

SECOND EDITION

MICROECONOMICS

Robert S. Pindyck

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Daniel L. Rubinfeld

UNIVERSITY OF CALIFORNIA, BERKELEY

Macmillan Publishing Company

NEW YORK

Maxwell Macmillan Canada

TORONTO

Maxwell Macmillan International

NEW YORK OXFORD SINGAPORE SYDNEY

CONTENTS

PART I INTRODUCTION: MARKETS AND PRICES

1 Preliminaries	3
1.1 The Use and Limitations of Microeconomic Theory	4
1.2 Positive Versus Normative Analysis	5
1.3 Why Study Microeconomics?	8
Corporate Decision Making: Ford Introduces the Taurus	8
Public Policy Design: Automobile Emission Standards	9
1.4 What is a Market?	10
Competitive Versus Noncompetitive Markets	11
Market Price	12
The Extent of a Market	12
1.5 Real Versus Nominal Prices	13
Summary	16
Questions for Review	16
2 The Basics of Supply and Demand	18
2.1 The Market Mechanism	19
2.2 Shifts in Supply and Demand	21
2.3 Elasticities of Supply and Demand	28
2.4 Short-Run Versus Long-Run Elasticities	32
Demand	32
Supply	38
* 2.5 Understanding and Predicting the Effects of Changing Market Conditions	41
2.6 Effects of Government Intervention—Price Controls	49
Summary	52
Questions for Review	52
Exercises	53

PART II PRODUCERS, CONSUMERS, AND COMPETITIVE MARKETS

3 Consumer Behavior	57
3.1 Consumer Preferences	58
Some Basic Assumptions	59

*Sections marked with an asterisk are more demanding and can easily be omitted.

7.2 Costs in the Short Run	202
The Determinants of Short-Run Costs	204
The Shapes of the Cost Curves	205
7.3 Costs in the Long Run	208
The Cost-Minimizing Input Choice	208
The Isocost Line	209
Choosing Inputs	209
Cost Minimization with Varying Output Levels	214
7.4 Long-Run Versus Short-Run Cost Curves	215
The Inflexibility of Short-Run Production	215
Long-Run Average Cost	215
The Relationship Between Short-Run and Long-Run Costs	218
7.5 Production with Two Outputs—Economies of Scope	220
*7.6 Dynamic Changes in Costs—The Learning Curve	224
*7.7 Estimating and Predicting Cost	228
Cost Functions and The Measurement of Scale Economies	231
Summary	235
Questions for Review	236
Exercises	236
Appendix Production and Cost Theory—An Algebraic Treatment	238
Cost Minimization	238
Marginal Rate of Technical Substitution	239
Duality in Production and Cost Theory	240
The Cobb-Douglas Cost and Production Functions	241
Exercises	243
8 Profit Maximization and Competitive Supply	244
8.1 Profit Maximization	245
Do Firms Maximize Profit?	245
8.2 Marginal Revenue, Marginal Cost, and Profit Maximization	246
Demand and Marginal Revenue for a Competitive Firm	247
Profit Maximization by a Competitive Firm	249
8.3 Choosing Output in the Short Run	249
Short-Run Profit Maximization by a Competitive Firm	249
The Short-Run Profitability of a Competitive Firm	251
8.4 The Competitive Firm's Short-Run Supply Curve	254
The Firm's Response to an Input Price Change	255
8.5 The Short-Run Market Supply Curve	257
Elasticity of Market Supply	259
Producer Surplus in the Short Run	261
8.6 Choosing Output in the Long Run	263
Zero Profit	265
Long-Run Competitive Equilibrium	265
Economic Rent	268
Producer Surplus in the Long Run	268
8.7 The Industry's Long-Run Supply Curve	270
Constant-Cost Industry	270
Increasing-Cost Industry	272

Decreasing-Cost Industry	273		
The Short-Run and Long-Run Effects of a Tax	274		
Long-Run Elasticity of Supply	276		
8.8 When Is a Market Perfectly Competitive?			278
Contestable Markets	279		
Summary	280	Questions for Review	281
		Exercises	281
9 The Analysis of Competitive Markets			283
9.1 Evaluating the Gains and Losses from Government Policies—Consumer and Producer Surplus			284
Review of Consumer and Producer Surplus	284		
Application of Consumer and Producer Surplus	286		
9.2 The Efficiency of a Competitive Market			290
9.3 Minimum Prices			295
9.4 Price Supports and Production Quotas			299
Price Supports	300		
Production Quotas	301		
9.5 Import Quotas and Tariffs			307
9.6 The Impact of a Tax or Subsidy			312
Summary	320	Questions for Review	320
		Exercises	321

PART III MARKET STRUCTURE AND COMPETITIVE STRATEGY

10 Market Power: Monopoly and Monopsony			327
10.1 Monopoly			328
Average Revenue and Marginal Revenue	329		
The Monopolist's Output Decision	330		
An Example	332		
A Rule of Thumb for Pricing	334		
Shifts in Demand	335		
The Effect of a Tax	337		
*The Multiplant Firm	338		
10.2 Monopoly Power			340
Measuring Monopoly Power	342		
The Rule of Thumb for Pricing	343		
10.3 Sources of Monopoly Power			346
The Elasticity of Market Demand	346		
The Number of Firms	347		
The Interaction Among Firms	348		
10.4 The Social Costs of Monopoly Power			348
Price Regulation	350		
Regulation in Practice	352		

10.5	Monopsony		353
	Monopsony and Monopoly Compared	356	
10.6	Monopsony Power		357
	Sources of Monopsony Power	358	
	The Social Costs of Monopsony Power	359	
	Bilateral Monopoly	360	
10.7	Limiting Market Power: The Antitrust Laws		362
	Enforcement of the Antitrust Laws	364	
	Summary	366	
	Questions for Review	366	
	Exercises	367	
11	Pricing with Market Power		370
	11.1 Capturing Consumer Surplus		371
	11.2 Price Discrimination		373
	First-Degree Price Discrimination	373	
	Second-Degree Price Discrimination	376	
	Third-Degree Price Discrimination	377	
	11.3 Intertemporal Price Discrimination and Peak-Load Pricing		384
	11.4 The Two-Part Tariff		388
	*11.5 Bundling		393
	Mixed Bundling	397	
	Tying	401	
	*11.6 Advertising		402
	A Rule of Thumb for Advertising	404	
	Summary	406	
	Questions for Review	407	
	Exercises	408	
	Appendix Transfer Pricing in the Integrated Firm		412
	Transfer Pricing When There Is No Outside Market	413	
	Transfer Pricing With a Competitive Outside Market	416	
	Transfer Pricing With a Noncompetitive Outside Market	417	
	A Numerical Example	420	
	Exercises	422	
12	Monopolistic Competition and Oligopoly		423
	12.1 Monopolistic Competition		424
	The Makings of Monopolistic Competition	425	
	Equilibrium in the Short Run and the Long Run	425	
	Monopolistic Competition and Economic Efficiency	427	
	12.2 Oligopoly		430
	Equilibrium in an Oligopolistic Market	431	
	The Cournot Model	432	
	Example: A Linear Demand Curve	435	
	12.3 First Mover Advantage—The Stackelberg Model		438
	12.4 Price Competition		439
	Price Competition with Homogeneous Products—The Bertrand Model	439	
	Price Competition with Differentiated Products	441	

12.5	Competition Versus Collusion: The Prisoners' Dilemma	445
12.6	Implications of the Prisoners' Dilemma for Oligopolistic Pricing	448
	Price Rigidity	449
	Price Signaling and Price Leadership	451
	The Dominant Firm Model	454
12.7	Cartels	454
	The Analysis of Cartel Pricing	456
	Summary	460
	Questions for Review	461
	Exercises	461
13	Game Theory and Competitive Strategy	465
13.1	Gaming and Strategic Decisions	466
	Noncooperative Versus Cooperative Games	466
13.2	Dominant Strategies	468
13.3	The Nash Equilibrium Revisited	470
	Maximin Strategies	472
	*Mixed Strategies	473
13.4	Repeated Games	476
13.5	Sequential Games	481
	The Extensive Form of a Game	482
	The Advantage of Moving First	483
13.6	Threats, Commitments, and Credibility	484
	Empty Threats	485
	Commitment and Credibility	486
13.7	Entry Deterrence	489
	Strategic Trade Policy and International Competition	492
13.8	Bargaining Strategy	497
	Summary	499
	Questions for Review	500
	Exercises	501
14	Markets for Factor Inputs	504
14.1	Competitive Factor Markets	504
	Demand for a Factor Input When Only One Input Is Variable	505
	Demand for a Factor Input When Several Inputs Are Variable	508
	The Market Demand Curve	510
	The Supply of Inputs to a Firm	513
	The Market Supply of Inputs	515
14.2	Equilibrium in a Competitive Factor Market	519
	Economic Rent	521
14.3	Factor Markets with Monopsony Power	524
	Marginal and Average Expenditure	525
	The Input Purchasing Decision of the Firm	526
14.4	Factor Markets With Monopoly Power	528
	Monopoly Power over the Wage Rate	528
	A Two-Sector Model of Labor Employment	530
	Bilateral Monopoly in the Labor Market	531
	Summary	533
	Questions for Review	534
	Exercises	535

15 Investment, Time, and Capital Markets	536
15.1 Stocks Versus Flows	537
15.2 Present Discounted Value	538
Valuing Payment Streams	539
15.3 The Value of a Bond	542
Perpetuities	542
The Effective Yield on a Bond	543
15.4 The Net Present Value Criterion for Capital Investment Decisions	546
The Electric Motor Factory	548
Real Versus Nominal Discount Rates	548
Negative Future Cash Flows	550
15.5 Adjustments for Risk	550
Diversifiable Versus Nondiversifiable Risk	551
The Capital Asset Pricing Model	552
15.6 Investment Decisions by Consumers	556
*15.7 Intertemporal Production Decisions—Depletable Resources	558
The Production Decision of an Individual Resource Producer	558
The Behavior of Market Price	559
User Cost	559
Resource Production by a Monopolist	560
15.8 How Are Interest Rates Determined?	562
A Variety of Interest Rates	564
Summary	565
Questions for Review	566
Exercises	567

PART IV INFORMATION, MARKET FAILURE, AND THE ROLE OF GOVERNMENT

16 General Equilibrium and Economic Efficiency	571
16.1 General Equilibrium Analysis	572
Two Interdependent Markets—Moving to General Equilibrium	572
The Attainment of General Equilibrium	574
16.2 Efficiency in Exchange	576
The Advantages of Trade	577
The Edgeworth Box Diagram	578
Efficient Allocations	579
The Contract Curve	581
Consumer Equilibrium in a Competitive Market	582
16.3 Equity and Efficiency	585
The Utility Possibilities Frontier	585
Equity and Perfect Competition	587

16.4 Efficiency in Production		588
Production in the Edgeworth Box	588	
Input Efficiency	590	
Producer Equilibrium in a Competitive Input Market	591	
The Production Possibilities Frontier	592	
Output Efficiency	594	
Efficiency in Output Markets	595	
16.5 The Gains from Free Trade		596
Comparative Advantage	597	
An Expanded Production Possibilities Frontier	598	
16.6 An Overview—The Efficiency of Competitive Markets		602
16.7 Why Markets Fail		603
Market Power	603	
Incomplete Information	604	
Externalities	604	
Public Goods	605	
Summary	605	
Questions for Review	606	
Exercises	607	
17 Markets with Asymmetric Information		608
17.1 Quality Uncertainty and the Market for “Lemons”		609
The Market for Used Cars	609	
Implications of Asymmetric Information	611	
Insurance	611	
The Market for Credit	612	
The Importance of Reputation and Standardization	613	
17.2 Market Signaling		615
A Simple Model of Job Market Signaling	616	
Guarantees and Warranties	619	
17.3 Moral Hazard		620
17.4 The Principal-Agent Problem		623
The Principal-Agent Problem in Private Enterprises	624	
The Principal-Agent Problem in Public Enterprises	625	
Incentives in the Principal-Agent Framework	627	
*17.5 Managerial Incentives in an Integrated Firm		629
Asymmetric Information and Incentive Design in the Integrated Firm	629	
Applications	632	
17.6 Asymmetric Information in Labor Markets: Efficiency Wage Theory		633
Summary	636	
Questions for Review	636	
Exercises	637	
18 Externalities and Public Goods		639
18.1 Externalities		640
Negative Externalities and Inefficiency	640	
Positive Externalities and Inefficiency	642	

18.2 Ways of Correcting Market Failure	644
An Emissions Standard	645
An Emissions Fee	646
Standards versus Fees	647
Transferable Emissions Permits	650
18.3 Externalities and Property Rights	654
Property Rights	654
Bargaining and Economic Efficiency	654
Costly Bargaining—The Role of Strategic Behavior	656
A Legal Solution—Suing for Damages	656
18.4 Common Property Resources	658
18.5 Public Goods	661
Efficiency and Public Goods	663
Public Goods and Market Failure	664
18.6 Private Preferences for Public Goods	667
Summary	669
Questions for Review	670
Exercises	670
Appendix The Basics of Regression	673
An Example	673
Estimation	674
Statistical Tests	676
Goodness of Fit	677
Economic Forecasting	678
Summary	681
Glossary	683
Answers to Selected Exercises	693
Index	707

LIST OF EXAMPLES

1.1 Unemployment and the Labor Force Participation of Women	6
1.2 The Price of Eggs and the Price of a College Education	14
2.1 The Long-Run Behavior of Mineral Prices	25
2.2 The Market for Wheat	27
2.3 The Demands for Gasoline and Automobiles	36
2.4 The Weather in Brazil and the Price of Coffee in New York	40
2.5 Declining Demand and the Behavior of Copper Prices	45
2.6 The World Oil Market on the Back of an Envelope	46
2.7 Price Controls and the Natural Gas Shortage	50

11.5 The Complete Dinner vs. à La Carte: A Restaurant's Pricing Problem	400
11.6 Advertising: Supermarkets to Designer Jeans	405
12.1 Monopolistic Competition in the Markets for Colas and Coffee	428
12.2 A Pricing Problem for Procter & Gamble	443
12.3 Procter & Gamble in a Prisoners' Dilemma	447
12.4 Price Leadership and Price Rigidity in Commercial Banking	452
12.5 The Cartelization of Intercollegiate Athletics	459
13.1 Acquiring a Company	467
13.2 Oligopolistic Cooperation in the Water Meter Industry	479
13.3 Competition and Collusion in the Airline Industry	480
13.4 Wal-Mart Stores' Preemptive Investment Strategy	488
13.5 DuPont Deters Entry in the Titanium Dioxide Industry	494
13.6 Diaper Wars	495
14.1 The Demand for Jet Fuel	511
14.2 Labor Supply for One- and Two-Earner Households	518
14.3 Pay in the Military	523
14.4 Monopsony Power in the Market for Baseball Players	527
14.5 The Decline of Private Sector Unionism	533
15.1 The Value of Lost Earnings	540
15.2 The Yields on Corporate Bonds	545
15.3 Capital Investment in the Disposable Diaper Industry	554
15.4 Choosing an Air Conditioner	557
15.5 How Depletable are Depletable Resources?	561
16.1 The Interdependence of International Markets	575
16.2 The Effects of Automobile Import Quotas	599
16.3 The Costs and Benefits of Special Protection	600
17.1 Lemons in Major League Baseball	614
17.2 Reducing Moral Hazard—Warranties of Animal Health	622
17.3 Crisis in the Saving and Loan Industry	622
17.4 The Managers of Nonprofit Hospitals as Agents	626
17.5 Efficiency Wages at Ford Motor Company	635
18.1 The Costs and Benefits of Reduced Sulfur Dioxide Emissions	651
18.2 Emissions Trading and Clean Air	652
18.3 The Coase Theorem at Work	657
18.4 Crawfish Fishing in Louisiana	660
18.5 The Demand for Clean Air	665
A.1 The Demand for Coal	680