

Contents

Preface xiii

PART ONE: INDIVIDUAL DECISION MAKING 3

Chapter 1. Preference and Choice 5

1.A Introduction 5

1.B Preference Relations 6

1.C Choice Rules 9

1.D The Relationship between Preference Relations and Choice Rules 11

Exercises 15

Chapter 2. Consumer Choice 17

2.A Introduction 17

2.B Commodities 17

2.C The Consumption Set 18

2.D Competitive Budgets 20

2.E Demand Functions and Comparative Statics 23

2.F The Weak Axiom of Revealed Preference and the Law of Demand 28

Exercises 36

Chapter 3. Classical Demand Theory 40

3.A Introduction 40

3.B Preference Relations: Basic Properties 41

3.C Preference and Utility 46

3.D The Utility Maximization Problem 50

3.E The Expenditure Minimization Problem 57

3.F Duality: A Mathematical Introduction 63

3.G Relationships between Demand, Indirect Utility, and Expenditure Functions 67

3.H Integrability 75

3.I Welfare Evaluation of Economic Changes 80

3.J The Strong Axiom of Revealed Preference 91

Appendix A: Continuity and Differentiability Properties of Walrasian Demand 92

Exercises 96

Chapter 4. Aggregate Demand 105

4.A Introduction 105

4.B Aggregate Demand and Aggregate Wealth 106

4.C	Aggregate Demand and the Weak Axiom	109	
4.D	Aggregate Demand and the Existence of a Representative Consumer		116
	Appendix A: Regularizing Effects of Aggregation	122	
	Exercises	123	
Chapter 5.	Production	127	
5.A	Introduction	127	
5.B	Production Sets	128	
5.C	Profit Maximization and Cost Minimization	135	
5.D	The Geometry of Cost and Supply in the Single-Output Case		143
5.E	Aggregation	147	
5.F	Efficient Production	149	
5.G	Remarks on the Objectives of the Firm	152	
	Appendix A: The Linear Activity Model	154	
	Exercises	160	
Chapter 6.	Choice Under Uncertainty	167	
6.A	Introduction	167	
6.B	Expected Utility Theory	168	
6.C	Money Lotteries and Risk Aversion	183	
6.D	Comparison of Payoff Distributions in Terms of Return and Risk		194
6.E	State-dependent Utility	199	
6.F	Subjective Probability Theory	205	
	Exercises	208	
PART TWO:	GAME THEORY	217	
Chapter 7.	Basic Elements of Noncooperative Games	219	
7.A	Introduction	219	
7.B	What Is a Game?	219	
7.C	The Extensive Form Representation of a Game	221	
7.D	Strategies and the Normal Form Representation of a Game		228
7.E	Randomized Choices	231	
	Exercises	233	
Chapter 8.	Simultaneous-Move Games	235	
8.A	Introduction	235	
8.B	Dominant and Dominated Strategies	236	
8.C	Rationalizable Strategies	242	
8.D	Nash Equilibrium	246	
8.E	Games of Incomplete Information: Bayesian Nash Equilibrium		253
8.F	The Possibility of Mistakes: Trembling-Hand Perfection		258
	Appendix A: Existence of Nash Equilibrium	260	
	Exercises	262	

Chapter 9. Dynamic Games	267
9.A Introduction	267
9.B Sequential Rationality, Backward Induction, and Subgame Perfection	268
9.C Beliefs and Sequential Rationality	282
9.D Reasonable Beliefs and Forward Induction	292
Appendix A: Finite and Infinite Horizon Bilateral Bargaining	296
Appendix B: Extensive Form Trembling-Hand Perfect Nash Equilibrium	299
Exercises	301

PART THREE: MARKET EQUILIBRIUM AND MARKET FAILURE 307

Chapter 10. Competitive Markets 311

10.A Introduction	311
10.B Pareto Optimality and Competitive Equilibria	312
10.C Partial Equilibrium Competitive Analysis	316
10.D The Fundamental Welfare Theorems in a Partial Equilibrium Context	325
10.E Welfare Analysis in the Partial Equilibrium Model	328
10.F Free-Entry and Long-Run Competitive Equilibria	334
10.G Concluding Remarks on Partial Equilibrium Analysis	341
Exercises	344

Chapter 11. Externalities and Public Goods 350

11.A Introduction	350
11.B A Simple Bilateral Externality	351
11.C Public Goods	359
11.D Multilateral Externalities	364
11.E Private Information and Second-Best Solutions	368
Appendix A: Nonconvexities and the Theory of Externalities	374
Exercises	378

Chapter 12. Market Power 383

12.A Introduction	383
12.B Monopoly Pricing	384
12.C Static Models of Oligopoly	387
12.D Repeated Interaction	400
12.E Entry	405
12.F The Competitive Limit	411
12.G Strategic Precommitments to Affect Future Competition	414
Appendix A: Infinitely Repeated Games and the Folk Theorem	417
Appendix B: Strategic Entry Deterrence and Accommodation	423
Exercises	428

Chapter 13. Adverse Selection, Signaling, and Screening	436
13.A Introduction	436
13.B Informational Asymmetries and Adverse Selection	437
13.C Signaling	450
13.D Screening	460
Appendix A: Reasonable-Beliefs Refinements in Signaling Games	467
Exercises	473
Chapter 14. The Principal-Agent Problem	477
14.A Introduction	477
14.B Hidden Actions (Moral Hazard)	478
14.C Hidden Information (and Monopolistic Screening)	488
14.D Hidden Actions and Hidden Information: Hybrid Models	501
Appendix A: Multiple Effort Levels in the Hidden Action Model	502
Appendix B: A Formal Solution of the Principal-Agent Problem with Hidden Information	504
Exercises	507
PART FOUR: GENERAL EQUILIBRIUM	511
Chapter 15. General Equilibrium Theory: Some Examples	515
15.A Introduction	515
15.B Pure Exchange: The Edgeworth Box	515
15.C The One-Consumer, One-Producer Economy	525
15.D The 2×2 Production Model	529
15.E General Versus Partial Equilibrium Theory	538
Exercises	540
Chapter 16. Equilibrium and Its Basic Welfare Properties	545
16.A Introduction	545
16.B The Basic Model and Definitions	546
16.C The First Fundamental Theorem of Welfare Economics	549
16.D The Second Fundamental Theorem of Welfare Economics	551
16.E Pareto Optimality and Social Welfare Optima	558
16.F First-Order Conditions for Pareto Optimality	561
16.G Some Applications	566
Appendix A: Technical Properties of the Set of Feasible Allocations	573
Exercises	575
Chapter 17. The Positive Theory of Equilibrium	578
17.A Introduction	578
17.B Equilibrium: Definitions and Basic Equations	579
17.C Existence of Walrasian Equilibrium	584

17.D	Local Uniqueness and the Index Theorem	589
17.E	Anything Goes: The Sonnenschein–Mantel–Debreu Theorem	598
17.F	Uniqueness of Equilibria	606
17.G	Comparative Statics Analysis	616
17.H	Tâtonnement Stability	620
17.I	Large Economies and Nonconvexities	627
Appendix A: Characterizing Equilibrium through Welfare Equations		630
Appendix B: A General Approach to the Existence of Walrasian Equilibrium		632
Exercises		641

Chapter 18. Some Foundations for Competitive Equilibria 652

18.A	Introduction	652
18.B	Core and Equilibria	652
18.C	Noncooperative Foundations of Walrasian Equilibria	660
18.D	The Limits to Redistribution	665
18.E	Equilibrium and the Marginal Productivity Principle	670
Appendix A: Cooperative Game Theory		673
Exercises		684

Chapter 19. General Equilibrium Under Uncertainty 687

19.A	Introduction	687
19.B	A Market Economy with Contingent Commodities: Description	688
19.C	Arrow–Debreu Equilibrium	691
19.D	Sequential Trade	694
19.E	Asset Markets	699
19.F	Incomplete Markets	709
19.G	Firm Behavior in General Equilibrium Models Under Uncertainty	713
19.H	Imperfect Information	716
Exercises		725

Chapter 20. Equilibrium and Time 732

20.A	Introduction	732
20.B	Intertemporal Utility	733
20.C	Intertemporal Production and Efficiency	736
20.D	Equilibrium: The One-Consumer Case	743
20.E	Stationary Paths, Interest Rates, and Golden Rules	754
20.F	Dynamics	759
20.G	Equilibrium: Several Consumers	765
20.H	Overlapping Generations	769
20.I	Remarks on Nonequilibrium Dynamics: Tâtonnement and Learning	778
Exercises		782

Chapter 21. Social Choice Theory	789
21.A Introduction	789
21.B A Special Case: Social Preferences over Two Alternatives	790
21.C The General Case: Arrow's Impossibility Theorem	792
21.D Some Possibility Results: Restricted Domains	799
21.E Social Choice Functions	807
Exercises	812
Chapter 22. Elements of Welfare Economics and Axiomatic Bargaining	817
22.A Introduction	817
22.B Utility Possibility Sets	818
22.C Social Welfare Functions and Social Optima	825
22.D Invariance Properties of Social Welfare Functions	831
22.E The Axiomatic Bargaining Approach	838
22.F Coalitional Bargaining: The Shapley Value	846
Exercises	850
Chapter 23. Incentives and Mechanism Design	857
23.A Introduction	857
23.B The Mechanism Design Problem	858
23.C Dominant Strategy Implementation	869
23.D Bayesian Implementation	883
23.E Participation Constraints	891
23.F Optimal Bayesian Mechanisms	897
Appendix A: Implementation and Multiple Equilibria	910
Appendix B: Implementation in Environments with Complete Information	912
Exercises	918
MATHEMATICAL APPENDIX	926
M.A Matrix Notation for Derivatives	926
M.B Homogeneous Functions and Euler's Formula	928
M.C Concave and Quasiconcave Functions	930
M.D Matrices: Negative (Semi)Definiteness and Other Properties	935
M.E The Implicit Function Theorem	940
M.F Continuous Functions and Compact Sets	943
M.G Convex Sets and Separating Hyperplanes	946
M.H Correspondences	949
M.I Fixed Point Theorems	952
M.J Unconstrained Maximization	954
M.K Constrained Maximization	956
M.L The Envelope Theorem	964
M.M Linear Programming	966
M.N Dynamic Programming	969
Index	971