

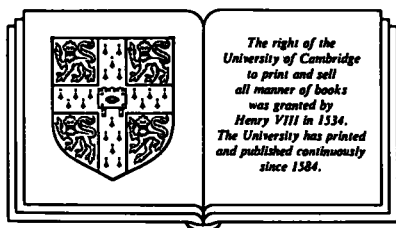
The economics of imperfect competition

A spatial approach

Melvin L. Greenhut
Texas A&M University

George Norman
University of Leicester

Chao-shun Hung
Florida Atlantic University



CAMBRIDGE UNIVERSITY PRESS

Cambridge

London New York New Rochelle

Melbourne Sydney

Contents

| | |
|--|------------------|
| List of figures and tables | <i>page</i> xiii |
| Preface | xvii |
| Chapter 1. Introduction | 1 |
| 1.1. Imperfect competition and "space": some introductory remarks | 2 |
| 1.2. Price policy and imperfect (or spatial) competition | 3 |
| 1.3. Market demand and pricing policy | 6 |
| 1.4. Discriminatory pricing: an introduction | 10 |
| 1.5. The generality of a spatial approach to imperfect competition: an example | 12 |
| 1.6. Plan of the book | 14 |
| Mathematical appendix | 15 |
| Part I. Nondiscriminatory pricing | |
| Chapter 2. A general theory of imperfect competition and nondiscriminatory pricing: the short run | 19 |
| 2.1. The basic spatial model | 22 |
| 2.2. Elasticity and the fundamental pricing equation | 22 |
| 2.3. A seeming digression: negative exponential demand | 25 |
| 2.4. Elasticity revisited | 26 |
| 2.5. Spatial monopoly | 26 |
| 2.6. Spatial competition and aggregate demand elasticity | 27 |
| 2.7. Demand effect and competition effect under free entry | 30 |
| 2.8. Effect of entry on competitive prices | 31 |
| 2.8.1. Löschian competition | 32 |
| 2.8.2. H-S and G-O competition | 33 |
| 2.9. Concluding remarks | 35 |
| Mathematical appendix | 35 |
| Chapter 3. A general theory of imperfect competition and nondiscriminatory pricing: the long run | 38 |
| 3.1. Long-run equilibrium prices | 38 |

| | |
|---|----|
| 3.2. Comparative-statics effects of changes in fixed costs, transport costs, and consumer density | 41 |
| 3.3. An application: pricing in the service industry with different entry conditions | 43 |
| 3.3.1. The model with restricted entry | 46 |
| 3.3.2. A caveat: unrestricted large-scale entry | 50 |
| 3.3.3. Summary | 51 |
| 3.4. F.o.b. prices vis-à-vis uniform prices: tying contracts | 53 |
| 3.5. Concluding remarks | 54 |
| Mathematical appendix | 55 |
| Chapter 4. Nondiscriminatory prices, economic development, and merger policies | 57 |
| 4.1. Examples of less and more convex demand functions | 57 |
| 4.1.1. Alternative competitive models | 59 |
| 4.1.2. Spatial and nonspatial prices viewed in the classical demand-curve diagram | 61 |
| 4.1.3. Shifts in net demand due to changes in transport costs | 63 |
| 4.1.4. Changes in consumer density and fixed costs | 64 |
| 4.1.5. Summary | 64 |
| 4.2. Prices in a developing economy (newly formed industries) | 64 |
| 4.3. Antitrust merger policy | 68 |
| 4.4. Concluding remarks | 71 |
| Mathematical appendix | 71 |
| Chapter 5. Product differentiation: a spatial f.o.b. perspective | 73 |
| 5.1. A simple model of product differentiation | 74 |
| 5.2. Equilibrium in a differentiated-product industry | 78 |
| 5.2.1. The demand curve | 80 |
| 5.2.2. Market equilibrium | 84 |
| 5.2.3. Comparative statics | 86 |
| 5.3. Some extensions | 87 |
| 5.3.1. Alternative competitive reactions | 87 |
| 5.3.2. Collusion | 90 |
| 5.3.3. Elastic individual demand | 91 |
| 5.3.4. Other extensions: strategic behavior, advertising | 93 |
| 5.4. Conclusions | 94 |
| Appendix: equivalence of the Salop and Capozza-Van Order analyses | 95 |
| Mathematical appendix | 96 |

Part II. Discriminatory pricing

| | |
|--|------------|
| Chapter 6. Discriminatory pricing and alternative demand conditions | 101 |
| 6.1. Price discrimination | 102 |
| 6.2. A model of spatial competition | 103 |
| 6.3. Optimal discriminatory pricing | 104 |
| 6.4. Production differentiation revisited | 111 |
| 6.5. Conclusions | 112 |
| Mathematical appendix | 113 |
| Chapter 7. Alternative pricing policies | 115 |
| 7.1. Comparison of alternative pricing policies: the f.o.b. mill schedule, the uniform schedule, and a discriminatory price schedule | 116 |
| 7.1.1. Prices and profits | 116 |
| 7.1.2. Welfare effects | 117 |
| 7.1.3. The short-run competitive equilibrium price | 122 |
| 7.1.4. Long-run competitive equilibrium: individual firm and total output | 123 |
| 7.2. Long-run equilibria in uniform-delivered-pricing models | 125 |
| 7.2.1. Uniform delivered prices under alternative competitive assumptions | 127 |
| 7.2.2. Long-run equilibrium uniform prices and market areas | 128 |
| 7.2.3. Comparative statics of the uniform-delivered-pricing model | 129 |
| 7.3. Conclusions | 129 |
| Mathematical appendix I | 130 |
| Mathematical appendix II | 132 |
| Chapter 8. Discriminatory pricing and market overlap | 135 |
| 8.1. Market overlap and pricing with homogeneous goods | 135 |
| 8.1.1. The basic pricing equation | 136 |
| 8.1.2. The price effects of local competition | 137 |
| 8.1.3. Distant competition with completely overlapped markets | 139 |
| 8.1.4. Distant competition with partially overlapped markets | 141 |
| 8.1.5. Some suggested applications | 142 |
| 8.2. Optimal pricing policies: differentiated products | 143 |

| | |
|--|------------|
| 8.3. Collusive oligopoly and nonzero conjectural variation | 148 |
| 8.4. Conclusions | 150 |
| Mathematical appendix | 150 |
| Chapter 9. Intraindustry trade: a spatial approach | 153 |
| 9.1. Intraindustry trade in homogeneous commodities | 154 |
| 9.2. Other considerations | 160 |
| 9.2.1. Product differentiation | 160 |
| 9.2.2. Reciprocal dumping and welfare considerations | 161 |
| 9.2.3. Intraindustry production | 162 |
| 9.3. Conclusions | 164 |
| Mathematical appendix | 165 |
| Chapter 10. Optimal pricing with delivered-price or transport constraints | 166 |
| 10.1. Pricing policy with a limit-price constraint | 166 |
| 10.1.1. The Greenhut-Ohta model | 166 |
| 10.1.2. A factor-input application | 168 |
| 10.1.3. An alternative view: the Norman model | 169 |
| 10.2. Endogenous transport rates and choice of price policies | 174 |
| 10.3. Conclusions | 178 |
| Chapter 11. International and intranational pricing with a general cost function: an introduction to optimal-control theory | 180 |
| 11.1. Optimal-control theory: an overview | 180 |
| 11.2. An application: spatial pricing with nonlinear marginal costs | 183 |
| 11.3. Determination of the market boundary | 186 |
| 11.4. F.o.b. mill and uniform pricing: a brief digression | 187 |
| 11.5. An illustration: optimal behavior with different tariff rates | 187 |
| 11.5.1. Specific tariffs | 188 |
| 11.5.2. Ad valorem tariffs | 189 |
| 11.6. The ad valorem tariff and price discrimination | 191 |
| 11.7. Competitive pricing: a brief digression | 194 |
| 11.8. Conclusions | 194 |
| Chapter 12. Dynamic market strategy: further application of optimal-control theory | 197 |
| 12.1. Dynamic market strategy under threat of competitive entry | 198 |
| 12.1.1. A formal model | 198 |

| | |
|---|------------|
| Contents | ix |
| 12.1.2. Analysis | 200 |
| 12.1.3. Determination of market segmentation: some empirical comments | 204 |
| 12.1.4. Alternative supply modes: an application to the multinational enterprise | 208 |
| 12.2. Pricing over time: intertemporal price discrimination | 209 |
| 12.2.1. Some background on industrial prices | 210 |
| 12.2.2. Pricing over time: the basic intertemporal price discrimination | 211 |
| 12.3. Conclusions | 215 |
| Chapter 13. Heterogeneous prices and heterogeneous goods | 217 |
| 13.1. Market strategy with variable entry threats | 217 |
| 13.1.1. Some preliminary analysis | 218 |
| 13.1.2. Determinants of different strategies | 223 |
| 13.1.3. Some testable implications | 228 |
| 13.2. Pricing with heterogeneous demand | 229 |
| 13.2.1. Price discrimination when individual demands are not identical | 229 |
| 13.2.2. Price discrimination and income distribution | 234 |
| 13.3. Concluding remarks | 234 |
| Mathematical appendix | 235 |
| Chapter 14. Empirical findings on alternative pricing policies: demand and competitive impacts | 237 |
| 14.1. Price findings for sampled firms | 239 |
| 14.2. The theory and operational model | 241 |
| 14.3. Empirical data evaluated | 243 |
| 14.4. The generality of price discrimination | 247 |
| 14.5. Conclusions | 249 |
| Appendix | 251 |
| Part III. Pricing, location, and competition | |
| Chapter 15. General location and market-area principles | 255 |
| 15.1. Cost theories of location | 255 |
| 15.1.1. Von Thünen | 255 |
| 15.1.2. Weber | 257 |
| 15.2. Locational-interdependence theory | 261 |
| 15.3. The market-area school | 263 |
| 15.4. Maximum-profit plant location | 267 |
| 15.5. Concluding remarks | 269 |

| | |
|---|-----|
| Chapter 16. Pricing, demand distribution, and location choice | 271 |
| 16.1. A simple price/location model | 271 |
| 16.2. Monopoly location under a heterogeneous distribution of consumers | 273 |
| 16.3. Duopoly, pricing policy, and location choice | 279 |
| 16.3.1. Competitive location: noncoincident location | 280 |
| 16.3.2. Competitive location: coincident location | 286 |
| 16.3.3. Location choice under alternative market structures: some comments | 288 |
| 16.4. Concluding remarks | 288 |
| Mathematical appendix | 290 |
| Chapter 17. Optimal location in nonspatial markets: a spatial approach | 293 |
| 17.1. Product differentiation: some brief comments | 293 |
| 17.2. Scheduling of transport services | 295 |
| 17.2.1. Freight shipping | 295 |
| 17.2.2. Airline services | 297 |
| 17.3. Concluding remarks | 300 |
| Chapter 18. Competition, free entry, and long-run profit | 302 |
| 18.1. The existence of long-run profit: some intuitive remarks | 302 |
| 18.2. A formal model: Eaton and Lipsey | 305 |
| 18.3. Sources of positive pure profit | 310 |
| 18.4. Multiple equilibria: some comments | 313 |
| 18.5. An example | 314 |
| 18.6. Conclusions | 315 |
| Mathematical appendix | 317 |
| Chapter 19. An efficient long-run allocative equilibrium | 319 |
| 19.1. Introduction | 319 |
| 19.2. Decisionmakers of the spatial firms and their objectives | 320 |
| 19.2.1. Maximizing profits subject to two constraints | 320 |
| 19.2.2. A residual return | 321 |
| 19.3. The short run: some comments | 324 |
| 19.4. Imputation of rents: ascribing lost-opportunity costs | 325 |
| 19.5. A stable tangency point | 329 |
| 19.6. Special spatial features: the Eaton-Lipsey and Capozza-Van Order theses | 333 |
| 19.7. Conclusions | 334 |
| Appendix A | 334 |
| Appendix B | 340 |

| | |
|--|------------|
| Contents | xi |
| Chapter 20. Long-run locational equilibrium | 344 |
| 20.1. The Löschian hexagonal network and spatial economic discontinuities | 344 |
| 20.2. The markup for uncertainty | 345 |
| 20.3. Allocative efficiency in the spatial economy | 348 |
| 20.3.1. The multiplant monopolist | 349 |
| 20.3.2. Competition | 351 |
| 20.3.3. Competitive equilibrium | 352 |
| 20.4. Impact of conjectural variations on long-run equilibrium | 356 |
| 20.5. Conclusion | 357 |
| Chapter 21. Epilogue – Regulatory controls: a spatial economics view of governmental constraints on free enterprise | 359 |
| 21.1. Government enterprises: the government agency or bureau | 359 |
| 21.2. The essential ingredients of bureaucracy: its totalitarian base and inefficiency | 361 |
| 21.3. The incipient Sherman and Clayton Act violations: judicial legislation | 362 |
| 21.3.1. Sherman and Clayton Act violations | 363 |
| 21.3.2. Commission control includes incipient violation of any antitrust law | 363 |
| 21.3.3. Virtually unlimited control of the bureaucracy | 365 |
| 21.3.4. Extensions: pro and con | 366 |
| 21.3.5. Historical reversal? | 368 |
| 21.4. Clearing up the antitrust paradox | 368 |
| 21.5. Economic efficiency as a possible goal | 369 |
| 21.6. Cable television and Federal Communications Commission regulations | 372 |
| 21.6.1. Municipal regulation of cable television | 372 |
| 21.6.2. The Federal Communications Commission | 373 |
| Notes | 374 |
| Bibliography | 389 |
| Author index | 401 |
| Subject index | 405 |