Contents

Preface	page x
Foreword by Evan Kwerel	xv
1 Getting to Work	0088 1
1.1 Politics Sets the Stage	3
1.2 Designing for Multiple Goals	3
1.2.1 Substitutes and Complements	6
1.2.2 New Zealand's Rights Auction	9
1.2.3 Better Auction Designs	13
1.2.4 The FCC Design and Its Progeny	13
1.3 Comparing Seller Revenues	16
1.4 The Academic Critics	19
1.4.1 Resale and the Coase Theorem	19
1.4.2 Mechanism Design Theory	21
1.4.3 Theory and Experiment	25
1.4.4 Practical Concerns	26
1.5 Plan for This Book	31
PART I THE MECHANISM DESIGN APPROACH	35
2 Vickrey-Clarke-Groves Mechanisms	45
2.1 Formulation	45
2.2 Always Optimal and Weakly Dominant Strategies	49
2.3 Balancing the Budget	53
2.4 Uniqueness	55
2.5 Disadvantages of the Vickrey Auction	56
2.5.1 Practical Disadvantages	56
2.5.2 Monotonicity Problems	57
2.5.3 The Merger–Investment Disadvantage	60
2.6 Conclusion	61

vii

3 The Envelope Theorem and Payoff Equivalence	64
3.1 Hotelling's Lemma	65
3.2 The Envelope Theorem in Integral Form	66
3.3 Quasi-linear Payoffs	69
3.3.1 Holmstrom's Lemma	70
3.3.2 The Green–Laffont–Holmstrom Theorem	71
3.3.3 Myerson's Lemma	73
3.3.4 Revenue Equivalence Theorems	75
3.3.5 The Myerson–Satterthwaite Theorem	77
3.3.6 The Jehiel–Moldovanu Impossibility Theorems	80
3.3.7 Myerson and Riley-Samuelson Revenue-Maximizing	
Auctions	84
3.3.8 The McAfee-McMillan Weak-Cartels Theorem	87
3.3.9 Sequential Auctions and Weber's Martingale Theorem	90
3.3.10 Matthews Theorem: Risk Averse Payoff Equivalence	91
3.4 Conclusion	94
gating for Multiple Code	
4 Bidding Equilibrium and Revenue Differences	00
4.1 The Single Crossing Conditions	98
4.1.1 The Monotonic Selection Theorem	99
4.1.2 The Sufficiency Theorem	101 102
4.1.3 The Constraint Simplification Theorem	
4.1.4 The Mirrlees–Spence Representation Theorem	105
4.2 Deriving and Verifying Equilibrium Strategies	106 110
4.2.1 The Second-Price Auction with a Reserve Price	
4.2.2 The Sealed Tender, or First-Price, Auction	111
4.2.3 The War of Attrition Auction	112 117
4.2.4 The All-Pay Auction	
4.3 Revenue Comparisons in the Benchmark Model	119
4.3.1 Payoff Equivalence without Revenue	119
Equivalence	121
4.3.2 Budget Constraints	132
4.3.3 Endogenous Quantities	135
4.3.4 Correlated Types	137
4.4 Expected-Revenue-Maximizing Auctions	140
4.4.1 Myerson's Theorem	140
4.4.2 Bulow–Klemperer Theorem	144
4.4.3 The Irregular Case	148
4.5 Auctions with Weak and Strong Bidders	148
4.6 Conclusion	154
	107

Contents	·

=	Interdependence of Types and Values	157
5	5.1 Which Models and Assumptions are "Useful"?	158
	5.1.1 Payoffs Depend Only on Bids and Types	158
	5.1.2 Types Are One-Dimensional and Values Are Private	159
	5.1.3 Types Are Statistically Independent	161
	5.2 Statistical Dependence and Revenue-Maximizing Auctions	162
	5.3 Wilson's Drainage Tract Model	166
	5.3.1 Equilibrium	167
	5.3.2 Profits and Revenues	173
	5.3.3 Bidder Information Policy	175
	5.3.4 Seller Information Policy	177
	5.4 Correlated Types and Interdependent Values	181
	5.4.1 Affiliation	182
	5.4.2 The Milgrom–Weber Ascending Auction Models	187
	5.4.2.1 The (Second-Price) Button Auction with Minimal	
	Information	188
	5.4.2.2 The Button Auction with Maximal Information	195
	5.4.2.3 Some Revenue Comparisons	198
	5.4.3 First-Price Auctions	200
	5.5 Conclusion	204
6	Auctions in Context	208
	6.1 The Profit and Surplus Contribution of an Entrant	214
	6.2 Symmetric Models with Costly Entry	216
	6.2.1 Symmetric Bidders and Uncoordinated Entry	218
	6.2.1.1 Equilibrium in Entry and Bidding Decisions	218
	6.2.1.2 Setting the Reserve Price	222
	6.2.2 Coordinating Entry among Symmetric Competitors	225
	6.2.2.1 Pre-qualifying Bidders	227
	6.2.2.2 Auctions, Negotiations, and Posted Prices	230
	6.2.2.3 Buy Prices	232
	6.3 Asymmetric Models: Devices to Promote Competition	234
	6.3.1 Example of Set-asides	235
	6.3.2 Example of Bidding Credits	237
	6.3.3 Example of Lot Structure and Consolation Prizes	238
	6.3.4 Premium Auctions	239
	6.3.5 Dutch vs. English Auctions and the Anglo-Dutch Design	241
	6.4 After the Bidding Ends	243
	6.4.1 Bankruptcy and Non-performance	243
	6.4.2 Scoring Rules vs. Price-Only Bids	245
	6.5 Conclusion	247

PART II MULTI-UNIT AUCTIONS	251
7 Uniform Price Auctions	255
7.1 Uniform Price Sealed-Bid Auctions	257
7.1.1 Demand Reduction	258
7.1.2 Low-Price Equilibria	262
7.2 Simultaneous Ascending Auctions	265
7.2.1 The Simultaneous Ascending Auction and the Walrasian	8,1
Tatonnement	268
7.2.2 Clock Auctions	279
7.2.3 Strategic Incentives in Uniform Price Auctions	284
7.2.3.1 The Basic Clock Auction Model	284
7.2.3.2 The Alternating-Move Clock Auction	287
7.2.3.3 Strategic Incentives with Elastic Supply	290
7.3 Conclusion	293
8 Package Auctions and Combinatorial Bidding	296
8.1 Vickrey Auctions and the Monotonicity Problems	302
8.1.1 Bidders' Vickrey Payoffs Bound Their Core Payoffs	305
8.1.2 Vickrey Auctions and the Entry Puzzle	305
8.1.3 When Are Vickrey Outcomes in the Core?	307
8.1.4 Substitute Goods and Core Outcomes	308
8.1.5 Substitute Goods and Vickrey Outcomes	312
8.2 Bernheim–Whinston First-Price Package Auctions	315
8.2.1 Formulation	316
8.2.2 Profit-Target Strategies	318
8.2.3 Equilibrium and the Core	319
8.3 Ausubel–Milgrom Ascending Proxy Auctions	324
8.3.1 The Proxy Auction with Unlimited Budgets	325
8.3.1.1 Proxy Outcomes Are Core Outcomes	326
8.3.1.2 Profit-Target Strategies and Equilibrium	327
8.3.1.3 The Proxy Auction When Goods Are Substitutes	329
8.3.2 The Non-transferable-Utility Proxy Auction	330
8.4 Conclusion	333
Bibliography	339
Author Index	347
Subject Index	351