

Table of contents

Chapter 1: Introduction

- 1.1 The scope of urban transportation economics
- 1.2 The scope of this book

Chapter 2: Travel Demand

- 2.1 Aggregate approaches and trends
 - 2.1.1 *Aggregate demand models*
 - 2.1.2 *Example: Demand for motorization*
 - 2.1.3 *Example: Demand for public transit*
 - 2.1.4 *Driving patterns by young adults*
 - 2.1.5 *Impacts of digital automotive technologies*
 - 2.1.6 *Transportation and land use* [Erik took lead - completed]
- 2.2 Disaggregate Models: Methods
 - 2.2.1 *Basic discrete-choice models*
 - 2.2.2 *Estimation*
 - 2.2.3 *Interpreting coefficient estimates*
 - 2.2.4 *Data*
 - 2.2.5 *Randomness, scale of utility, and measures of benefit*
 - 2.2.6 *Aggregation and forecasting*
 - 2.2.7 *Specifications*
 - 2.2.8 *Ordered and rank-ordered models*
- 2.3 Disaggregate Models: Examples
 - 2.3.1 *Mode Choice*
 - 2.3.2 *Trip Scheduling Choice*
 - 2.3.3 *Choice of Free or Express Lanes*
- 2.4 Advanced Discrete-Choice Modeling
 - 2.4.1 *Generalized Extreme Value Models*
 - 2.4.2 *Random parameters and mixed logit*
 - 2.4.3 *Combined discrete and continuous choice*
 - 2.4.4 *Panel data*
 - 2.4.5 *Endogenous prices and aggregate information*
 - 2.4.6 *Automobile ownership and use*
- 2.5 Attitudes, perceptions, and latent classes
- 2.6 Activity patterns, trip chaining, and agent-based modeling
- 2.7 Values of time, reliability, and crowding
 - 2.7.1 *Value of time: theory*

- 2.7.2 *Value of reliability: theory*
- 2.7.3 *Empirical results: value of time*
- 2.7.4 *Empirical results: value of reliability*

2.8 Big data

- 2.8.1 *What are big data?*
- 2.8.2 *Sources of big data*
- 2.8.3 *Advantages of big data*
- 2.8.4 *Limitations and challenges*
- 2.8.5 *Practical applications*
- 2.8.6 *Use of big data for research*

2.9 Conclusions

Chapter 3: Costs

3.1 The nature of cost functions

- 3.1.1 *General definitions*
- 3.1.2 *Economies of scale*
- 3.1.3 *Definition of outputs*
- 3.1.4 *Methods of measurement*
- 3.1.5 *External, social, and full costs*

3.2 Cost functions for public transit

- 3.2.1 *Cost functions including user inputs*
- 3.2.2 *Transit network design*
- 3.2.3 *Cost comparison: express bus vs rail transit*

3.3 Highway travel: congestion technology

- 3.3.1 *Fundamentals of congestion*
- 3.3.2 *Empirical speed-flow relationships*
- 3.3.3 *Macroscopic Fundamental Diagrams*
- 3.3.4 *Dynamic congestion models*
- 3.3.5 *Congestion modeling: a conclusion*

3.4 Highway travel: short-run costs and equilibrium

- 3.4.1 *Stationary-state congestion on a homogeneous road*
- 3.4.2 *Time-averaged models*
- 3.4.3 *Dynamic models with endogenous scheduling*
- 3.4.4 *Network equilibrium*
- 3.4.5 *The role of information*
- 3.4.6 *Disequilibrium behavior*
- 3.4.7 *Traffic accidents and economics of traffic safety*
- 3.4.8 *Environmental costs*
- 3.4.9 *Empirical evidence on short-run variable costs*

3.5 Highway Travel: Long-Run Costs

- 3.5.1 *Analytic long-run cost functions*
- 3.5.2 *Implications of Autonomous Vehicles*
- 3.5.3 *Electric vehicles*

3.5.4 *Empirical Evidence on Capital Costs*

3.5.5 *Is Highway Travel Subsidized?*

3.6 The role of parking

3.7 Bicycles and scooters

3.7.1 *Determinants of bicycling and modeling considerations*

3.7.2 *Bicycling and cost-benefit analysis*

3.7.3 *Bicycle sharing systems*

3.7.4 *Electric bicycles*

3.7.5 *Electric scooters*

3.8 Conclusions

Chapter 4: Pricing and Usage

4.1 First-best congestion pricing of highways

4.1.1 *Static congestion*

4.1.2 *Dynamic congestion*

4.2 Second-Best Pricing

4.2.1 *Network aspects*

4.2.2 *Time-of-day aspects*

4.2.3 *User heterogeneity*

4.2.4 *Stochastic congestion and information*

4.2.5 *Monetary rewards and tradeable permits*

4.2.6 *Interactions with other distorted markets*

4.2.7 *Second-best pricing: a conclusion*

4.3 Congestion Pricing in Practice

4.3.1 *Full congestion pricing in large cities*

4.3.2 *Value Pricing in North America*

4.3.3 *Other road pricing schemes*

4.3.4 *Distance-based tolling*

4.3.5 *Implications of autonomous vehicles*

4.3.6 *Conclusions*

4.4 Pricing of Parking

4.4.1 *Parking pricing with search congestion*

4.4.2 *Parking pricing and road traffic congestion*

4.4.3 *Parking pricing with endogenous trip timing*

4.4.4 *Optimal occupancy*

4.4.5 *Summary*

4.5 Pricing of Public Transit

4.5.1 *Fare level*

4.5.2 *Fare structure*

4.5.3 *Incentive effects of subsidies*

4.5.4 *Political considerations of transit subsidies*

4.6 Political Economy of Pricing

4.6.1 *Tax competition*

- 4.6.2 *Political economy of government decision-making*
- 4.6.3 *Political economy of parking fees*
- 4.6.4 *Distributional effects of pricing*
- 4.6.5 *Public acceptability*
- 4.6.6 *Policy lessons*

4.7 Conclusions

Chapter 5: Investment

5.1 Capacity choice for highways

- 5.1.1 *Basic results: capacity choice with first-best pricing and static congestion*
- 5.1.2 *Self-financing in more complex settings*
- 5.1.3 *Second-best highway capacity*
- 5.1.4 *Naïve investment rules*

5.2 Cost-benefit analysis

- 5.2.1 *Willingness to pay*
- 5.2.2 *Demand and cost forecasts*
- 5.2.3 *Discounting future costs and benefits*
- 5.2.4 *Distortions*
- 5.2.5 *Wider economic benefits and network effects*
- 5.2.6 *Example: high-speed rail*
- 5.2.7 *Conclusion: the use and misuse of cost-benefit analysis*

5.3 Conclusions

Chapter 6: Industrial Organization of Transportation Providers

6.1 Private highways

- 6.1.1 *Single road with static congestion*
- 6.1.2 *Single road with dynamic congestion*
- 6.1.3 *Heterogeneous users*
- 6.1.4 *Private toll lanes: the two-route problem revisited*
- 6.1.5 *Competition in networks*

6.2 Regulation and franchising of private roads

6.3 Privately provided transit services

- 6.3.1 *Forms of privatization*
- 6.3.2 *Market structure and competitive practices*
- 6.3.3 *Contract design*
- 6.3.4 *Efficiency of public and private providers*
- 6.3.5 *Experience with privatization and deregulation*
- 6.3.6 *Ride-sourcing, ride-sharing, and Mobility as a Service*

6.4 Conclusions

Chapter 7: Transportation, Energy, and Climate

- 7.1 Fuel price, fuel efficiency, and motor vehicle usage
 - 7.1.1 *Dynamics of demand responses*
 - 7.1.2 *Empirical results: demand for motor vehicle fuel*
 - 7.1.3 *Empirical results: fuel efficiency the energy efficiency gap*
 - 7.1.4 *Empirical results: motor vehicle usage and the rebound effect*
- 7.2 Policies to reduce motor vehicle fuel consumption
 - 7.2.1 *Promoting vehicle fuel efficiency*
 - 7.2.2 *Fuel taxes*
- 7.3 Motor Vehicle Usage and Climate Change
 - 7.3.1 *The role of motor vehicle emissions in greenhouse-gas control*
 - 7.3.2 *The social cost of carbon dioxide*
 - 7.3.3 *Carbon taxes*
 - 7.3.4 *Alternative fuels*
- 7.4 Conclusions

Chapter 8: Conclusion

- 8.1 Continuing themes
 - 8.1.1 *Scheduling and reliability*
 - 8.1.2 *Safety*
 - 8.1.3 *Design of road pricing schemes*
 - 8.1.4 *Sustainability*
 - 8.1.5 *Urban goods movement*
- 8.2 Emerging themes
- 8.3 Trends in transportation research