CONTENTS OF VOLUME I

| intro | duction to the Series | , |
|---------|--|---------|
| Conte | ents of the Handbook | vi |
| Prefa | ce to the Handbook | х |
| PART | Γ 1 – DETERMINANTS OF FIRM AND MARKET ORGAN | IZATION |
| Chapte | r 1 | |
| Techr | nological Determinants of Firm and Industry Structure | |
| | C. PANZAR | 3 |
| 1. | Introduction | |
| 2. | | 2 |
| | 2.1. Economies of scale | 2 |
| | 2.2. Product specific economies of scale | 11 |
| | 2.3. Economies of scope | 15 |
| | 2.4. Cost subadditivity and natural monopoly | 23 |
| 3, | Industry configurations | 33 |
| | 3.1. Feasible and efficient single product industry configurations | 35 |
| | 3.2. Efficient multiproduct industry configurations | 38 |
| 4. | Empirical issues | 41 |
| | 4.1. Aggregation and the hedonic approach | 42 |
| | 4.2. Long-run and short-run measures of returns to scale | 45 |
| | 4.3. Empirical studies of electric power | 46 |
| | 4.4. Empirical studies of telecommunications | 51 |
| 5. | Concluding remarks | 56 |
| Biblio | graphy | 56 |
| Chapter | • 2 | |
| The T | heory of the Firm | |
| BENGT | R. HOLMSTROM AND JEAN TIROLE | 61 |
| 1. | Introduction | 63 |
| 2. | The limits of integration | 65 |
| | 2.1. Incomplete contracts | 66 |
| | 2.2. Information flows and incomplete contracts | 74 |

| xviii | Contents of Volume I |
|-------|----------------------|
|-------|----------------------|

| | 2.3. Reputation | 76 |
|---------|---|-----|
| | 2.4. Concluding remark | 78 |
| 3. | Capital structure | 78 |
| | 3.1. The incentive argument | 79 |
| | 3.2. The signalling argument | 82 |
| | 3.3. The control argument | 85 |
| | 3.4. Concluding remark | 86 |
| 4. | The separation of ownership and control | 86 |
| | 4.1. Internal discipline | 87 |
| | 4.2. Labor market discipline | 94 |
| | 4.3. Product market discipline | 95 |
| | 4.4. Capital market discipline | 97 |
| | 4.5. Implications for firm behavior | 101 |
| | 4.6. The hazards of a black-box view of the firm | 104 |
| | 4.7. Concluding remark | 105 |
| 5. | Internal hierarchies | 106 |
| | 5.1. Hierarchies as information systems | 107 |
| | 5.2. Supervision in hierarchies | 110 |
| | 5.3. Hierarchies as incentive structures | 114 |
| | 5.4. Hierarchies as internal labor markets | 117 |
| | 5.5. The hierarchy as a nexus of contracts | 120 |
| | 5.6. The hierarchy as an authority structure | 123 |
| | 5.7. Organizational forms | 125 |
| 6. | Conclusion | 126 |
| Refere | nces | 127 |
| Chapter | 3 | |
| Transa | action Cost Economics | |
| OLIVE | R E. WILLIAMSON | 135 |
| 1. | Introduction | 136 |
| 2. | Background | 137 |
| | 2.1. Main case | 137 |
| | 2.2. Behavioral assumptions | 138 |
| | 2.3. Legal centralism versus private ordering | 140 |
| 3. | Operationalizing transaction cost economics | 141 |
| | 3.1. The technology of transacting | 142 |
| | 3.2. A simple contractual schema | 145 |
| | 3.3. The measurement branch | 149 |
| 4. | The paradigm problem: Vertical integration | 150 |
| | 4.1. A heuristic model | 150 |
| | 4.2. A combined neoclassical-transaction cost treatment | 155 |

| 5. Other applications 159 5.1. Nonstandard commercial contracting 159 5.2. Economics of the family 164 5.3. Corporate finance 167 5.4. The modern corporation 170 6. The evidence 172 7. Public policy ramifications 174 7.1. Microeconomics 175 7.2. Macroeconomics: Stagflation 177 8. Conclusions 178 Chapter 4 Vertical Integration: Determinants and Effects MARTIN K. PERRY 1. Introduction 185 1.1. What is vertical integration? 185 1.2. Determinants of vertical integration 187 1.3. Outline 189 2. Monopoly and monopsony 190 2.1. Monopoly and price discrimination 192 2.2. Monopoly and price discrimination 192 2.3. Monopolysitic competition 196 3. Monopolistic competition 199 3.1. Monopolistic competition at the retail stage 200 3.2. Monopolistic competition and externalities at the retail stage 203 4. Uncertainty and information 2 | Conten | ts of Volume I | xix |
|--|--------|--|-----|
| 5.1. Nonstandard commercial contracting 159 5.2. Economics of the family 164 5.3. Corporate finance 167 5.4. The modern corporation 170 6. The evidence 172 7. Public policy ramifications 174 7.1. Microeconomics 175 7.2. Macroeconomics: Stagflation 177 8. Conclusions 178 Chapter 4 Vertical Integration: Determinants and Effects MARTIN K. PERRY 1. Introduction 185 1.1. What is vertical integration? 185 1.2. Determinants of vertical integration 187 1.3. Outline 189 2. Monopoly and monopsony 190 2.1. Monopoly and variable proportions 191 2.2. Monopoly and variable proportions 191 2.3. Monopolistic competition 192 2.3. Monopolistic competition 196 3. Monopolistic competition at the retail stage 200 3.2. Monopolistic competition at the retail stage 203 4. Uncertainty and information 205 4.2. Rationing and assurance of supply 206 | 5. | Other applications | 150 |
| 5.2. Economics of the family 164 5.3. Corporate finance 167 5.4. The modern corporation 170 6. The evidence 172 7. Public policy ramifications 174 7.1. Microeconomics 175 7.2. Macroeconomics: Stagflation 177 8. Conclusions 178 References Chapter 4 Vertical Integration: Determinants and Effects MARTIN K. PERRY 1. Introduction 185 1.1. What is vertical integration? 185 1.2. Determinants of vertical integration 187 1.3. Outline 189 2. Monopoly and monopsony 190 2.1. Monopoly and variable proportions 191 2.2. Monopoly and price discrimination 192 2.3. Monopoly and price discrimination 192 2.3. Monopoly and price discrimination 192 2.3. Monopoly and price discrimination 192 3. Monopolistic competition 199 3.1. Monopolistic competition and externalities at the retail stage 203 4. Uncertainty and information 205 | | | |
| 5.3. Corporate finance 167 5.4. The modern corporation 170 6. The evidence 172 7. Public policy ramifications 174 7.1. Microeconomics 175 7.2. Macroeconomics: Stagflation 177 8. Conclusions 178 References Chapter 4 Vertical Integration: Determinants and Effects MARTIN K. PERRY 1. Introduction 185 1.1. What is vertical integration? 185 1.2. Determinants of vertical integration 187 1.3. Outline 189 2. Monopoly and monopsony 190 2.1. Monopoly and variable proportions 191 2.2. Monopoly and price discrimination 192 2.3. Monopolistic competition 199 3.1. Monopolistic competition at the retail stage 200 3.2. Monopolistic competition at the retail stage 203 4. Uncertainty and information 205 4.1. Diversification 205 4.2. Rationing and assurance of supply 206 4.3. Information and agency problems 208 | | | |
| 5.4. The modern corporation 170 6. The evidence 172 7. Public policy ramifications 174 7.1. Microeconomics 175 7.2. Macroeconomics: Stagflation 177 8. Conclusions 178 Chapter 4 Vertical Integration: Determinants and Effects MARTIN K. PERRY 183 1. Introduction 185 1.1. What is vertical integration? 185 1.2. Determinants of vertical integration 187 1.3. Outline 189 2. Monopoly and monopsony 190 2.1. Monopoly and variable proportions 191 2.2. Monopoly and price discrimination 192 2.3. Monoposony and backward integration 196 3. Monopolistic competition 199 3.1. Monopolistic competition at the retail stage 200 3.2. Monopolistic competition and externalities at the retail stage 203 4. Uncertainty and information 205 4.1. Diversification 205 4.2. Rationing and assurance of supply 206 4.3. Information and agency problems 208 4.4. | | 5.3. Corporate finance | |
| 6. The evidence 172 7. Public policy ramifications 174 7.1. Microeconomics 175 7.2. Macroeconomics: Stagflation 177 8. Conclusions 178 References Chapter 4 Vertical Integration: Determinants and Effects MARTIN K. PERRY 183 1. Introduction 185 1.1. What is vertical integration? 185 1.2. Determinants of vertical integration 187 1.3. Outline 189 2. Monopoly and monopsony 190 2.1. Monopoly and variable proportions 191 2.2. Monopoly and variable proportions 191 2.3. Monopolistic competition 192 3. Monopolistic competition 199 3.1. Monopolistic competition at the retail stage 200 3.2. Monopolistic competition and externalities at the retail stage 203 4. Uncertainty and information 205 4.1. Diversification 205 4.2. Rationing and assurance of supply 206 4.3. Information and agency problems 208 4.4. Prices versus quantities | | 5.4. The modern corporation | |
| 7. Public policy ramifications 174 7.1. Microeconomics 175 7.2. Macroeconomics: Stagflation 177 8. Conclusions 178 References Chapter 4 Vertical Integration: Determinants and Effects MARTIN K. PERRY 1. Introduction 185 1.1. What is vertical integration? 185 1.2. Determinants of vertical integration 187 1.3. Outline 189 2. Monopoly and monopsony 190 2.1. Monopoly and variable proportions 191 2.2. Monopoly and price discrimination 192 2.3. Monopolistic competition 192 3. Monopolistic competition 199 3.1. Monopolistic competition and externalities at the retail stage 200 3.2. Monopolistic competition and externalities at the retail stage 203 4. Uncertainty and information 205 4.1. Diversification 205 4.2. Rationing and assurance of supply 206 4.3. Information and agency problems 208 4.4. Prices versus quantities <td>6.</td> <td></td> <td></td> | 6. | | |
| 7.1. Microeconomics 175 7.2. Macroeconomics: Stagflation 177 8. Conclusions 178 References 178 Chapter 4 Vertical Integration: Determinants and Effects MARTIN K. PERRY 1. Introduction 185 1.1. What is vertical integration? 185 1.2. Determinants of vertical integration 187 1.3. Outline 189 2. Monopoly and monopsony 190 2.1. Monopoly and variable proportions 191 2.2. Monopoly and price discrimination 192 2.3. Monopolistic competition 199 3.1. Monopolistic competition at the retail stage 200 3.2. Monopolistic competition at the retail stage 200 3.2. Monopolistic competition and externalities at the retail stage 203 4. Uncertainty and information 205 4.1. Diversification 205 4.2. Rationing and assurance of supply 206 4.3. Information and agency problems 208 4.4. Prices versus quantities 211 5. Transaction cost economics 212 5.1. Asset speci | 7. | Public policy ramifications | |
| 7.2. Macroeconomics: Stagflation 1778 8. Conclusions 178 References 178 Chapter 4 Vertical Integration: Determinants and Effects MARTIN K. PERRY 183 1. Introduction 185 1.1. What is vertical integration? 185 1.2. Determinants of vertical integration 187 1.3. Outline 189 2. Monopoly and monopsony 190 2.1. Monopoly and variable proportions 191 2.2. Monopoly and backward integration 192 2.3. Monopolistic competition 199 3.1. Monopolistic competition at the retail stage 200 3.2. Monopolistic competition and externalities at the retail stage 203 4. Uncertainty and information 205 4.1. Diversification 205 4.2. Rationing and assurance of supply 206 4.3. Information and agency problems 208 4.4. Prices versus quantities 211 5. Transaction cost economics 212 5.1. Asset specificity 213 5.2. | | 7.1. Microeconomics | |
| 8. Conclusions 178 Chapter 4 Vertical Integration: Determinants and Effects MARTIN K. PERRY 1. Introduction 185 1.1. What is vertical integration? 185 1.2. Determinants of vertical integration 187 1.3. Outline 189 2. Monopoly and monopsony 190 2.1. Monopoly and variable proportions 191 2.2. Monopoly and price discrimination 192 2.3. Monopolistic competition 199 3. Monopolistic competition at the retail stage 200 3.2. Monopolistic competition at the retail stage 203 4. Uncertainty and information 205 4.1. Diversification 205 4.2. Rationing and assurance of supply 206 4.3. Information and agency problems 206 4.4. Prices versus quantities 211 5. Transaction cost economics 212 5.1. Asset specificity 213 5.2. Evidence 215 5.3. Cases from business history 219 6. Incomplete contracts 221 6.1. Contract law 221 | | 7.2. Macroeconomics: Stagflation | |
| Chapter 4 Vertical Integration: Determinants and Effects MARTIN K. PERRY 183 1. Introduction 185 1.1. What is vertical integration? 185 1.2. Determinants of vertical integration 187 1.3. Outline 189 2. Monopoly and monopsony 190 2.1. Monopoly and variable proportions 191 2.2. Monopoly and price discrimination 192 2.3. Monopolistic competition 199 3. Monopolistic competition at the retail stage 200 3.2. Monopolistic competition at the retail stage 200 3.2. Monopolistic competition and externalities at the retail stage 203 4. Uncertainty and information 205 4.1. Diversification 205 4.2. Rationing and assurance of supply 206 4.3. Information and agency problems 208 4.4. Prices versus quantities 211 5. Transaction cost economics 212 5.1. Asset specificity 213 5.2. Evidence 215 5.3. Cases from business history 219 6. Incomplete contracts | 8. | Conclusions | |
| Vertical Integration: Determinants and Effects MARTIN K. PERRY 183 1. Introduction 185 1.1. What is vertical integration? 185 1.2. Determinants of vertical integration 187 1.3. Outline 189 2. Monopoly and monopsony 190 2.1. Monopoly and variable proportions 191 2.2. Monopoly and price discrimination 192 2.3. Monopsony and backward integration 196 3. Monopolistic competition 199 3.1. Monopolistic competition at the retail stage 200 3.2. Monopolistic competition and externalities at the retail stage 203 4. Uncertainty and information 205 4.1. Diversification 205 4.2. Rationing and assurance of supply 206 4.3. Information and agency problems 208 4.4. Prices versus quantities 211 5. Transaction cost economics 211 5.1. Asset specificity 213 5.2. Evidence 215 5.3. Cases from business history 219 6. Incomplete contracts 224 | Refer | ences | 178 |
| MARTIN K. PERRY 185 1. Introduction 185 1.1. What is vertical integration? 185 1.2. Determinants of vertical integration 187 1.3. Outline 189 2. Monopoly and monopsony 190 2.1. Monopoly and variable proportions 191 2.2. Monopoly and price discrimination 192 2.3. Monopsony and backward integration 196 3. Monopolistic competition 199 3.1. Monopolistic competition at the retail stage 200 3.2. Monopolistic competition and externalities at the retail stage 203 4. Uncertainty and information 205 4.1. Diversification 205 4.2. Rationing and assurance of supply 206 4.3. Information and agency problems 208 4.4. Prices versus quantities 211 5. Transaction cost economics 212 5.1. Asset specificity 213 5.2. Evidence 215 5.3. Cases from business history 219 6. Incomplete contracts 221 6.2. Models of incomplete contracts 224 7. Vertical equilibrium 229 <td>Chapte</td> <td>er 4</td> <td></td> | Chapte | er 4 | |
| MARTIN K. PERRY 185 1. Introduction 185 1.1. What is vertical integration? 185 1.2. Determinants of vertical integration 187 1.3. Outline 189 2. Monopoly and monopsony 190 2.1. Monopoly and variable proportions 191 2.2. Monopoly and price discrimination 192 2.3. Monopsony and backward integration 196 3. Monopolistic competition 199 3.1. Monopolistic competition at the retail stage 200 3.2. Monopolistic competition and externalities at the retail stage 203 4. Uncertainty and information 205 4.1. Diversification 205 4.2. Rationing and assurance of supply 206 4.3. Information and agency problems 208 4.4. Prices versus quantities 211 5. Transaction cost economics 212 5.1. Asset specificity 213 5.2. Evidence 215 5.3. Cases from business history 219 6. Incomplete contracts 221 6.2. Models of incomplete contracts 224 7. Vertical equilibrium 229 <td>Vertic</td> <td>cal Integration: Determinants and Effects</td> <td></td> | Vertic | cal Integration: Determinants and Effects | |
| 1. Introduction 185 1.1. What is vertical integration? 185 1.2. Determinants of vertical integration 187 1.3. Outline 189 2. Monopoly and monopsony 190 2.1. Monopoly and variable proportions 191 2.2. Monopoly and price discrimination 192 2.3. Monopsony and backward integration 196 3. Monopolistic competition 199 3.1. Monopolistic competition at the retail stage 200 3.2. Monopolistic competition and externalities at the retail stage 203 4. Uncertainty and information 205 4.1. Diversification 205 4.2. Rationing and assurance of supply 206 4.3. Information and agency problems 208 4.4. Prices versus quantities 211 5. Transaction cost economics 212 5.1. Asset specificity 213 5.2. Evidence 215 5.3. Cases from business history 219 6. Incomplete contracts 221 6.1. Contract law 221 6.2. Models of incomplete contracts 224 7. Vertical equilibrium 229 <td></td> <td></td> <td>183</td> | | | 183 |
| 1.1. What is vertical integration? 1.2. Determinants of vertical integration 1.3. Outline 1.4. Monopoly and monopsony 2.1. Monopoly and price discrimination 2.2. Monopoly and price discrimination 2.3. Monopolistic competition 3. Monopolistic competition 3.1. Monopolistic competition at the retail stage 3.2. Monopolistic competition and externalities at the retail stage 4. Uncertainty and information 2.05 4.1. Diversification 2.05 4.2. Rationing and assurance of supply 4.3. Information and agency problems 4.4. Prices versus quantities 5. Transaction cost economics 2.1. Asset specificity 2.1. Asset specificity 2.2. Evidence 2.3. Cases from business history 6. Incomplete contracts 6.1. Contract law 6.2. Models of incomplete contracts 7. Vertical equilibrium 229 7.1. Vertical equilibrium 229 7.1. Vertical equilibrium 229 | 1. | Introduction | |
| 1.2. Determinants of vertical integration 187 1.3. Outline 189 2. Monopoly and monopsony 190 2.1. Monopoly and variable proportions 191 2.2. Monopoly and price discrimination 192 2.3. Monopsony and backward integration 196 3. Monopolistic competition 199 3.1. Monopolistic competition at the retail stage 200 3.2. Monopolistic competition and externalities at the retail stage 203 4. Uncertainty and information 205 4.1. Diversification 205 4.2. Rationing and assurance of supply 206 4.3. Information and agency problems 208 4.4. Prices versus quantities 211 5. Transaction cost economics 212 5.1. Asset specificity 213 5.2. Evidence 215 5.3. Cases from business history 219 6. Incomplete contracts 221 6.1. Contract law 221 6.2. Models of incomplete contracts 224 7. Vertical equilibrium 229 7.1. Vertical equilibrium 229 | | ··· | |
| 1.3. Outline 2. Monopoly and monopsony 2.1. Monopoly and variable proportions 2.2. Monopoly and price discrimination 2.3. Monopsony and backward integration 3. Monopolistic competition 3.1. Monopolistic competition at the retail stage 3.2. Monopolistic competition and externalities at the retail stage 4. Uncertainty and information 4.1. Diversification 4.2. Rationing and assurance of supply 4.3. Information and agency problems 4.4. Prices versus quantities 5. Transaction cost economics 5.1. Asset specificity 5.2. Evidence 5.3. Cases from business history 6. Incomplete contracts 6.1. Contract law 6.2. Models of incomplete contracts 7. Vertical equilibrium 229 7.1. Vertical equilibrium 229 7.1. Vertical equilibrium 229 | | | |
| 2. Monopoly and monopsony 2.1. Monopoly and variable proportions 2.2. Monopoly and price discrimination 2.3. Monopsony and backward integration 3. Monopolistic competition 3.1. Monopolistic competition at the retail stage 3.2. Monopolistic competition and externalities at the retail stage 4. Uncertainty and information 205 4.1. Diversification 4.2. Rationing and assurance of supply 4.3. Information and agency problems 4.4. Prices versus quantities 208 4.4. Prices versus quantities 211 5. Transaction cost economics 212 5.1. Asset specificity 213 5.2. Evidence 215 5.3. Cases from business history 219 6. Incomplete contracts 6.1. Contract law 221 6.2. Models of incomplete contracts 7. Vertical equilibrium 229 7.1. Vertical equilibrium 229 7.1. Vertical equilibrium 229 | | The state of the s | |
| 2.1. Monopoly and variable proportions 191 2.2. Monopoly and price discrimination 192 2.3. Monopsony and backward integration 196 3. Monopolistic competition 199 3.1. Monopolistic competition at the retail stage 200 3.2. Monopolistic competition and externalities at the retail stage 203 4. Uncertainty and information 205 4.1. Diversification 205 4.2. Rationing and assurance of supply 206 4.3. Information and agency problems 208 4.4. Prices versus quantities 211 5. Transaction cost economics 212 5.1. Asset specificity 213 5.2. Evidence 215 5.3. Cases from business history 219 6. Incomplete contracts 221 6.1. Contract law 221 6.2. Models of incomplete contracts 224 7. Vertical equilibrium 229 7.1. Vertical equilibrium 229 | 2. | Monopoly and monopsony | |
| 2.2. Monopoly and price discrimination 192 2.3. Monopoly and backward integration 196 3. Monopolistic competition 199 3.1. Monopolistic competition at the retail stage 200 3.2. Monopolistic competition and externalities at the retail stage 203 4. Uncertainty and information 205 4.1. Diversification 205 4.2. Rationing and assurance of supply 206 4.3. Information and agency problems 208 4.4. Prices versus quantities 211 5. Transaction cost economics 212 5.1. Asset specificity 213 5.2. Evidence 215 5.3. Cases from business history 219 6. Incomplete contracts 221 6.2. Models of incomplete contracts 221 6.2. Models of incomplete contracts 224 7. Vertical equilibrium 229 7.1. Vertical equilibrium 229 | | 1 J | |
| 2.3. Monopsony and backward integration 196 3. Monopolistic competition 199 3.1. Monopolistic competition at the retail stage 200 3.2. Monopolistic competition and externalities at the retail stage 203 4. Uncertainty and information 205 4.1. Diversification 205 4.2. Rationing and assurance of supply 206 4.3. Information and agency problems 208 4.4. Prices versus quantities 211 5. Transaction cost economics 212 5.1. Asset specificity 213 5.2. Evidence 215 5.3. Cases from business history 219 6. Incomplete contracts 221 6.2. Models of incomplete contracts 221 6.2. Models of incomplete contracts 224 7. Vertical equilibrium 229 7.1. Vertical equilibrium 229 | | | |
| 3. Monopolistic competition 3.1. Monopolistic competition at the retail stage 3.2. Monopolistic competition and externalities at the retail stage 4. Uncertainty and information 4.1. Diversification 4.2. Rationing and assurance of supply 4.3. Information and agency problems 4.4. Prices versus quantities 5. Transaction cost economics 5.1. Asset specificity 5.2. Evidence 5.3. Cases from business history 6. Incomplete contracts 6.1. Contract law 6.2. Models of incomplete contracts 7. Vertical equilibrium 7.1. Vertical equilibrium 7.1. Vertical equilibrium 7.200 200 201 202 203 203 204 205 205 205 206 207 208 208 208 209 208 209 209 209 209 209 209 209 209 200 200 | | 1 7 1 | |
| 3.1. Monopolistic competition at the retail stage 3.2. Monopolistic competition and externalities at the retail stage 4. Uncertainty and information 4.1. Diversification 4.2. Rationing and assurance of supply 4.3. Information and agency problems 4.4. Prices versus quantities 5. Transaction cost economics 5.1. Asset specificity 5.2. Evidence 5.3. Cases from business history 6. Incomplete contracts 6.1. Contract law 6.2. Models of incomplete contracts 7. Vertical equilibrium 7.1. Vertical equilibrium 209 | 3. | | |
| 3.2. Monopolistic competition and externalities at the retail stage 4. Uncertainty and information 4.1. Diversification 4.2. Rationing and assurance of supply 4.3. Information and agency problems 4.4. Prices versus quantities 5. Transaction cost economics 5.1. Asset specificity 5.2. Evidence 5.3. Cases from business history 6. Incomplete contracts 6.1. Contract law 6.2. Models of incomplete contracts 7. Vertical equilibrium 7.1. Vertical equilibrium 203 205 205 206 207 208 208 208 208 208 209 209 209 | | | |
| 4. Uncertainty and information 205 4.1. Diversification 205 4.2. Rationing and assurance of supply 206 4.3. Information and agency problems 208 4.4. Prices versus quantities 211 5. Transaction cost economics 212 5.1. Asset specificity 213 5.2. Evidence 215 5.3. Cases from business history 219 6. Incomplete contracts 221 6.1. Contract law 221 6.2. Models of incomplete contracts 224 7. Vertical equilibrium 229 7.1. Vertical equilibrium 229 | | | |
| 4.1. Diversification 205 4.2. Rationing and assurance of supply 206 4.3. Information and agency problems 208 4.4. Prices versus quantities 211 5. Transaction cost economics 212 5.1. Asset specificity 213 5.2. Evidence 215 5.3. Cases from business history 219 6. Incomplete contracts 221 6.1. Contract law 221 6.2. Models of incomplete contracts 224 7. Vertical equilibrium 229 7.1. Vertical equilibrium 229 | 4. | | |
| 4.2. Rationing and assurance of supply 206 4.3. Information and agency problems 208 4.4. Prices versus quantities 211 5. Transaction cost economics 212 5.1. Asset specificity 213 5.2. Evidence 215 5.3. Cases from business history 219 6. Incomplete contracts 221 6.1. Contract law 221 6.2. Models of incomplete contracts 224 7. Vertical equilibrium 229 7.1. Vertical equilibrium 229 | | · · · · · · · · · · · · · · · · · · · | |
| 4.3. Information and agency problems 208 4.4. Prices versus quantities 211 5. Transaction cost economics 212 5.1. Asset specificity 213 5.2. Evidence 215 5.3. Cases from business history 219 6. Incomplete contracts 221 6.1. Contract law 221 6.2. Models of incomplete contracts 224 7. Vertical equilibrium 229 7.1. Vertical equilibrium 229 | | 4.2. Rationing and assurance of supply | |
| 4.4. Prices versus quantities 211 5. Transaction cost economics 212 5.1. Asset specificity 213 5.2. Evidence 215 5.3. Cases from business history 219 6. Incomplete contracts 221 6.1. Contract law 221 6.2. Models of incomplete contracts 224 7. Vertical equilibrium 229 7.1. Vertical equilibrium 229 | | | |
| 5. Transaction cost economics 212 5.1. Asset specificity 213 5.2. Evidence 215 5.3. Cases from business history 219 6. Incomplete contracts 221 6.1. Contract law 221 6.2. Models of incomplete contracts 224 7. Vertical equilibrium 229 7.1. Vertical equilibrium 229 | | | |
| 5.1. Asset specificity 213 5.2. Evidence 215 5.3. Cases from business history 219 6. Incomplete contracts 221 6.1. Contract law 221 6.2. Models of incomplete contracts 224 7. Vertical equilibrium 229 7.1. Vertical equilibrium 229 | 5. | Transaction cost economics | |
| 5.2. Evidence 215 5.3. Cases from business history 219 6. Incomplete contracts 221 6.1. Contract law 221 6.2. Models of incomplete contracts 224 7. Vertical equilibrium 229 7.1. Vertical equilibrium 229 | | | |
| 5.3. Cases from business history 219 6. Incomplete contracts 221 6.1. Contract law 221 6.2. Models of incomplete contracts 224 7. Vertical equilibrium 229 7.1. Vertical equilibrium 229 | | | |
| 6. Incomplete contracts 221 6.1. Contract law 221 6.2. Models of incomplete contracts 224 7. Vertical equilibrium 229 7.1. Vertical equilibrium 229 | | 5.3. Cases from business history | |
| 6.1. Contract law 221 6.2. Models of incomplete contracts 224 7. Vertical equilibrium 229 7.1. Vertical equilibrium 229 | 6. | • | |
| 6.2. Models of incomplete contracts 7. Vertical equilibrium 7.1. Vertical equilibrium 229 221 224 229 | | | |
| 7. Vertical equilibrium 229 7.1. Vertical equilibrium 229 | | | |
| 7.1. Vertical equilibrium 229 | 7. | · · · · · · · · · · · · · · · · · · · | |
| | | | |
| | | | |

| | 7.3. The Stigler model | 231 |
|--------|---|------------------------|
| | 7.4. Models with demand fluctuations | 234 |
| 8. | Measurement and trends | 236 |
| | 8.1. Input measures | 236 |
| | 8.2. Measures and trends in the twentieth century | 237 |
| | 8.3. Trends prior to the twentieth century | 239 |
| 9. | Public policy | 241 |
| | 9.1. Section 2 of the Sherman Act | 242 |
| | 9.2. Section 7 of the Clayton Act | 244 |
| | 9.3. Public policy in the United Kingdom and the European Economic | 214 |
| _ | Community | 247 |
| Refer | ences | 250 |
| | | 200 |
| DADT | ANIAINGIG OFFICE | |
| PAK | 2 - ANALYSIS OF MARKET BEHAVIOR | |
| Chapte | | |
| Nonc | poperative Game Theory for Industrial Organization: | |
| An In | troduction and Overview | |
| DREW | FUDENBERG AND JEAN TIROLE | 259 |
| 1. | Introduction | |
| | Games, strategies, and equilibria | 261 |
| | 2.1. The extensive and normal forms | 261 |
| | 2.2. Nash equilibrium | 261 |
| | 2.3. Existence of Nash equilibria | 265 |
| | 2.4. Correlated equilibria | 269 |
| | 2.5. Coalition-proof equilibria and strong equilibria | 272 |
| 3. | Dynamic games of complete information | 275 |
| | 3.1. Subgame perfection | 276 |
| | 3.2. Repeated games and "implicit collusion" | 276 |
| | 3.3. Continuous-time games | 278 |
| | 3.4. State-space or Markov equilibria | 288 |
| | 3.5. Games of timing | 289 292 |
| | 3.6. Discrete vs. continuous time, and the role of period length | 292 |
| | 3.7. Open-loop equilibria | 293 296 |
| 4. | Static games of incomplete and imperfect information | 296 296 |
| | 4.1. Bayesian games and Bayesian equilibrium | 296 |
| | 4.2. Using Bayesian equilibria to justify mixed strategy equilibria | |
| 5. | Dynamic games of incomplete information | 302 304 |
| | 5.1. The basic signalling game | 30 4 305 |
| | 5.2. Examples | 306 |
| | 5.3. Some refinements | 311 |
| | 5.4. Finite games: Existence and refinements in finite games | 315 |
| | 5.5. Perturbed games and robust equilibria | 320 |
| | - | 320 |

| Conten | ts of Volume I | xxi |
|---------|---|-------------|
| 6. | Concluding remark | 322 |
| Refer | ences | 323 |
| | | 020 |
| Chapte | er 6 | |
| Theo | ries of Oligopoly Behavior | |
| CARL | SHAPIRO | 329 |
| 1. | Introduction | 330 |
| 2. | Static oligopoly theory | 333 |
| | 2.1. Cournot oligopoly: Competition in outputs | 333 |
| | 2.2. Bertrand oligopoly: Competition in prices | 343 |
| | 2.3. Cournot vs. Bertrand | 348 |
| | 2.4. Can there be reactions in a static model? | 352 |
| 3. | Repeated oligopoly games | 356 |
| | 3.1. Finitely repeated oligopoly games | 357 |
| | 3.2. Infinitely repeated oligopoly games: Supergames | 361 |
| 4. | Two-stage competition | 381 |
| | 4.1. A simple model of two-stage competition | 383 |
| | 4.2. Welfare effects of strategic behavior | 386 |
| | 4.3. Taxonomy of strategic behavior | 388 |
| | 4.4. Examples of two-period models | 389 |
| 5. | Dynamic rivalry | 397 |
| | 5.1. What makes for dynamics? | 397 |
| | 5.2. The state-space approach to dynamic oligopoly models | 398 |
| | 5.3. Pricing and quantity games | 400 |
| | 5.4. Investment games | 403 |
| | 5.5. Intangible state variables | 405 |
| _ | 5.6. Simple state-space games | 407 |
| 6. | Conclusions | 408 |
| Refere | ences | 410 |
| | | |
| Chapter | | |
| | s, Collusion, and Horizontal Merger | |
| ALEXIS | S JACQUEMIN AND MARGARET E. SLADE | 415 |
| 1. | Introduction | 416 |
| 2. | Factors that facilitate or hinder collusion | 417 |
| | 2.1. Reaching an agreement | 417 |
| | 2.2. Incentives to cheat | 420 |
| | 2.3. Detection | 42 1 |
| • | 2.4. Prevention | 422 |
| • | 2.5. Evidence | 423 |
| 3. | Types and extent of horizontal collusion | 424 |
| | 3.1. Explicit agreement | 424 |
| | 3.2. Tacit collusion | <i>44</i> 1 |

| xxii | | |
|---------|---|----------------------|
| XXII | | Contents of Volume 1 |
| 4. | Collusion, public interest, and government policy | 450 |
| | 4.1. Identifying collusion | 450 |
| | 4.2. Collusion and restriction of competition | 451 |
| | 4.3. Efficiency tradeoffs | 453 |
| | 4.4. Industrial policy | 459 |
| Refere | ences | 463 |
| | | 466 |
| Ch | | |
| Chapter | | |
| MODII | ity Barriers and the Value of Incumbency | |
| | RD J. GILBERT | 475 |
| 1. | Introduction | |
| 2. | Determinants of the conditions of entry | 476 |
| | 2.1. Scale economies, sunk costs, and limit pricing | 480 |
| | 2.2. Absolute cost advantages | 480 |
| | 2.3. Product differentiation | 493 |
| 3. | Fat cats and puppy dogs | 503 |
| 4. | Entry, dynamics, and industry structure | 509 |
| | 4.1. Dynamic limit pricing | 510 |
| | 4.2. Multiple incumbents and entrants | 511 |
| _ | E | 515 |

515 520

523

526

528

530

| | | 531 |
|----------------------|---|---|
| Chapter Preda | tion, Monopolization, and Antitrust | |
| JANUS 1. | SZ A. ORDOVER AND GARTH SALONER Introduction | 537 |
| 2. 3. 4. 5. | Framework for economic analysis of dominant firm conduct Pricing and nonpricing models of anticompetitive behavior 3.1. Predatory pricing 3.2. Nonprice conduct aimed at eliminating competitors Putting rivals at a disadvantage Government facilitation of anticompetitive behavior 5.1. Anticompetitive practices and a regulated firm 5.2. Anticompetitive uses of the political and legal process 5.3. Anticompetitive practices in an open economy | 538 540 545 545 562 565 570 571 573 |

5. Exit barriers and asset specificity

7. Contestable markets

9. Concluding remarks

References

6. The role of information in entry deterrence

8. Mobility barriers and economic performance

| Content | s of Volume I | |
|---------|--|-------|
| 001000 | , of toward I | xxiii |
| 6. | Tests of anticompetitive behavior | 579 |
| 7. | Conclusions | 590 |
| Refere | ences | 592 |
| Chapter | r 10 | |
| Price | Discrimination | |
| HAL R | . VARIAN | 597 |
| 1. | Introduction | 598 |
| 2. | Theory | 600 |
| | 2.1. Types of price discrimination | 600 |
| | 2.2. First-degree price discrimination | 601 |
| | 2.3. Second-degree price discrimination | 611 |
| | 2.4. Third-degree price discrimination | 617 |
| | 2.5. Defining the market | 624 |
| | 2.6. Bundling | 626 |
| 3. | Applications | 630 |
| | 3.1. Spatial price discrimination | 631 |
| | 3.2. Intertemporal discrimination | 632 |
| | 3.3. Vertical integration and price discrimination | 636 |
| | 3.4. Imperfect information | 637 |
| | 3.5. Quality differences | 640 |
| | 3.6. Monopolistic competition | 641 |
| | 3.7. Legal aspects of price discrimination | 643 |
| 4. | Summary | 646 |
| Bibliog | graphy | 647 |
| Chapter | 11 | |
| | al Contractual Relations | |
| MICHA | EL L. KATZ | 655 |
| 1. | Introduction | 656 |
| 2. | Private incentives: A single manufacturer with a single dealer | 661 |
| 2. | 2.1. The basic model | 661 |
| | 2.2. The use of the price system | 664 |
| | 2.3. The need for more sophisticated contracts | 672 |
| 3. | Private incentives: A single manufacturer with many dealers | 677 |
| | 3.1. Externalities across dealers | 678 |
| | 3.2. A new control instrument | 689 |
| | 3.3. The number of dealers | 693 |
| 4. | Private incentives: Multiple manufacturers | 696 |
| | 4.1. Free riding across manufacturers | 696 |
| | 4.2. Lock-in | 697 |
| | 4.3. Effects on interbrand competition | 699 |
| | 4.4. Entry deterrence | 707 |

| WW117 |
|-------|
| |

| Contents | οf | Volumo | T |
|----------|------|---------|---|
| Contents | OI . | v ouume | , |

| 5 | . Welfare analysis | 709 |
|--------|---|------------|
| | 5.1. The two wedges | 709 |
| | 5.2. Price distortions | 710 |
| | 5.3. Nonprice distortions | 711 |
| | 5.4. What does all of this have to do with public policy? | 713 |
| Refe | rences | 718 |
| Chapte | er 12 | |
| | uct Differentiation | |
| | RTIS EATON AND RICHARD G. LIPSEY | 723 |
| 1. | | |
| | 1.1. The awkward facts | 725 |
| | 1.2. Technology | 725 |
| | 1.3. Two approaches to consumers' preferences | 726 |
| 2. | Non-address branch | 727 728 |
| | 2.1. The representative consumer approach | 728 728 |
| | 2.2. Monopolistic competition and the representative consumer | 731 |
| | 2.3. Chamberlin's model and diversity of tastes | 731 |
| 3. | The address approach | 734 |
| | 3.1. Describing a good | 734 |
| | 3.2. Consumers' preferences | 735 |
| _ | 3.3. Aspects of an address model | 738 |
| 4. | An illustrative address model | 739 |
| | 4.1. Competition in addresses | 739 |
| | 4.2. Free-entry equilibrium | 740 |
| | 4.3. Pure profit in free-entry equilibrium | 741 |
| | 4.4. Non-uniqueness of free-entry equilibrium | 741 |
| | 4.5. No invisible hand | 741 |
| | 4.6. Foresighted entry | 742 |
| 5. | 4.7. History matters | 744 |
| ٥. | Pure profit reconsidered | 745 |
| | 5.1. The importance of sunk costs | 745 |
| | 5.2. The durability of sunk capital, predatory entry and profit dissipation 5.3. Endogenous prices | 746 |
| | Secretary Property | 748 |
| | 5.4. The integer problem, balkanization and localized competition5.5. How robust is balkanization? | 749 |
| 6. | Vertical differentiation and natural oligopoly | 750 |
| 7. | Price versus quantity competition | 752 |
| 8. | Multi-address firms | 755 |
| 9. | Product diversity and economic policy | 756 |
| 10. | An historical postscript | 759 |
| Refere | nces | 761 766 |
| | | /00 |

| Conten | ts of Volume I | xx |
|--------|--|-------------|
| Chapte | r 13 | |
| Impe | rfect Information in the Product Market | |
| JOSEF | PH E. STIGLITZ | |
| PAR | ΓΙ | 77 1 |
| 1. | Introduction and overview | 771 |
| | 1.1. Methodological remarks | 773 |
| | 1.2. On the use of derived demand curves | 774 |
| 2. | | 779 |
| | 2.1. The resolution of the paradoxes | 782 |
| PART | II. Equilibrium price distributions, monopoly power, | |
| | and price rigidities: Homogeneous goods | 787 |
| 3. | Constructing models with price distributions | 787 |
| | 3.1. Alternative interpretations | 790 |
| 4. | Bargains and ripoffs | 791 |
| 5. | A general theory of equilibrium pricing with search | 795 |
| | 5.1. Search with replacement | 797 |
| | 5.2. Price rigidities | 798 |
| 6. | Theory of sales | 799 |
| | 6.1. The model | 801 |
| | 6.2. Characterization of equilibrium | 802 |
| | 6.3. Single price equilibria | 805 |
| | 6.4. Non-existence of equilibrium with discriminating firms | 807 |
| 7. | Alternative theories of price distributions | 807 |
| | 7.1. Search with limited information | 809 |
| | 7.2. Equilibrium with a limited number of stores | 813 |
| | 7.3. Price distributions with friendly neighbors | 815 |
| _ | 7.4. Price distributions in models with transportation costs | 815 |
| 8. | Concluding remarks | 817 |
| | 8.1. Monopoly power | 818 |
| | 8.2. Price dispersion | 820 |
| | 8.3. Price rigidities | 821 |
| PART | —————————————————————————————————————— | 822 |
| 9. | | 822 |
| | 9.1. The simplest reputation model | 826 |
| 4.0 | 9.2. Reputations with heterogeneous firms | 829 |
| 10. | Product variety | 834 |
| | 10.1. Product variety, imperfect discrimination, and price dispersions | 835 |
| 11. | , o | 838 |
| 12. | | 842 |
| 13. | Concluding remarks | 843 |

| | | contents of rotatile 1 |
|--------|---|------------------------|
| | endix: Notation | 844 |
| | | 844 |
| Chapi | | |
| The | Timing of Innovation: Research, Development, and Diffusion | n |
| JENN | NIFER F. REINGANUM | 849 |
| | . Introduction | 850 |
| | . Symmetric models | 853 |
| 3. | . Asymmetric models | 868 |
| | . Licensing | 884 |
| 5. | T WILL GIVE OF THEOVALIONS | 893 |
| 6. | Conclusions | 904 |
| Refe | rences | 905 |
| Chapte | er 15 | |
| | Theory and the Facts of How Markets Clear: Is Industrial | |
| Organ | nization Valuable for Understanding Macroeconomics? | |
| DENN | VIS W. CARLTON | 000 |
| 1. | Introduction | 909 |
| 2. | | 910 |
| | 2.1. Competition | 912 |
| | 2.2. Oligopoly models | 912 |
| | 2.3. Monopoly | 913 |
| 3. | | 915 |
| | 3.1. Casual observation | |
| | 3.2. Studies of price statistics | 916 |
| | 3.3. Summary of evidence on prices | 917 |
| 4. | How to explain the evidence | 924 925 |
| | 4.1. Extensions to the simple theory – the introduction of time | 925 925 |
| | 4.2. Fixed costs of changing price | 923 |
| | 4.3. Asymmetric information and moral hazard | 934 |
| | 4.4. Toward a general theory of allocation | 934 936 |
| _ | 4.5. Summary of new theories | 940 |
| 5. | Market structure means more than just the degree of | 240 |
| | concentration | 941 |
| | 5.1. Produce to order versus produce to stock | 941 |
| _ | 5.2. Transmission of shocks in industries with fixed prices | 942 |
| 6. | Summary | 943 |
| Refere | nces | 943 |
| Index | | 947 |
| | | 2マ/ |

TECHNOLOGICAL DETERMINANTS OF FIRM AND INDUSTRY STRUCTURE

JOHN C. PANZAR*

Northwestern University

| 1. | Introduction | 4 |
|-----|--|----|
| 2. | The multiproduct cost function | 4 |
| | 2.1. Economies of scale | 7 |
| | 2.2. Product specific economies of scale | 11 |
| | 2.3. Economies of scope | 15 |
| | 2.4. Cost subadditivity and natural monopoly | 23 |
| 3. | Industry configurations | 33 |
| | 3.1. Feasible and efficient single product industry configurations | 35 |
| | 3.2. Efficient multiproduct industry configurations | 38 |
| 4. | Empirical issues | 41 |
| | 4.1. Aggregation and the hedonic approach | 42 |
| | 4.2. Long-run and short-run measures of returns to scale | 45 |
| | 4.3. Empirical studies of electric power | 46 |
| | 4.4. Empirical studies of telecommunications | 51 |
| 5. | Concluding remarks | 56 |
| Ril | bliography | 56 |

^{*}I would like to thank Avner Greif for his research assistance, Bobby Willig for helpful comments, and the National Science Foundation, SES 8409171, for partial research support. Any errors are, of course, solely my responsibility.

THE THEORY OF THE FIRM

BENGT R. HOLMSTROM

Yale University

JEAN TIROLE*

Massachusetts Institute of Technology

Contents

| 1. | Introduction | 63 |
|----|--|-----|
| 2. | The limits of integration | 65 |
| | 2.1. Incomplete contracts | 66 |
| | 2.2. Information flows and incomplete contracts | 74 |
| | 2.3. Reputation | 76 |
| | 2.4. Concluding remark | 78 |
| 3. | Capital structure | 78 |
| | 3.1. The incentive argument | 79 |
| | 3.2. The signalling argument | 82 |
| | 3.3. The control argument | 85 |
| | 3.4. Concluding remark | 86 |
| 4. | The separation of ownership and control | 86 |
| | 4.1. Internal discipline | 87 |
| | 4.2. Labor market discipline | 94 |
| | 4.3. Product market discipline | 95 |
| | 4.4. Capital market discipline | 97 |
| | 4.5. Implications for firm behavior | 101 |
| | 4.6. The hazards of a black-box view of the firm | 104 |
| | 4.7. Concluding remark | 105 |
| 5. | Internal hierarchies | 106 |
| | 5.1. Hierarchies as information systems | 107 |
| | 5.2. Supervision in hierarchies | 110 |

Handbook of Industrial Organization, Volume I, Edited by R. Schmalensee and R.D. Willig © Elsevier Science Publishers B.V., 1989

^{*}Support from NSF and the Sloan Foundation is gratefully acknowledged. We would like to thank Jeff Borland, Joel Demski, Bob Gibbons, Oliver Hart, Paul Milgrom, John Moore and Richard Schmalensee for very helpful comments on an earlier draft.

| | 6.2 Triange 11 | |
|----|--|-----|
| | 5.3. Hierarchies as incentive structures | 114 |
| | 5.4. Hierarchies as internal labor markets | 114 |
| | 5.5. The hierarchy as a nexus of contracts | 117 |
| | 5.6. The hierarchy as an authority structure | 120 |
| | 5.7. Organizational forms | 123 |
| 6. | Conclusion | 125 |
| Re | eferences | 126 |
| | | 127 |

TRANSACTION COST ECONOMICS

OLIVER E. WILLIAMSON*

University of California, Berkeley

| 1. | Introduction | 136 |
|-----|---|-----|
| 2. | Background | 137 |
| | 2.1. Main case | 137 |
| | 2.2. Behavioral assumptions | 138 |
| | 2.3. Legal centralism versus private ordering | 140 |
| 3. | Operationalizing transaction cost economics | 141 |
| | 3.1. The technology of transacting | 142 |
| | 3.2. A simple contractual schema | 145 |
| | 3.3. The measurement branch | 149 |
| 4. | The paradigm problem: Vertical integration | 150 |
| | 4.1. A heuristic model | 150 |
| | 4.2. A combined neoclassical-transaction cost treatment | 155 |
| 5. | Other applications | 159 |
| | 5.1. Nonstandard commercial contracting | 159 |
| | 5.2. Economics of the family | 164 |
| | 5.3. Corporate finance | 167 |
| | 5.4. The modern corporation | 170 |
| 6. | The evidence | 172 |
| 7. | Public policy ramifications | 174 |
| | 7.1. Microeconomics | 175 |
| | 7.2. Macroeconomics: Stagflation | 177 |
| 8. | Conclusions | 178 |
| Ref | ferences | 178 |
| | | |

VERTICAL INTEGRATION: DETERMINANTS AND EFFECTS

MARTIN K. PERRY*

Rutgers University and Bell Communications Research, Inc.

| 1. | Introduction | 18: |
|----|---|-----|
| | 1.1. What is vertical integration? | 18: |
| | 1.2. Determinants of vertical integration | 18' |
| | 1.3. Outline | 189 |
| 2. | Monopoly and monopsony | 190 |
| | 2.1. Monopoly and variable proportions | 193 |
| | 2.2. Monopoly and price discrimination | 192 |
| | 2.3. Monopsony and backward integration | 190 |
| 3. | Monopolistic competition | 199 |
| | 3.1 Monopolistic competition at the retail stage | 200 |
| | 3.2. Monopolistic competition and externalities at the retail stage | 203 |
| 4. | Uncertainty and information | 203 |
| | 4.1. Diversification | 205 |
| | 4.2. Rationing and assurance of supply | 206 |
| | 4.3. Information and agency problems | 208 |
| | 4.4. Prices versus quantities | 211 |
| 5. | Transaction cost economics | 212 |
| | 5.1. Asset specificity | 213 |
| | 5.2. Evidence | 215 |
| | 5.3. Cases from business history | 219 |
| 6. | Incomplete contracts | 221 |
| | 6.1. Contract law | 221 |
| | 6.2. Models of incomplete contracts | 224 |

| 7. | Vertical equilibrium | 229 |
|----|---|-----|
| | 7.1. Vertical equilibrium | 229 |
| | 7.2. The Young model | 229 |
| | 7.3. The Stigler model | 231 |
| | 7.4. Models with demand fluctuations | 234 |
| 8. | Measurement and trends | 236 |
| | 8.1. Input measures | 236 |
| | 8.2. Measures and trends in the twentieth century | 237 |
| | 8.3. Trends prior to the twentieth century | 239 |
| 9. | Public policy | 241 |

Public policy in the United Kingdom and the European Economic Community

Section 2 of the Sherman Act

Section 7 of the Clayton Act

M.K. Perry

242

244

247

250

184

References

NONCOOPERATIVE GAME THEORY FOR INDUSTRIAL ORGANIZATION: AN INTRODUCTION AND OVERVIEW

DREW FUDENBERG

Massachusetts Institute of Technology

JEAN TIROLE*

Massachusetts Institute of Technology

| 1. | Introduction | 26 |
|----|---|-----|
| 2. | Games, strategies, and equilibria | 26: |
| | 2.1. The extensive and normal forms | 263 |
| | 2.2. Nash equilibrium | 265 |
| | 2.3. Existence of Nash equilibria | 269 |
| | 2.4. Correlated equilibria | 272 |
| | 2.5. Coalition-proof equilibria and strong equilibria | 275 |
| 3. | Dynamic games of complete information | 276 |
| | 3.1. Subgame perfection | 270 |
| | 3.2. Repeated games and "implicit collusion" | 278 |
| | 3.3. Continuous-time games | 288 |
| | 3.4. State-space or Markov equilibria | 289 |
| | 3.5. Games of timing | 292 |
| | 3.6. Discrete vs. continuous time, and the role of period length | 295 |
| | 3.7. Open-loop equilibria | 296 |
| 4. | Static games of incomplete and imperfect information | 296 |
| | 4.1. Bayesian games and Bayesian equilibrium | 296 |
| | 4.2. Using Bayesian equilibria to justify mixed strategy equilibria | 302 |
| 5. | Dynamic games of incomplete information | 304 |
| | 5.1. The basic signalling game | 305 |

| 260 | |
|-----|-----|
| | 5.2 |

References

5.2. Examples

5.5. Perturbed games and robust equilibria

5.4. Finite games: Existence and refinements in finite games

Some refinements

Concluding remark

D. Fudenberg and J. Tirole

306

311

315

320

322

323

THEORIES OF OLIGOPOLY BEHAVIOR*

CARL SHAPIRO**

Princeton University

| 1. | Inti | roduction | 330 |
|-----|-----------------|--|-----|
| 2. | Sta | tic oligopoly theory | 333 |
| | | Cournot oligopoly: Competition in outputs | 333 |
| | 2.2. | Bertrand oligopoly: Competition in prices | 343 |
| | 2.3. | | 348 |
| | 2.4. | Can there be reactions in a static model? | 352 |
| 3. | | peated oligopoly games | 356 |
| | 3.1. | | 357 |
| • | 3.2. | Infinitely repeated oligopoly games: Supergames | 361 |
| 4. | Two | o-stage competition | 381 |
| | 4.1. | | 383 |
| | 4.2. | Welfare effects of strategic behavior | 386 |
| | 4.3 | Taxonomy of strategic behavior | 388 |
| | 4.4. | The state of the s | 389 |
| 5. | Dynamic rivalry | | 397 |
| | | What makes for dynamics? | 397 |
| | 5.2. | The state-space approach to dynamic oligopoly models | 398 |
| | 5.3. | Pricing and quantity games | 400 |
| | 5.4. | Investment games | 403 |
| | 5.5, | Intangible state variables | 405 |
| | 5.6. | Simple state-space games | 407 |
| 6. | | online state-space games | 408 |
| Rei | eren | CPC | 410 |

CARTELS, COLLUSION, AND HORIZONTAL MERGER

ALEXIS JACQUEMIN

Université Catholique de Louvain

MARGARET E. SLADE*

University of British Columbia

| 1. | Intr | oduction | 416 |
|----|------|--|-----|
| 2. | Fac | tors that facilitate or hinder collusion | 417 |
| | | Reaching an agreement | 417 |
| | 2.2. | Incentives to cheat | 420 |
| | 2.3. | Detection | 421 |
| | 2.4. | Prevention | 422 |
| | 2.5. | Evidence | 423 |
| 3. | Tvp | es and extent of horizontal collusion | 424 |
| | | Explicit agreement | 424 |
| | | Tacit collusion | 441 |
| 4. | Col | lusion, public interest, and government policy | 450 |
| | | Identifying collusion | 451 |
| | | Collusion and restriction of competition | 453 |
| | 4.3. | Efficiency tradeoffs | 459 |
| | | Industrial policy | 463 |
| Re | eren | · · | 466 |

MOBILITY BARRIERS AND THE VALUE OF INCUMBENCY

RICHARD J. GILBERT*

University of California, Berkeley

| 4 | T | | |
|----|---|-----|--|
| 1. | Introduction | 476 | |
| 2. | Determinants of the conditions of entry | 480 | |
| | 2.1. Scale economies, sunk costs, and limit pricing | 480 | |
| | 2.2. Absolute cost advantages | 493 | |
| | 2.3. Product differentiation | 503 | |
| 3. | Fat cats and puppy dogs | 509 | |
| 4. | Entry, dynamics, and industry structure | 510 | |
| | 4.1. Dynamic limit pricing | 511 | |
| | 4.2. Multiple incumbents and entrants | 515 | |
| 5. | Exit barriers and asset specificity | 520 | |
| 6. | The role of information in entry deterrence | 523 | |
| 7. | Contestable markets | 526 | |
| 8. | Mobility barriers and economic performance | 528 | |
| 9. | Concluding remarks | 530 | |
| Re | eferences | | |
| | | | |

PREDATION, MONOPOLIZATION, AND ANTITRUST

JANUSZ A. ORDOVER

New York University

GARTH SALONER*

Massachusetts Institute of Technology and Hoover Institution

| 1. | Introduction | 538 |
|------------|--|-----|
| 2. | Framework for economic analysis of dominant firm conduct | 540 |
| 3. | Pricing and nonpricing models of anticompetitive behavior | 545 |
| | 3.1. Predatory pricing | 545 |
| | 3.2. Nonprice conduct aimed at eliminating competitors | 562 |
| 4. | Putting rivals at a disadvantage | 565 |
| 5. | | 570 |
| | 5.1. Anticompetitive practices and a regulated firm | 571 |
| | 5.2. Anticompetitive uses of the political and legal process | 573 |
| | 5.3. Anticompetitive practices in an open economy | 577 |
| 6. | Tests of anticompetitive behavior | 579 |
| 7. | Conclusions | 590 |
| References | | 592 |
| | | |

PRICE DISCRIMINATION

HAL R. VARIAN*

University of Michigan

| 1. | Introduction | 598 |
|-----|---|------|
| 2. | Theory | 600 |
| ~. | | 600 |
| | 2.1. Types of price discrimination 2.2. First-degree price discrimination | 601 |
| | | 611 |
| | | 617 |
| | 2.4. Third-degree price discrimination | 624 |
| | 2.5. Defining the market | |
| | 2.6. Bundling | 626 |
| 3. | Applications | 630 |
| | 3.1 Spatial price discrimination | 631 |
| | 3.2 Intertemporal discrimination | 632 |
| | 3.3. Vertical integration and price discrimination | 636 |
| | 3.4. Imperfect information | 637 |
| | | 640 |
| | 3.5. Quality differences | 641 |
| | 3.6. Monopolistic competition | 643 |
| | 3.7. Legal aspects of price discrimination | - :- |
| 4. | Summary | 646 |
| Bil | bliography | 647 |

VERTICAL CONTRACTUAL RELATIONS

MICHAEL L. KATZ*

University of California at Berkeley

| 1. | Introduction | 656 |
|----------|---|-----|
| 2, | | 661 |
| | 2.1. The basic model | 661 |
| | 2.2. The use of the price system | 664 |
| | 2.3. The need for more sophisticated contracts | 672 |
| 3. | Private incentives: A single manufacturer with many dealers | 677 |
| | 3.1. Externalities across dealers | 678 |
| | 3.2. A new control instrument | 689 |
| | 3.3. The number of dealers | 693 |
| 4. | | 696 |
| •• | 4.1. Free riding across manufacturers | 696 |
| | 4.2. Lock-in | 697 |
| | 4.3. Effects on interbrand competition | 699 |
| | | 707 |
| 5 | 4.4. Entry deterrence Welfare analysis | 709 |
| ٥. | 5.1. The two wedges | 709 |
| | 5.2. Price distortions | 710 |
| | · · · · · · · · · · · · · · · · · · · | 711 |
| | 5.3. Nonprice distortions5.4. What does all of this have to do with public policy? | 713 |
| n | | 718 |
| VG | ferences | |

PRODUCT DIFFERENTIATION

B. CURTIS EATON

Simon Fraser University

RICHARD G. LIPSEY

Queen's University and C.D. Howe Institute

| 1. | Introduction | 725 |
|----|---|-----|
| | 1.1. The awkward facts | 725 |
| | 1.2. Technology | 726 |
| | 1.3. Two approaches to consumers' preferences | 727 |
| 2. | Non-address branch | 728 |
| | 2.1. The representative consumer approach | 728 |
| | 2.2. Monopolistic competition and the representative consumer | 731 |
| | 2.3. Chamberlin's model and diversity of tastes | 731 |
| 3. | The address approach | 734 |
| | 3.1. Describing a good | 734 |
| | 3.2. Consumers' preferences | 735 |
| | 3.3. Aspects of an address model | 738 |
| 4. | An illustrative address model | 739 |
| | 4.1. Competition in addresses | 739 |
| | 4.2. Free-entry equilibrium | 740 |
| | 4.3. Pure profit in free-entry equilibrium | 741 |
| | 4.4. Non-uniqueness of free-entry equilibrium | 741 |
| | 4.5. No invisible hand | 741 |
| | 4.6. Foresighted entry | 742 |
| | 4.7. History matters | 744 |
| 5. | Pure profit reconsidered | 745 |
| | 5.1. The importance of sunk costs | 745 |
| | 5.2. The durability of sunk capital, predatory entry and profit dissipation | 746 |
| | 5.3. Endogenous prices | 748 |
| | 5.4. The integer problem, balkanization and localized competition | 749 |
| | 5.5. How robust is balkanization? | 750 |

| 124 | | B.C. Eaton and R.G. Lipsey |
|-----|--|----------------------------|
| 6. | Vertical differentiation and natural oligopoly | 752 |
| 7. | Price versus quantity competition | 755 |
| 8. | Multi-address firms | 756 |
| 9. | Product diversity and economic policy | 759 |

References

An historical postscript

IMPERFECT INFORMATION IN THE PRODUCT MARKET

JOSEPH E. STIGLITZ*

Princeton University and NBER

| PAI | RT I | | 771 |
|-----|--------|--|-----|
| 1. | Intro | oduction and overview | 771 |
| | 1.1. | Methodological remarks | 773 |
| | 1.2. | On the use of derived demand curves | 774 |
| 2. | Thre | e paradoxes | 779 |
| | 2.1. | The resolution of the paradoxes | 782 |
| PAI | RT II. | Equilibrium price distributions, monopoly power, and price | |
| | | rigidities: Homogeneous goods | 787 |
| 3. | Con | structing models with price distributions | 787 |
| | 3.1. | Alternative interpretations | 790 |
| 4. | Barg | ains and ripoffs | 791 |
| 5. | | neral theory of equilibrium pricing with search | 795 |
| | - | Search with replacement | 797 |
| | 5.2. | Price rigidities | 798 |
| 6. | Theo | ry of sales | 799 |
| | 6.1. | The model | 801 |
| | 6.2. | Characterization of equilibrium | 802 |
| | 6.3. | Single price equilibria | 805 |
| | 6.4, | | 807 |
| | | | |

| 770 | | | J.E. Stiglitz |
|------|--------|--|---------------|
| 7. | Alte | rnative theories of price distributions | 807 |
| | 7.1. | | 809 |
| | 7.2. | Equilibrium with a limited number of stores | 813 |
| | 7.3. | | 815 |
| | 7.4. | Price distributions in models with transportation costs | 815 |
| 8. | Con | cluding remarks | 817 |
| | | Monopoly power | 818 |
| | 8.2. | Price dispersion | 820 |
| | 8.3. | Price rigidities | 821 |
| PAI | RT III | | 822 |
| 9. | Qual | ity and reputations | 822 |
| | | The simplest reputation model | 826 |
| | | Reputations with heterogeneous firms | 829 |
| 10. | | uct variety | 834 |
| | | Product variety, imperfect discrimination, and price dispersions | 835 |
| 11. | Othe | r mechanisms for conveying information about quality | 838 |
| 12. | Adve | ertising | 842 |
| 13. | Conc | cluding remarks | 843 |
| App | | : Notation | 844 |
| Refe | erence | s | 844 |
| | | | |

THE TIMING OF INNOVATION: RESEARCH, DEVELOPMENT, AND DIFFUSION

JENNIFER F. REINGANUM*

The University of Iowa

| _ | | 850 |
|----|---------------------------------------|-----|
| | Introduction | 853 |
| | | 868 |
| 3. | Asymmetric models | 884 |
| 4. | Licensing | 893 |
| 5. | Adoption and diffusion of innovations | 904 |
| 6. | Conclusions | 905 |
| Re | eferences | 705 |

THE THEORY AND THE FACTS OF HOW MARKETS CLEAR: IS INDUSTRIAL ORGANIZATION VALUABLE FOR UNDERSTANDING MACROECONOMICS?

DENNIS W. CARLTON*

University of Chicago and NBER

| 1. | Introduction | 910 |
|----|---|-----|
| 2. | Simple theories of how markets clear | 912 |
| ۷. | - | 912 |
| | 2.1. Competition | 913 |
| | 2.2. Oligopoly models | 915 |
| _ | 2.2. Monopoly | 916 |
| 3. | 4 | 916 |
| | 3.1. Casual observation | 917 |
| | 3.2. Studies of price statistics | 924 |
| | 3.3. Summary of evidence on prices | |
| 4. | How to explain the evidence | 925 |
| | 4.1. Extensions to the simple theory - the introduction of time | 925 |
| | 4.2. Fixed costs of changing price | 931 |
| | 4.3. Asymmetric information and moral hazard | 934 |
| | 4.4. Toward a general theory of allocation | 936 |
| | 4.5. Summary of new theories | 940 |
| _ | Market structure means more than just the degree of concentration | 941 |
| 5. | Market structure means more to stock | 941 |
| | 5.1. Produce to order versus produce to stock5.2. Transmission of shocks in industries with fixed prices | 942 |
| | | 943 |
| 6. | Summary | 943 |
| Re | eferences | 745 |