

Preface

This study presents new microeconomic analyses of congestion-prone services that comprise most services at the final consumption stage. This study is distinguished from other studies in that it accommodates two unique features of service markets: the importance of service quality in the decisions of both consumers and suppliers, and the difference between system throughput and physical service capacity. This study covers partial equilibrium analyses of both private and public congestion-prone services in two different circumstances: under no competition and competition among multiple options differentiated by service quality.

This monograph proposes a set of new modeling approaches for the following: consumer demands, service costs, profit-maximizing choices for firms, and policies for public services. Some of the modeling approaches proposed in this study apply and adapt existing microeconomic approaches, and others are newly proposed. The key unique feature common to all these modeling approaches is to employ service time as the variable that accommodates two important features of service markets: congestion delay and service quality competition.

The first application area of the proposed modeling approaches is to characterize the industrial structure of a service market under quality competition. Through analyses based on the modeling approaches, it is shown that interactions among consumers and suppliers endogenously determine the industrial organization type of each firm and allow the coexistence of multiple organization types in a market. Further, it is proved that a lower-quality service should charge a lower price and a lower service production cost so as to have a positive demand, and that a consumer with a larger wage tends to choose a higher-quality service.

The second application area of the new modeling approaches is to assess marketwise resource allocation efficiency for service markets under quality competition. One important topic advocates that the diversity of service quality is an independent and indispensable criterion, in addition to Pareto optimality, to judge marketwise resource allocation efficiency for service markets. The other important topic analyzes how innovative services contribute to improving resource allocation efficiency in market economies. Further, these analytical outcomes are applied to explaining agglomeration economies of large urban areas.

The third application area is to determine the applicability of analytical outcomes from the proposed modeling approaches to economic studies dealing with practical decision-making problems. From this perspective, we analyze a number of topics that have hitherto not been considered in existing studies. For example, we introduce a new method to develop statistical models for consumer choices from among options having different service qualities. We also illustrate a cost-benefit analysis that uses user time cost that can reflect service quality. In addition, we develop optimal pricing and investment rules for a public service under the constraint of insufficient government funds.

This monograph consists of one introductory chapter, Chap. 1; 12 chapters of analyses, grouped into four parts; and one concluding chapter, Chap. 14. Chapter 1 provides a brief overview of the overall analytical approach used in this study. Each part, composed of multiple chapters, introduces and analyzes one group of decision-making problems: utility maximization problems in Part I; cost minimization problems for public and private congestion-prone services in Part II; profit maximization problems for congestion-prone private services in Part III; and social welfare maximization problems for public services in Part IV. The final chapter, Chap. 14, summarizes and concludes this work.

The four different groups of decision-making problems, introduced above, form the backbone of all the mathematical and economic analyses in this monograph. The utility maximization and cost minimization problems are used to develop consumer demand and supplier cost functions, respectively. These two functions provide inputs to profit and social welfare maximization problems. Optimality conditions for profit maximization problems are utilized to depict the market equilibrium and industrial structure of service markets. Optimality conditions for social welfare maximization problems are utilized to characterize marketwise resource efficiency for a given service type and optimal policies for a given public service.

Each part is presented according to the following plan. Firstly, each part introduces a set of postulates and their behavioral implications for the approach to model one of the four types of decision-making problems introduced above. Subsequently, it presents a number of theorems developed from optimality conditions for the specific type of decision-making problem and suggests the economic implications of the theorems. Finally, the study applies and extends the preceding analyses to explore the range of topics necessary to understand the overall structure of service markets.

Mathematically, all decision-making models proposed here are formulated as nonlinear mathematical programming problems with constraints, including stochastic programming problems. Mathematical analyses to develop theorems and corollaries from the optimization problems rely mainly on elementary optimization theory and real analysis.

This monograph will be of interest to graduate students and researchers in economics and other fields that require knowledge of microeconomics, such as urban and transportation planning as well as business administration. The monograph as a whole can serve as a self-contained book useful to readers who want to

grasp the overall structure of service markets. The monograph can also be a useful reference for a number of important research themes in applied microeconomics and planning, such as consumer choice behaviors, the cost structure of public and private congestion-prone service systems, congestion pricing for public congestion-prone service systems, and agglomeration economies of large urban areas.

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