微观经济学亚洲版

Microeconomics An Asian Perspective

(美) Robert S. Pindyck

(美) Daniel L. Rubinfeld

(新加坡) Winston T. H. Koh

著



微观经济学亚洲版

Microeconomics An Asian Perspective

(美) Robert S. Pindyck

(美) Daniel L. Rubinfeld

著

(新加坡) Winston T. H. Koh

清华大学出版社 北京 北京市版权局著作权合同登记号 图字: 01-2009-0539

Original edition, entitled MICROECONOMICS: AN ASIAN PERSPECTIVE, 013123451X by ROBERT S. PINDYCK, DANIEL L. RUBINFELD and WINSTON T. H. KOH, published by Pearson education, Inc., publishing as Prentice Hall, copyright © 2006.

All Rights Reserved. No part of this book may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording or by any information storage retrieval system, without permission from Pearson Education, Inc.

China edition published by PEARSON EDUCATION ASIA LTD., and TSINGHUA UNIVERSITY PRESS Copyright © 2009.

This edition is manufactured in the People's Republic of China, and is authorized for sale only in the People's Republic of China excluding Hong Kong, Macao and Taiwan.

For sale and distribution in the People's Republic of China exclusively (except Taiwan, Hong Kong SAR and Macao SAR).

仅限于中华人民共和国境内(不包括中国香港、澳门特别行政区和中国台湾地区)销售发行。

本书封面贴有 Pearson Education (培生教育出版集团)激光防伪标签,无标签者不得销售。版权所有,侵权必究。侵权举报电话: 010-62782989 13701121933

图书在版编目 (CIP) 数据

微观经济学 = Microeconomics: 亚洲版: 英文/(美) 平狄克 (Pindyck, R.S.), (美) 鲁宾菲尔德 (Rubinfeld, D. L.),(新) 科尔 (Koh, W. T. H.) 著. 一北京: 清华大学出版社, 2009.12(清华经济学系列英文版教材)

ISBN 978-7-302-21564-6

I. 微… II. ①平…②鲁… ③科… III. 微观经济学—高等学校—教材—英文 IV. F016

中国版本图书馆 CIP 数据核字(2009)第 218566 号

责任编辑: 江 娅 责任印制: 杨 艳

出版发行: 清华大学出版社

地 址:北京清华大学学研大厦 A 座

http://www.tup.com.cn

邮 编: 100084

社 总 机: 010-62770175

邮 购: 010-62786544

投稿与读者服务: 010-62776969, c-service@tup.tsinghua.edu.cn

质 量 反 馈: 010-62772015, zhiliang@tup.tsinghua.edu.cn

印装者:清华大学印刷厂

发 行 者: 全国新华书店

开 本: 203×260

印张: 48.25

版 次: 2009 年 12 月第 1 版

印 次: 2009年12月第1次印刷

印 数: 1~5000

定 价: 68.00 元

本书如存在文字不清、漏印、缺页、倒页、脱页等印装质量问题,请与清华大学出版社出版部联系调换。联系电话: 010-62770177 转 3103 产品编号: 033049-01

为了适应经济全球化的发展趋势,满足国内广大读者了解、学习和借鉴国外先进管理经验和掌握经济理论前沿动态的需要,清华大学出版社与国外著名出版公司合作影印出版一系列英文版经济管理方面的图书。我们所选择的图书,基本上是已再版多次、在国外深受欢迎,并被广泛采用的优秀教材,绝大部分是该领域中较具权威性的经典之作。在选书的过程中,我们得到了很多专家、学者的支持、帮助和鼓励,在此表示谢意!

由于原作者所处国家的政治、经济和文化背景等与我国不同,对书中所持观点,敬请广大读者在阅读过程中注意加以分析和鉴别。

我们期望这套影印书的出版对我国经济科学的发展能有所帮助, 对我国经济管理专业的教学能有所促进。

欢迎广大读者给我们提出宝贵的意见和建议,同时也欢迎有关的专业人士向我们推荐您所接触到的国外优秀图书。

清华大学出版社 2009.10 世纪之交,中国与世界的发展呈现最显著的两大趋势——以网络为代表的信息技术的突飞猛进,以及经济全球化的激烈挑战。无论是无远弗界的因特网,还是日益密切的政治、经济、文化等方面的国际合作,都标示着 21 世纪的中国是一个更加开放的中国,也面临着一个更加开放的世界。

教育,特别是管理教育总是扮演着学习与合作的先行者的角色。改革开放以来,尤其是 20 世纪 90 年代之后,为了探寻中国国情与国际上一切优秀的管理教育思想、方法和手段的完美结合,为了更好地培养高层次的"面向国际市场竞争、具备国际经营头脑"的管理者,我国的教育机构与美国、欧洲、澳洲以及亚洲一些国家和地区的大量的著名管理学院和顶尖跨国企业建立了长期密切的合作关系。以清华大学经济管理学院为例,2000年,学院顾问委员会成立,并于10月举行了第一次会议,2001年4月又举行了第二次会议。这个顾问委员会包括了世界上最大的一些跨国公司和中国几家顶尖企业的最高领导人,其阵容之大、层次之高,超过了世界上任何一所商学院。在这样高层次、多样化、重实效的管理教育国际合作中,教师和学生与国外的交流机会大幅度增加,越来越深刻地融入到全球性的教育、文化和思想观念的时代变革中,我们的管理教育工作者和经济管理学习者,更加真切地体验到这个世界正发生着深刻的变化,也更主动地探寻和把握着世界经济发展和跨国企业运作的脉搏。

我国管理教育的发展,闭关锁国、闭门造车是绝对不行的,必须同国际接轨,按照国际一流的水准来要求自己。正如朱镕基同志在清华大学经济管理学院成立十周年时所发的贺信中指出的那样:"建设有中国特色的社会主义,需要一大批掌握市场经济的一般规律,熟悉其运行规则,而又了解中国企业实情的经济管理人才。清华大学经济管理学院就要敢于借鉴、引进世界上一切优秀的经济管理学院的教学内容、方法和手段,结合中国的国情,办成世界第一流的经管学院。"作为达到世界一流的一个重要基础,朱镕基同志多次建议清华的 MBA 教育要加强英语教学。我体会,这不仅因为英语是当今世界交往中重要的语言工具,是连接中国与世界的重要桥梁和媒介,而且更是中国经济管理人才参与国际竞争,加强国际合作,实现中国企业的国际战略的基石。推动和实行英文教学并不是目的,真正的目的在于培养学生——这些未来的企业家——能够具备同国际竞争对手、合作伙伴沟通和对抗的能力。按照这一要求,清华大学经济管理学院正在不断推动英语教学的步伐,使得英语不仅是一门需要学习的核心课程,

而且渗透到各门专业课程的学习当中。

课堂讲授之外,课前课后的大量英文原版著作、案例的阅读对于提高学生的英文水平也是非常关键的。这不仅是积累相当的专业词汇的重要手段,而且是对学习者思维方式的有效训练。

我们知道,就阅读而言,学习和借鉴国外先进的管理经验和掌握经济理论动态,或是阅读翻译作品,或是阅读原著。前者属于间接阅读,后者属于直接阅读。直接阅读取决于读者的外文阅读能力,有较高外语水平的读者当然喜欢直接阅读原著,这样不仅可以避免因译者的疏忽或水平所限而造成的纰漏,同时也可以尽享原作者思想的真实表达。而对于那些有一定外语基础,但又不能完全独立阅读国外原著的读者来说,外文的阅读能力是需要加强培养和训练的,尤其是专业外语的阅读能力更是如此。如果一个人永远不接触专业外版图书,他在获得国外学术信息方面就永远会比别人差半年甚至一年的时间,他就会在无形中减弱自己的竞争能力。因此,我们认为,有一定外语基础的读者,都应该尝试一下阅读外文原版,只要努力并坚持,就一定能过了这道关,到那时就能体验到直接阅读的妙处了。

在掌握大量术语的同时,我们更看重读者在阅读英文原版著作时对于西方管理者或研究者的思维方式的学习和体会。我认为,原汁原味的世界级大师富有特色的表达方式背后,反映了思维习惯,反映了思想精髓,反映了文化特征,也反映了战略偏好。知己知彼,对于跨文化的管理思想、方法的学习,一定要熟悉这些思想、方法所孕育、成长的文化土壤,这样,有朝一日才能真正"具备国际战略头脑"。

以往,普通读者购买和阅读英文原版还有一个书价的障碍。一本外版书少则几十美元,多则上百美元,一般读者只能望书兴叹。随着全球经济合作步伐的加快,目前在出版行业有了一种新的合作出版的方式,即外文影印版,其价格几乎与国内同类图书持平。这样一来,读者可以不必再为书价发愁。清华大学出版社这些年在这方面一直以独特的优势领先于同行。早在1997年,清华大学出版社敢为人先,在国内最早推出一批优秀商学英文版教材,规模宏大,在企业界和管理教育界引起不小的轰动,更使国内莘莘学子受益良多。

为了配合清华大学经济管理学院推动英文授课的急需,也为了向全国更多的 MBA 试点院校和更多的经济管理学院的教师和学生提供学习上的支持,清华大学出版社再次隆重推出与世界著名出版集团合作的英文原版影印商学教科书,也使广大工商界人士、经济管理类学生享用到最新最好质优价廉的国际教材。

祝愿我国的管理教育事业在社会各界的大力支持和关心下不断发展、日进日新;祝愿我国的经济建设在不断涌现的大批高层次的面向国际市场竞争、具备国际经营头脑的管理者的勉力经营下早日中兴。

赶纯的 教授

About the Authors

Robert S. Pindyck is the Bank of Tokyo-Mitsubishi Professor of Economics and Finance in the Sloan School of Management at M.I.T. Professor Pindyck received his Ph.D from M.I.T. in 1971. Professor Pindyck's research and writing have covered a variety of topics in microeconomics, including the effects of uncertainty on firm behavior and market structure; the determinants of market; power, the behavior of natural resource, commodity, and financial markets; and criteria for investment decisions.

Daniel L. Rubinfeld is the Robert L. Bridges Professor of Law and Professor of Economics at the University of California, Berkeley. Professor Rubinfeld received his Ph.D from M.I.T. in 1972. Professor Rubinfeld, who served as chief economist at the Department of Justice in 1997 and 1998, is the author of a variety of articles relating to antitrust, competition policy, law and economics, law and statistics, and public economics.

Winston T.H. Koh is an Associate Professor of Economics in the School of Economics and Social Sciences at the Singapore Management University. Professor Koh received his Ph.D from Princeton University in 1988. He has been an investment banker with J.P. Morgan, as well as the general manager of a private equity fund. Professor Koh's current research interests include investment management and global financial markets, and economics of information and collective choice.

For further information about the authors, see their websites:

http://web.mit.edu/rpindyck/www http://www.law.berkeley.edu/faculty/rubinfeldd http://www.sess.smu.edu.sg/faculty/economics/winston_koh.htm

Preface

For students who care about how the world works, microeconomics is one of the most relevant and interesting subjects they can study. A good grasp of microeconomics is vital for managerial decision-making, for designing and understanding public policy, and more generally for appreciating how a modern economy functions.

The first edition of this book, *Microeconomics: An Asian Perspective*, is written because we believe that students should be exposed to the new topics that have come to play a central role in microeconomics over the years—topics such as game theory and competitive strategy, the roles of uncertainty and information, and the analysis of pricing by firms with market power. We also feel that students need to be shown how microeconomics can help them to understand what goes on in different parts of the world, not just in the Americas and Europe, but also in Asia, and how it can be used as a practical tool for decision making. Microeconomics is an exciting and dynamic subject, but students need to be given an appreciation of its relevance and usefulness. They want and need a good understanding of how microeconomics can actually be used outside the classroom.

To respond to these needs, *Microeconomics: An Asian Perspective* provides a treatment of microeconomic theory that stresses its relevance and application to both managerial and public policy decision-making. This applied emphasis is accomplished by including detailed examples, drawn from Asia, the United States and other parts of the world, that cover topics such as the analysis of demand, cost, and market efficiency; the design of pricing strategies; investment and production decisions; and public policy analysis. Because of the importance that we attach to these examples, they are included in the flow of the text.

In this book, we have incorporated dramatic changes that have occurred in the field in recent years. There has been growing interest in game theory and the strategic interactions of firms (Chapters 12 and 13), in the role and implications of uncertainty and asymmetric information (Chapters 5 and 17), in the pricing strategies of firms with market power (Chapters 10 and 11), and in the design of policies to deal efficiently with externalities such as environmental pollution (Chapter 18). These topics, which receive only limited attention in most books, are covered extensively here.

That the coverage is comprehensive and up-to-date does not mean that this book is "advanced" or difficult. We have worked hard to make the exposition clear and accessible as well as lively and engaging. We believe that the study of microeconomics should be enjoyable and stimulating. We hope that our book reflects this belief. Except for appendices and footnotes, *Microeconomics: An Asian Perspective* uses few calculus. As a result, it should be suitable for students from a broad range of backgrounds. (Those sections that are more demanding are marked with an asterisk and can be easily omitted.)

Alternative Course Design

Microeconomics: An Asian Perspective offers instructors considerable flexibility in course design. For a one-quarter or one-semester course stressing the basic core material, we would suggest using the following chapters and sections of chapters: 1 through 6, 7.1–7.4, 8 through 10, 11.1–11.3, 12, 14, 15.1–15.4, 18.1–18.2, and 18.5. A somewhat more ambitious course might also include parts of Chapters 5 and 16 and additional sections in Chapters 7 and 9. To emphasize uncertainty and market failure, an instructor should also include substantial parts of Chapters 5 and 17.

Depending on one's interests and the goals of the course, other sections could be added or used to replace the materials listed above. A course emphasizing modern pricing theory and business strategy would include all of Chapters 11, 12, and 13 and the remaining sections of Chapter 15. A course in managerial economics might also include the appendices to Chapters 4, 7, and 11, as well as the appendix on regression analysis at the end of the book. A course stressing welfare economics and public policy should include Chapter 16 and additional sections of Chapter 18.

Finally, we want to stress that those sections or subsections that are more demanding and/or peripheral to the core material have been marked with an asterisk. These sections can easily be omitted without detracting from the flow of the book.

The Companion Website and Ancillaries

The Companion Website (http://www.pearsoned-asia.com/pindyck) is a content-rich Website with exercises, activities, and resources related specifically to the first edition of *Microeconomics: An Asian Perspective*. For instructors, the Companion Website provides you with all the resources available with this text to enhance your lectures. Instructors can also download their syllabus to the site.

Other ancillaries are also available to instructors and students using this book. The *Instructor's Manual* provides detailed solutions to all end-of-chapter review Questions and Exercises.

The *Test Bank* contains approximately 2,000 multiple-choice and short-answer questions with solutions. All these materials have been thoroughly reviewed and accuracy checked.

The *PowerPoint Lecture Presentation* allows instructors to edit the detailed outlines to create full-color, professional-looking presentations and customized handouts for students.

The *Study Guide* provides a wide variety of review materials and exercises for students. Each chapter contains a list of important concepts, chapter highlights, a concept review, problem sets, and a self-test quiz. Worked-out answers and solutions are provided for all exercises, problem sets, and self-test questions.

Acknowledgments

We owe a debt of gratitude to our students and to the colleagues with whom we often discuss microeconomics and its presentation. Robert Pindyck and Daniel Rubinfeld would also like to thank the following people for their research and editorial assistance: Peter Adams, Walter Athier, Phillip Gibbs, Mark Glickman, Andrew Guest, Kathy Hill, Salar Jahedi, Jamie Jue, Assunta Kent, Rashmi Khare, Mary Knott, Dawn Elliott Linahan, Masaya Okoshi, Kathy O'Regan, Karen Randig, Subi Rangan, Jeanette Sayre, Deborah Senior, Ashesh Shah, Nicola Stafford, Lynn Steele, Wilson Tai, Jay Tharp and Steve Wiggins. Their help was critical in developing and updating many of the examples.

Writing this book has been both a painstaking and enjoyable process. We have received exceptionally fine guidance from teachers of microeconomics over the years. We are especially grateful for the comments, criticisms and suggestions of the following colleagues: Steve Allen, Jean Andrews, Paul Anglin, J. C. K. Ash, Ravi Bhandari, Jeffrey Bellmont, Ernst Berndt, George Bittlingmayer, Severin Borenstein, Paul Carlin, Chung Chan, Whewon Cho, Setio Angarro Dewo, Frank Fabozzi, Joseph Farrell, Frank Fisher, Kenneth Fjell, Jonathan Hamilton, Daniel Ingberman, Robert Inman, T. G. Jayanth, Joyce Jacobsen, Paul Joskow, Stacey Kole, Lars Loe, David McAdams, Preston McAfee, Jeannette Mortensen, John Mullahy, Krishna Pendakur, Jeffrey Perloff, Ivan P'ng, A. Mitchell Polinsky, Richard Planck, Jeffrey Plishkin, Azam Qayum, Judith Roberts, Geoffrey Rothwell, Garth Saloner, Joel Schrag, Daniel Siegel, Thomas Stoker, David Storey, Alex Voorhoeve, James Walker, Michael Wachter and Michael Williams.

For the first edition of *Microeconomics: An Asian Perspective*, Winston Koh would like to thank Vincent Goh, Dion Tan, and Yi Hui Tan, who provided capable research assistance. He would also like to express his sincere thanks for the extraordinary effort that the editors at Pearson Education, Daniel Lim and Simon Tan, made towards the development of this edition of *Microeconomics: An Asian Perspective*.

R.S.P. D.L.R. W.T.K.

弗 I 部分	51 音:	市场与价格1
	第1章	绪论3
	第2章	供给与需求的基本原理21
第2部分	生产者	、消费者与竞争性市场61
	第3章	消费者行为63
	第4章	个体需求与市场需求107
	第5章	不确定性与消费者行为153
	第6章	生产187
	第7章	生产成本217
	第8章	利润最大化与竞争性供给265
	第9章	竞争性市场分析303
第3部分	市场结	构与竞争策略341
	第10章	市场势力:卖方垄断与买方垄断343
	第11章	有市场势力条件下的定价387
	第12章	垄断竞争与寡头441
	第13章	博弈论与竞争策略481
	第14章	要素市场525
	第15章	投资、时间与资本市场557
第4部分	信息、	市场失灵与政府的角色589
	第16章	一般均衡与经济效率591
	第17章	不对称信息条件下的市场625
	第18章	外部性与公共品655
附录:回》	归分析的	基本知识691
术语表	• • • • • • • •	699
部分习题智	答案	
图片索引.	• • • • • • • •	721
索引	• • • • • • •	723

Brief Contents

PAR	T 1 Introduction: Markets and Prices 1
1 P	reliminaries 3
2 T	he Basics of Supply and Demand 21
PAR	Producers, Consumers, and Competitive Markets 61
3 (Consumer Behavior 63
	ndividual and Market Demand 107
5 t	Incertainty and Consumer Behavior 153
6 P	Production 187
	The Cost of Production 217
	Profit Maximization and Competitive Supply 265
9 T	The Analysis of Competitive Markets 303
P A F	Market Power: Monopoly and Monopsony 343
11	Pricing with Market Power 387
12	Monopolistic Competition and Oligopoly 441
13	Game Theory and Competitive Strategy 481
14	Markets for Factor Inputs 525
15	Investment, Time, and Capital Markets 557
PA	
16	General Equilibrium and Economic Efficiency 591
17	Markets with Asymmetric Information 625
18	Externalities and Public Goods 655
	pendix: The Basics of Regression 691 ssary 699
	wers to Selected Exercises 709
Pho	to Credits 721
Inde	ex 723

Contents

Preface Acknowledgments

PAR	Introduction: Markets and Prices 1
1 1	Preliminaries 3
	1.1 The Themes of Microeconomics 4
	Trade-Offs 4
	Prices and Markets 5
	Theories and Models 5
	Positive versus Normative Analysis 6
	1.2 What is a Market? 7
	Competitive versus Noncompetitive Markets 8
	Market Price 8
	Market Definition—The Extent of a Market 9
	1.3 Real versus Nominal Prices 12
	1.4 Why Study Microeconomics? 15
	Corporate Decision Making: Introducing New Car Models in China 15
	Public Policy Design: Automobile Emission Standards for the Twenty-first Century 17
5	Summary 18
(Questions for Review 18
1	Exercises 19
2	The Basics of Supply and Demand 21
	2.1 Supply and Demand 22
	The Supply Curve 22
	The Demand Curve 23
	2.2 The Market Mechanism 25
	2.3 Changes in Market Equilibrium 26
	2.4 Elasticities of Supply and Demand 33
	Point versus Arc Elasticities 37
	2.5 Short-Run versus Long-Run Elasticities 39
	Demand 39
	Supply 44
:	*2.6 Understanding and Predicting the Effects of Changing Market
	Conditions 47
	2.7 Effects of Government Intervention—Price Controls 54
:	Summary 58
	Questions for Review 58
•	Exercises 59

PART 2 Producers, Consumers, and Competitive Markets 61 3 Consumer Behavior 63 Consumer Behavior 64

3.1 Consumer Preferences 65

Market Baskets 65

Some Basic Assumptions about Preferences 66

Indifference Curves 66

Indifference Maps 68

The Shape of Indifference Curves 70

The Marginal Rate of Substitution 71

Perfect Substitutes and Perfect Complements 72

3.2 Budget Constraints 79

The Budget Line 79

The Effects of Changes in Income and Prices 81

3.3 Consumer Choice 82 *Corner Solutions* 86

3.4 Revealed Preference 88

3.5 Marginal Utility and Consumer Choice 91

*3.6 Cost-of-Living Indexes 96
Ideal Cost-of-Living Index 97
Laspeyres Index 98
Paasche Index 99
Chain-Weighted Indexes 100

Summary 102 Questions for Review 103 Exercises 104

4 Individual and Market Demand 107

4.1 Individual Demand 108
Price Changes 108
The Individual Demand Curve 108
Income Changes 110
Normal versus Inferior Goods 112
Engel Curves 112
Substitutes and Complements 115

4.2 Income and Substitution Effects

4.2 Income and Substitution Effects 116
 Substitution Effect 117
 Income Effect 118
 A Special Case: The Giffen Good 119

4.3 Market Demand 121
From Individual to Market Demand 122
Elasticity of Demand 123

4.4 Consumer Surplus 127

Consumer Surplus and Demand 128

4.5 Network Externalities 131

The Bandwagon Effect 132

The Snob Effect 133

*4.6 Empirical Estimation of Demand 136 The Statistical Approach to Demand Estimation 136 The Form of the Demand Relationship 138 Interview and Experimental Approaches to Demand Determination 140 Summary 140 Questions for Review 141 Exercises 142 **Appendix to Chapter 4:** Demand Theory—A Mathematical Treatment 145 Utility Maximization 145 The Method of Lagrange Multipliers The Equal Margin Principle 147 Marginal Rate of Substitution 147 Marginal Utility of Income 148 An Example 148 Duality in Consumer Theory 149 Income and Substitution Effects 150 Exercises 152 Uncertainty and Consumer Behavior 153 **5.1** Describing Risk 154 Probability 154 Expected Value 155 Variability 155 Decision Making 158 **5.2** Preferences Toward Risk 159 Different Preferences Toward Risk 161 **5.3** Reducing Risk 164 Diversification 165 Insurance 166 The Value of Information 168 *5.4 The Demand for Risky Assets 171 Assets 171 Risky and Riskless Assets 172 Asset Returns 172 The Trade-Off Between Risk and Return 174 The Investor's Choice Problem 175

5.5 Behavioral Economics 180

Reference Points 181

Fairness 181

The Laws of Probability 182

Summing Up 182

Summary 184

Ouestions for Review 184

Exercises 185

6 Production 187

The Production Decisions of a Firm 187 **6.1** The Technology of Production 188

7

The Production Function 189	
The Short Run versus the Long Run 190	
6.2 Production with One Variable Input (Labor) 190	
Average and Marginal Products 191	
The Slopes of the Product Curve 192	
The Average Product of Labor Curve 194	
The Marginal Product of Labor Curve 194	
The Law of Diminishing Marginal Returns 194	
Labor Productivity 197	
6.3 Production with Two Variable Inputs 199	
Isoquants 200	
Input Flexibility 201	
Diminishing Marginal Returns 201	
Substitution Among Inputs 202	
Production Functions—Two Special Cases 203	
6.4 Returns to Scale 207	
Describing Returns to Scale 208	
Summary 213	
Questions for Review 213	
Exercises 214	
The Court of the C	
The Cost of Production 217	
7.1 Measuring Cost: Which Costs Matter? 217	
Economic Cost versus Accounting Cost 218	
Opportunity Cost 218	
Sunk Costs 219	
Fixed Costs and Variable Costs 220	
Fixed versus Sunk Costs 221	
Marginal and Average Cost 222	
7.2 Cost in the Short Run 224	
The Determinants of Short-Run Cost 224	
The Shapes of the Cost Curves 225	
7.3 Cost in the Long Run 229	
The User Cost of Capital 229	
The Cost-Minimizing Input Choice 230	
The Isocost Line 231	
Choosing Inputs 231	
Cost Minimization with Varying Output Levels 236	
The Expansion Path and Long-Run Costs 236	
7.4 Long-Run versus Short-Run Cost Curves 238	
The Inflexibility of Short-Run Production 238	
Long-Run Average Cost 239	
Economies and Diseconomies of Scale 240	
The Relationship Between Short-Run and Long-Run Cost 242	
	1 3
Product Transformation Curves 243	
Economies and Diseconomies of Scope 244	
The Degree of Economies of Scope 245	

*7.6 Dynamic Changes in Costs—The Learning Curve 247
Graphing the Learning Curve 247
Learning versus Economies of Scale 249

*7.7 Estimating and Predicting Cost 252

Cost Functions and the Measurement of Scale Economies 254

Summary 256 Questions for Review 257 Exercises 258

Appendix to Chapter 7: Production and Cost Theory— A Mathematical Treatment 260

Cost Minimization 260
Marginal Rate of Technical Substitution 261
Duality in Production and Cost Theory 262
The Cobb-Douglas Cost and Production Functions 262

Exercises 264

8 Profit Maximization and Competitive Supply 265

- **8.1** Perfectly Competitive Markets 266 When is a Market Highly Competitive? 268
- **8.2** Profit Maximization 268

 Do Firms Maximize Profit? 268
- 8.3 Marginal Revenue, Marginal Cost, and Profit Maximization 269
 Demand and Marginal Revenue for a Competitive Firm 271
 Profit Maximization by a Competitive Firm 272
- 8.4 Choosing Output in the Short Run 272
 Short-Run Profit Maximization by a Competitive Firm 272
 The Short-Run Profit of a Competitive Firm 274
- **8.5** The Competitive Firm's Short-Run Supply Curve 277 The Firm's Response to an Input Price Change 278
- 8.6 The Short-Run Market Supply Curve 280
 Elasticity of Market Supply 281
 Producer Surplus in the Short Run 284
- 8.7 Choosing Output in the Long Run 285 Long-Run Profit Maximization 286 Long-Run Competitive Equilibrium 287 Economic Rent 290 Producer Surplus in the Long Run 290
- 8.8 The Industry's Long-Run Supply Curve 292
 Constant-Cost Industry 292
 Increasing-Cost Industry 293
 Decreasing-Cost Industry 295
 The Effects of a Tax 295
 Long-Run Elasticity of Supply 297

Summary 300 Questions for Review 300 Exercises 301