i>Trade Secrets</i>	565	and Managerial Implications	E-24
Copyright Protection	566	Index	E-32
MANAGERIAL SOLUTION <i>Licensing</i>		Credits	E-51
<i>Inventions</i>	566		
<i>Summary 568 ■ Questions 569</i>			

Preface

Successful managers make extensive use of economic tools when making important decisions. They use these tools to produce at minimum cost, to choose an output level to maximize profit, and for many other managerial decisions including:

- ▶ Whether to offer buy-one-get-one-free deals
- ▶ How much to advertise
- ▶ Whether to sell various goods as a bundle
- ▶ What strategies to use to compete with rival firms
- ▶ How to design compensation contracts to provide appropriate incentives for employees
- ▶ How to structure an international supply chain to take advantage of cross-country differences in production costs

We illustrate how to apply economic theory using actual business examples and real data. Our experience teaching managerial economics at the Wharton School (University of Pennsylvania) and the Sauder School of Business (University of British Columbia) as well as teaching a wide variety of students at the Massachusetts Institute of Technology; Queen's University; and the University of California, Berkeley, has convinced us that students prefer our emphasis on real-world issues and examples from actual markets.

Main Innovations

This book differs from other managerial economics texts in three main ways.

- ▶ It places greater emphasis than other texts on *modern theories* that are increasingly useful to managers in areas such as industrial organization, transaction cost theory, game theory, contract theory, and behavioral economics.
- ▶ It makes more extensive use of real-world business examples to illustrate how to use economic theory in making business decisions.
- ▶ It employs a *problem-based* approach to demonstrate how to apply economic theory to specific business decisions.

Modern Theories for Business Decisions

This book has all the standard economic theory, of course. However, what sets it apart is its emphasis on modern theories that are particularly useful for managers.

Industrial Organization. How do managers differentiate their products to increase their profits? When do mergers pay off? When should a firm take (legal)

actions to prevent entry of rivals? What effects do government price regulations have on firms' behavior? These and many other questions are addressed by industrial organization theories.

Transaction Cost Theory. Why do some firms produce inputs while others buy them from a market? Why are some firms vertically integrated while others are not? We use transaction cost theory to address questions such as these, particularly in Chapter 7.

Game Theory. Should the manager of a radio station schedule commercial breaks at the same time as rival firms? What strategy should a manager use when bidding in an auction for raw materials? The major issue facing many managers is deciding what strategies to use in competing with rivals. This book goes well beyond other managerial economics texts by making significant use of game theory in Chapters 12–14 to examine such topics as oligopoly quantity and price setting, entry and exit decisions, entry deterrence, and strategic trade policy. Game theory provides a way of thinking about strategies and it provides methods to choose strategies that maximize profits. Unlike most microeconomic and managerial economics books, our applications of game theory are devoted almost exclusively to actual business problems.

Contract Theory. What kind of a contract should a manager offer a worker to induce the employee to work hard? How do managers avoid moral hazard problems so they aren't taken advantage of by people who have superior information? We use modern contract theory to show how to write contracts to avoid or minimize such problems.

Behavioral Economics. Should a manager allow workers to opt in or opt out of a retirement system? How can the manager of a motion picture firm take advantage of movie reviews? 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. These theories are particularly relevant for managers, but sadly they have been largely ignored by most economists until recently.

Real-World Business Examples

We demonstrate that economics is practical and useful to managers by examining real markets and actual business decisions. We do so in two ways. In our presentation of the basic theory, we use real-world data and examples. Second, we examine many real-world problems in our various application features.

To illustrate important economic concepts, we use graphs and calculations based on actual markets and real data. Students learn the basic model of supply and demand using estimated supply and demand curves for avocados, and they practice estimating demand curves using real data such as from the Portland Fish Exchange. They study how imported oil limits pricing by U.S. oil producers using real estimated supply and demand curves, derive cost curves from Japanese beer manufacturers using actual estimated production functions, and analyze oligopoly 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.

Problem-Based Learning

Managers have to solve business problems daily. We use a problem-solving approach to demonstrate how economic theory can help managers make good decisions. In each chapter, we solve problems using a step-by-step approach to model good problem-solving techniques. At the end of the chapter, we have an extensive set of questions. Some of these require the student to solve problems similar to the solved problems in the chapter, while others ask the student to use the tools of the chapter to answer questions about applications within the chapter or new real-world problems. We also provide exercises asking students to use spreadsheets to apply the theory they have learned to real-world problems.

Features

This book has more features dedicated to showing students how to apply theory to real-world problems than do rival texts.

Managerial Implications. Managerial Implications sections contain simple bottom-line statements of economic principles that managers can use to make key managerial decisions. For example, we describe how managers can assess whether they are maximizing profit by using data to estimate demand elasticities. We also show how they can structure discounts to maximize profits, promote customer loyalty, design auctions, prevent gray markets, and use important insights from game theory to improve managerial decisions.

Mini-Cases. Over a hundred Mini-Cases apply economic theory to interesting and important managerial problems. For example, Mini-Cases demonstrate how price increases on iTunes affect music downloads (using actual data), how to estimate Blackberry's production function using real-world data, why some top-end designers limit the number of designer bags customers can buy, how "poison pills" at Yahoo! affected shareholders, how Pfizer used limit pricing to slow entry of rivals, why advertisers pay so much for Superbowl commercials, and how managers of auto manufacturing firms react to tariffs and other regulations.

Q&As. After the introductory chapter, each chapter provides three to five Q&As (Questions & Answers). Each Q&A poses a qualitative or quantitative problem and then uses a step-by-step approach to solve the problem. Most of the 55 Q&As focus on important managerial issues such as how a cost-minimizing firm would adjust to changing factor prices, how a manager prices bundles of goods to maximize profits, how to determine Intel's and AMD's profit-maximizing quantities and prices using their estimated demand curves and marginal costs, and how to allocate production across plants internationally.

Managerial Problems and Managerial Solutions. After the introductory chapter, each chapter starts with a Managerial Problem that motivates the chapter by posing real-world managerial questions that can be answered using the economic principles and methods developed in the chapter. At the end of each chapter, we answer these questions in the Managerial Solution. Thus, each pair of these features combines the essence of a Mini-Case and a Q&A.

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 Q&A has at least one associated end-of-chapter question that references the Q&A and allows the student to answer a similar problem, and many of the questions are related to Mini-Cases that appear in the book. The answers to selected end-of-chapter problems 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.

Spreadsheet Exercises. In addition to the verbal, graphical, and mathematical exercises, each chapter has two end-of-chapter spreadsheet exercises. These exercises demonstrate how managers can use a spreadsheet to apply the economic methods described in the chapter. They address important managerial issues such as choosing the profit-maximizing level of advertising or designing compensation contracts to effectively motivate employees. Students can complete the spreadsheet exercises in [MyEconLab](#), which includes additional spreadsheet exercises.

Using Calculus. Calculus presentations of the theory appear at the appropriate points in the text in a Using Calculus feature. In contrast, most other books relegate calculus to appendices, mix calculus in with other material where it cannot easily be skipped, or avoid calculus entirely. We have a few appendices, but most of our calculus material is in Using Calculus sections, which are clearly identified and structured as discrete treatments. Therefore this book may be conveniently used both by courses that use calculus and those that do not. Some end-of-chapter questions are designed to use calculus and are clearly indicated.

Alternative Organizations

Because instructors differ in the order in which they cover material and in the range of topics covered, this text has been designed for maximum flexibility. The most common approach to teaching managerial economics is to follow the sequence of the chapters in the order presented. However, many variations are possible. For example, some instructors choose to address empirical methods (Chapter 3) first. Some instructors skip consumer theory (Chapter 4), which they can safely do without causing problems in later chapters.

Chapter 7, Firm Organization and Market Structure, provides an overview of the key issues that are discussed in later chapters, such as types of firms, profit maximization and its alternatives, conflicts between managers and owners (and other “agency” issues), and the structure of markets. We think that presenting this material early in the course is ideal, but all of this material except for the section on profit maximization can be covered later.

Because our treatment of game theory is divided into two chapters (Chapters 12 and 13), instructors can conveniently choose how much game theory to present. Later chapters that reference game theory do so in such a way that the game theoretical material can be easily skipped. Although Chapter 11 on oligopoly and monopolistic competition precedes the game theory chapters, a course could cover the game theory chapters first (with only minor explanations by the instructor). And a common variant is to present Chapter 14 on uncertainty earlier in the course.

The last chapter, Global Business (17), should be very valuable for instructors who take an international perspective. To promote this viewpoint, every chapter contains examples of dealing with firms based in a variety of countries in addition to the United States.

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 14-day 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 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.
- ▶ Test Item File 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 or by 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* by Souren Soumbatiants of Franklin University has many useful and creative teaching ideas. It also offers additional discussion questions, and provides solutions for all the end-of-chapter questions in the text.
- ▶ The *Online Test Bank* by Todd Fitch of the University of California, Berkeley, 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 Nelson Altamirano of National 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 *Managerial Economics and Strategy*.

Acknowledgments

Our greatest debt is to our very patient students at MIT; the University of British Columbia; the University of California, Berkeley; and the University of Pennsylvania for tolerantly dealing with our various approaches to teaching them economics. We appreciate their many helpful (and usually polite) suggestions.

We also owe a great debt to our editors, Adrienne D'Ambrosio and Jane Tufts. Adrienne D'Ambrosio, Executive Acquisitions Editor, was involved in every stage in designing the book, writing the book, testing it, and developing supplemental materials. Jane Tufts, our developmental editor, reviewed each chapter of this book for content, pedagogy, and presentation. By showing us how to present the material as clearly and thoroughly as possible, she greatly strengthened this text.

Our other major debt is to Satyajit Ghosh, University of Scranton, for doing most of the work on the spreadsheet exercises in the chapters and in [MyEconLab](#). We benefited greatly from his creative ideas about using spreadsheets to teach managerial economics.

We thank our teaching colleagues who provided many helpful comments and from whom we have shamelessly borrowed ideas. We particularly thank Tom Davidoff, Stephen Meyer, Nate Schiff, Ratna Shrestha, Mariano Tappata, and James Vercammen for using early versions of the textbook and for making a wide range of helpful contributions. We are also grateful to our colleagues Jen Baggs, Dennis Carlton, Jean-Etienne de Bettignes, Keith Head, Larry Karp, John Ries, Tom Ross, Leo Simon, Chloe Tergiman, and Ralph Winter for many helpful comments. We thank Evan Flater, Kai Rong Gan, Guojun He, Joyce Lam, WeiYi Shen, and Louisa Yeung for their valuable work as research assistants on the book.

We are very grateful to the many reviewers who spent untold hours reading and commenting on our original proposal and several versions of each chapter. Many of the best ideas in this book are due to them.

We'd especially like to thank Kristen Collett-Schmitt, Matthew Roelofs, and Adam Slawski for carefully reviewing the accuracy of the entire manuscript multiple times and for providing very helpful comments. We thank all the following reviewers, all of whom provided valuable comments at various stages:

Laurel Adams, <i>Northern Illinois University</i>	Jack Hou, <i>California State University, Long Beach</i>
James C. W. Ahiakpor, <i>California State University, East Bay</i>	Timothy James, <i>Arizona State University</i>
Nelson Altamirano, <i>National University</i>	Peter Daniel Jubinski, <i>St. Joseph's University</i>
Ariel Belasen, <i>Southern Illinois University, Edwardsville</i>	Chulho Jung, <i>Ohio University</i>
Bruce C. Brown, <i>California State Polytechnic University, Pomona</i>	Barry Keating, <i>University of Notre Dame</i>
Donald Bumpass, <i>Sam Houston State University</i>	Tom K. Lee, <i>California State University, Northridge</i>
James H. Cardon, <i>Brigham Young University</i>	Dale Lehman, <i>Alaska Pacific University</i>
Jihui Chen, <i>Illinois State University</i>	Vincent J. Marra Jr., <i>University of Delaware</i>
Ron Cheung, <i>Oberlin College</i>	Sheila J. Moore, <i>California Lutheran University</i>
Abdur Chowdhury, <i>Marquette University</i>	Thomas Patrick, <i>The College of New Jersey</i>
George Clarke, <i>Texas A&M International University</i>	Anita Alves Pena, <i>Colorado State University</i>
Kristen Collett-Schmitt, <i>University of Notre Dame</i>	Troy Quast, <i>Sam Houston State University</i>
Douglas Davis, <i>Virginia Commonwealth University</i>	Barry Ritchey, <i>Anderson University</i>
Christopher S. Decker, <i>University of Nebraska, Omaha</i>	Matthew R. Roelofs, <i>Western Washington University</i>
Craig A. Depken, II, <i>University of North Carolina, Charlotte</i>	Amit Sen, <i>Xavier University</i>
Jed DeVaro, <i>California State University, East Bay</i>	Stephanie Shayne, <i>Husson University</i>
David Ely, <i>San Diego State University</i>	Adam Slawski, <i>Pennsylvania State University</i>
Asim Erdilek, <i>Case Western Reserve University</i>	Caroline Swartz, <i>University of North Carolina, Charlotte</i>
Satyajit Ghosh, <i>University of Scranton</i>	Scott Templeton, <i>Clemson University</i>
Rajeev Goel, <i>Illinois State University</i>	Keith Willett, <i>Oklahoma State University</i>
Abbas P. Grammy, <i>California State University, Bakersfield</i>	Douglas Wills, <i>University of Washington, Tacoma</i>
Clifford Hawley, <i>West Virginia University</i>	Mark L. Wilson, <i>Troy University</i>
Matthew John Higgins, <i>Georgia Institute of Technology</i>	David Wong, <i>California State University, Fullerton</i>

It was a pleasure to work with the excellent staff at Pearson, who were incredibly helpful in producing this book. Meredith Gertz did a wonderful job of supervising the production process, assembling the extended publishing team, and managing the design of the handsome interior. Gillian Hall and the rest of the team at The Aardvark Group Publishing Services, including our copyeditor, Rebecca Greenberg, have our sincere gratitude for designing the book and keeping the project on track and on schedule. Ted Smykal did a wonderful job drawing most of the cartoons. Sarah Dumouchelle helped edit, arranged for the supplements, and was helpful in many other ways. We also want to acknowledge, with appreciation, the efforts of Melissa Honig, Courtney Kamauf, and Noel Lotz in developing [MyEconLab](#), the online assessment and tutorial system for the book.

Finally, we thank our wives, Jackie Persons and Barbara Spencer, for their great patience and support during the nearly endless writing process. We apologize for misusing their names—and those of our other relatives and friends—in the book!

J. M. P.

J. A. B.

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 very good like George Washington—come back as money.

If all the food, clothing, entertainment, and other goods and services we wanted were freely available, no one would study economics, and we would not need managers. However, most of the good things in life are scarce. We cannot have everything we want. Consumers cannot consume everything but must make choices about what to purchase. Similarly, managers of firms cannot produce everything and must make careful choices about what to produce, how much to produce, and how to produce it. Studying such choices is the main subject matter of economics. **Economics** is the study of decision making in the presence of scarcity.¹

Managerial economics is the application of economic analysis to managerial decision making. Managerial economics concentrates on how managers make economic decisions by allocating the scarce resources at their disposal. To make good decisions, a manager must understand the behavior of other decision makers, such as consumers, workers, other managers, and governments. In this book, we examine decision making by such participants in the economy, and we show how managers can use this understanding to be successful.

Main Topics

In this chapter, we examine two main topics:

- 1. Managerial Decision Making:** Economic analysis helps managers develop strategies to achieve a firm's objective—such as maximizing profit—in the presence of scarcity.
- 2. Economic Models:** Managers use models based on economic theories to help make predictions about consumer and firm behavior, and as an aid to managerial decision making.

1.1 Managerial Decision Making

A firm's managers allocate the limited resources available to them to achieve the firm's objectives. The objectives vary for different managers within a firm. A production manager's objective is normally to achieve a production target at the lowest possible cost. A marketing manager must allocate an advertising budget to promote the product most effectively. Human resource managers design compensation systems

¹Many dictionaries define economics as the study of the production, distribution, and consumption of goods and services. However, professional economists think of economics as applying more broadly, including any decisions made subject to scarcity.

to encourage employees to work hard. The firm's top manager must coordinate and direct all these activities.

Each of these tasks is constrained by resource scarcity. At any moment in time, a production manager has to use the existing factory and a marketing manager has a limited marketing budget. Such resource limitations can change over time but managers always face constraints.

Profit

Most private sector firms want to maximize *profit*, which is the difference between revenue and cost. The job of the senior manager in a firm, usually called the *chief executive officer* (CEO), is to focus on the *bottom line*: maximizing profit.

The CEO orders the production manager to minimize the cost of producing the particular good or service, asks the market research manager to determine how many units can be sold at any given price, and so forth. Minimizing cost helps the firm to maximize profit, but the CEO must also decide how much output to produce and what price to charge. It is the job of the CEO (and other senior executives) to ensure that all managerial functions are coordinated so that the firm makes as much profit as possible. It would be a major coordination failure if the marketing department set up a system of pricing and advertising based on selling 8,000 units a year, while the production department managed to produce only 2,000 units.

The CEO is also often concerned with how a firm is positioned in a market relative to its rivals. Senior executives at Coca-Cola and Pepsi spend a lot of time worrying about each other's actions. Managers in such situations have a natural tendency to view business rivalries like sporting events, with a winner and a loser. However, it is critical to the success of any firm that the CEO focus on maximizing the firm's profit rather than beating a rival.

Trade-Offs

People and firms face trade-offs because they can't have everything. Managers must focus on the trade-offs that directly or indirectly affect profits. Evaluating trade-offs often involves *marginal* reasoning: considering the effect of a small change. Key trade-offs include:

- ▶ **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. Car manufacturers choose between metal and plastic for many parts, which affects the car's weight, cost, and safety.
- ▶ **What prices to charge:** Some firms, such as farms, have little or no control over the prices at which their goods are sold and must sell at the price determined in the market. However, many other firms set their prices. When a manager of such a firm sets the price of a product, the manager must consider whether raising the price by a dollar increases the profit margin on each unit sold by enough to offset the loss from selling fewer units. Consumers, given their limited budgets, buy fewer units of a product when its price rises. Thus, ultimately, the manager's pricing decision is constrained by the scarcity under which consumers make decisions.

Other Decision Makers

It is important for managers of a firm to understand how decisions made by consumers, workers, managers of other firms, and governments constrain their firm. Consumers purchase products subject to their limited budgets. Workers decide on which jobs to take and how much to work given their scarce time and limits on their abilities. Rivals may introduce new, superior products or cut the prices of existing products. Governments around the world may tax, subsidize, or regulate products.

Thus, managers must understand how others make decisions. Most economic analysis is based on the assumption that decision makers are maximizers: they do the best they can with their limited resources. However, economists also consider some contexts in which economic decision makers do not successfully maximize for a variety of psychological reasons—a topic referred to as *behavioral economics*.

Interactions between economic decision makers take place primarily in markets. A **market** 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. 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. The primary participants in a market are firms that supply the product and consumers who buy it, but government policies such as taxes also play an important role in the operation of markets.

Strategy

When interacting with a small number of rival firms, a manager uses a strategy—a battle plan that specifies the *actions* or *moves* that the manager will make to maximize the firm's profit. A CEO's strategy might involve choosing the level of output, the price, or advertising now and possibly in the future. In setting its production levels and price, Pepsi's managers must consider what choices Coca-Cola's managers will make. One tool that is helpful in understanding and developing such strategies is *game theory*, which we use in several chapters.

1.2 Economic Models

Economists use economic models to explain how managers and other decision makers make decisions and to explain the resulting market outcomes. A **model** is a description of the relationship between two or more variables. Models are used in many fields. For example, astronomers use models to describe and predict the movement of comets and meteors, medical researchers use models to describe and predict the effect of medications on diseases, and meteorologists use models to predict weather.

Business economists construct models dealing with economic variables and use such models to describe and predict how a change in one variable will affect another. Such models are useful to managers in predicting the effects of their decisions and in understanding the decisions of others. Models allow managers to consider hypothetical situations—to use a *what-if analysis*—such as “What would happen if we raised our prices by 10%?” or “Would profit rise if we phased out one of our product lines?” Models help managers predict answers to what-if questions and to use those answers to make good decisions.

Mini-Case

Using an Income Threshold Model in 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 2012.²

Simplifying Assumptions

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

A model is a simplification of reality. The objective in building a model is to include the essential issues, while leaving aside the many complications that might distract us or disguise those essential elements. For example, the income threshold model focuses on only the relationship between income and purchases of durable goods. Prices, multiple car purchases by a single consumer, and other factors that might affect durable goods purchases are left out of the model. Despite these simplifications, the model—if correct—gives managers a good general idea of how the automobile market is likely to evolve in countries such as China.

We have described the income threshold model in words, but we could have presented it using graphs or mathematics. Representing economic models using mathematical formulas in spreadsheets has become very important in managerial decision making. 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.

²The sources for Mini-Cases are available at the back of the book.

Economists make many *assumptions* to simplify their models. 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, do not have an important effect on the decision to buy cars. Therefore, we ignore the color of cars that are sold in China in describing the relationship between 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. Part of the skill in using economic models lies in selecting a model that is appropriate for the task at hand.

Testing Theories

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

Economic *theory* refers to the development and use of a model to test *hypotheses*, which are proposed explanations for some phenomenon. A useful theory or hypothesis is one that leads to clear, testable predictions. A theory that says "If the price of a product rises, the quantity demanded of that product falls" provides a clear prediction. A theory that says "Human behavior depends on tastes, and tastes change randomly at random intervals" is not very useful because it does not lead to testable predictions and provides little explanation of the choices people make.

Economists test theories by checking whether the theory's predictions are correct. If a prediction does not come true, they might reject the theory—or at least reduce their confidence in the theory. Economists use a model until it is refuted by evidence or until a better model is developed for a particular use.

A good model makes sharp, clear predictions that are consistent with reality. Some very simple models make sharp or precise predictions that are incorrect. Some more realistic and therefore more complex models make ambiguous predictions, allowing for any possible outcome, so they are untestable. Neither incorrect models nor untestable models are helpful. The skill in model building lies in developing a model that is simple enough to make clear predictions but is realistic enough to be accurate. Any model is only an approximation of reality. A good model is one that is a close enough approximation to be useful.

Although economists agree on the methods they use to develop and apply testable models, they often disagree on the specific content of those models. One model might 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 next quarter. If the economists are reasonable, they will agree that pure logic alone cannot resolve their dispute. Indeed, they will agree that they'll have to use empirical evidence—facts about the real world—to find out which prediction is correct. One goal of this book is to teach managers how to think like economists so that they can build, apply, and test economic models to deal with important managerial problems.

Positive and Normative Statements

Economic analysis sometimes leads to predictions that seem undesirable or cynical. For instance, an economist doing market research for a producer of soft drinks might predict that "if we double the amount of sugar in this soft drink we will significantly increase sales to children." An economist making such a statement is not seeking to undermine the health of children by inducing them to consume excessive amounts of sugar. The economist is only making a scientific prediction about the relationship between cause and effect: more sugar in soft drinks is appealing to children.

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

An economist may test the hypothesis that the quantity of soft drinks demanded decreases as the price increases. Some may conclude from that study that “The government should tax soft drinks so that people will not consume so much sugar.” Such a statement is a value judgment. It may be based on the view that people *should* be protected from their own unwise choices, so the government *should* intervene.

This judgment is *not* a scientific prediction. It is a **normative statement**: a belief about whether something is good or bad. A normative statement cannot be tested because a value judgment cannot be refuted by evidence. A normative statement concerns what somebody believes *should* happen; a positive statement concerns what *is* or what *will* happen. Normative statements are sometimes called *prescriptive* statements because they prescribe a course of action, while positive statements are sometimes called *descriptive* statements because they describe reality. Although a normative conclusion can be drawn without first conducting a positive analysis, a policy debate will be better informed if a positive analysis is conducted first.³

Good economists and managers emphasize positive analysis. This emphasis has implications for what we study and even for 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 (positive) hypothesis such as “Graduating from college or university increases lifetime income.”

SUMMARY

- 1. Managerial Decision Making.** Economic analysis helps managers develop strategies to pursue their objectives effectively in the presence of scarcity. Various managers within a firm face different objectives and different constraints, but the overriding objective in most private-sector firms is to maximize profits. Making decisions subject to constraints implies making trade-offs. To make good managerial decisions, managers must understand how consumers, workers, other managers, and governments will act. Economic theories normally (but not always) assume that all decision makers attempt to maximize their well-being given the constraints they face.
- 2. Economic Models.** Managers use models based on economic theories to help make predictions and decisions, which they use to run their firms. A good model is simple to use and makes clear, testable predictions that are supported by evidence. Economists use models to construct *positive* hypotheses such as causal statements linking changes in one variable, such as income, to its effects, such as purchases of automobiles. These positive propositions can be tested. In contrast, *normative* statements, which are value judgments, cannot be tested.

³Some argue that, as (social) scientists, we economists should present only 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).

Supply and Demand

2

Talk is cheap because supply exceeds demand.

Managerial Problem

Carbon Taxes

Burning fossil fuels such as gasoline, coal, and heating oil releases gases containing carbon into the atmosphere.¹ These “greenhouse” gases are widely believed to contribute to global warming. To reduce this problem and raise tax revenues, many environmentalists and political leaders have proposed levying a *carbon tax* on the carbon content in fossil fuels.²

When governments impose carbon taxes on gasoline, managers of firms that sell gasoline need to think about how much of the tax they have to absorb and how much they can pass through to firms and consumers who buy gasoline. Similarly, managers of firms that purchase gasoline must consider how any pass-through charges will affect their costs of shipping, air travel, heating, and production. This pass-through analysis is critical in making short-run managerial decisions concerning how much to produce, whether to operate or shut down, and how to set prices and make long-run decisions such as whether to undertake capital investments.

The first broad-based carbon taxes on fuels containing carbon (such as gasoline) were implemented in Finland and Sweden at the beginning of the 1990s. Various other European countries soon followed suit. However, strong opposition to carbon taxes has limited adoption in the United States and Canada. The first North American carbon tax was not introduced

until 2006 in Boulder, Colorado, where it was applied to only electricity generation. In 2007 and 2008, the Canadian provinces of Quebec and British Columbia became the first provinces or states in North America to impose a broad-based carbon tax. Australia adopted a carbon tax in 2012. During the 2012–2013 U.S. federal government budget negotiations, several Congressional leaders called for carbon taxes to help balance the budget.

Such carbon taxes harm some industries and help others. The tax hurts owners and managers of gasoline retailing firms, who need to consider whether they can stay in business in the face of a significant carbon tax. Shippers and



¹Each chapter from Chapter 2 on begins with a Managerial Problem that contains a specific question, which is answered at the end of the chapter using the theories presented in the chapter. Sources for the Managerial Problems, Mini-Cases, and Managerial Implications appear at the back of the book.

²Their political opponents object, claiming that fears about global warming are exaggerated and warning of large price increases from such taxes.

manufacturers that use substantial amounts of fuel in production, as well as other firms, would also see their costs of operating rise.

Although a carbon tax harms some firms and industries, it creates opportunities for others. For example, wind power, which is an alternative to fossil fuels in generating electricity, would become much more attractive. Anticipating greater opportunities in this market in the future, Google invested nearly \$1 billion in wind and other renewable energy as of 2012. In 2013, Warren Buffett acquired two utility-scale solar plants in Southern California for between \$2 and \$2.5 billion. DONG Energy A/S and Iberdrola (IBE) SA's Scottish Power unit announced that they would invest £1.6 billion (\$2.6 billion) to build a large wind farm off northwest England by 2014.

Motor vehicle sector managers would need to consider whether to change their product mix in response to a carbon tax, perhaps focusing more on fuel-efficient vehicles. Even without a carbon tax, recent increases in gasoline prices have induced consumers to switch from sport utility vehicles (SUVs) to smaller cars. A carbon tax would favor fuel-efficient vehicles even more.

At the end of this chapter, we will return to this topic and answer a question of critical importance to managers in the motor vehicle industry and in other industries affected by gasoline prices: What will be the effect of imposing a carbon tax on the price of gasoline?

To analyze the price and other effects of carbon taxes, managers use an economic tool called the *supply-and-demand model*. Managers who are able to anticipate and act on the implications of the supply-and-demand model by responding quickly to changes in economic conditions, such as tax changes, make more profitable decisions.

The supply-and-demand model provides a good description of many markets and applies particularly well to markets in which there are many buyers and many sellers, as in most agricultural markets, much of the construction industry, many retail markets (such as gasoline retailing), and several other major sectors of the economy. In markets where this model is applicable, it allows us to make clear, testable predictions about the effects of new taxes or other shocks on prices and other market outcomes.

Main Topics

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 consumer incomes and the prices 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 and the level of technological sophistication used in production.
- 3. Market Equilibrium:** The interaction between consumers' demand and producers' supply determines the market price and quantity of a good or service that is bought and sold.
- 4. Shocks to the Equilibrium:** Changes in a factor that affect demand (such as consumer income) or supply (such as the price of inputs) alter the market price and quantity sold of a good or service.
- 5. Effects of Government Interventions:** Government policy may also affect the equilibrium by shifting the demand curve or the supply curve, restricting price or quantity, or using taxes to create a gap between the price consumers pay and the price firms receive.
- 6. When to Use the Supply-and-Demand Model:** The supply-and-demand model applies very well to highly competitive markets, which are typically markets with many buyers and sellers.

2.1 Demand

Consumers decide whether to buy a particular good or service and, if so, how much to buy based on its price and on other factors, including their incomes, the prices of other goods, their tastes, and the information they have about the product. Government regulations and other policies also affect buying decisions. Before concentrating on the role of price in determining quantity demanded, let's look briefly at some other factors.

Income plays a major role in determining what and how much to purchase. People who suddenly inherit great wealth might be more likely to purchase expensive Rolex watches or other luxury items and would probably be less likely to buy inexpensive Timex watches and various items targeted toward lower-income consumers. More broadly, when a consumer's income rises, that consumer will often buy more of many goods.

The *price of a related good* might also affect consumers' buying decisions. Related goods can be either *substitutes* or *complements*. A substitute good is a good that might be used or consumed instead of the good in question. Before deciding to go to a movie, a consumer might consider the prices of potential substitutes such as streaming a movie purchased online or going to a sporting event or a concert. Streaming movies, sporting events, and concerts compete with movie theaters for the consumer's entertainment dollar. If sporting events are too expensive, many consumers might choose to see movies instead. Different brands of essentially the same good are often very close substitutes. Before buying a pair of Levi's jeans, a customer might check the prices of other brands and substitute one of those brands for Levi's if its price is sufficiently attractive.

A complement is a good that is used with the good under consideration. Digital audio players such as the iPod application (app) for the iPhone and online audio recordings are complements because consumers obtain recordings online and then download them to audio players to listen to them. A decline in the price of digital audio players would affect the demand for online music. As consumers respond to the decline in the price of audio players by purchasing more such devices, they would also be more inclined to purchase and download online music. Thus, sellers of online music would experience an increase in demand for their product arising from the price decline of a complementary good (audio players).

Consumers' *tastes* are important in determining their demand for a good or service. Consumers do not purchase foods they dislike or clothes they view as unfashionable or uncomfortable. The importance of fashion illustrates how changing tastes affect consumer demand. Clothing items that have gone out of fashion can often be found languishing in discount sections of clothing stores even though they might have been readily purchased at high prices a couple of years (or even a few weeks) earlier when they were in fashion. Firms devote significant resources to trying to change consumer tastes through advertising.

Similarly, *information* about the effects of a good has an impact on consumer decisions. In recent years, as positive health outcomes have been linked to various food items, demand for these healthy foods (such as soy products and high-fiber breads) has typically risen when the information became well known.

Government rules and regulations affect demand. If a city government bans the use of skateboards on its streets, demand for skateboards in that city falls. Governments might also restrict sales to particular groups of consumers. For example, many political jurisdictions do not allow children to buy tobacco products, which reduces the quantity of cigarettes consumed.