A Handbook of Transport Economics, edited by André De Palma, Robin Lindsey, Emile Quinet, and Roger Vickerman. 2011. Cheltenham, U.K. and Northampton, Massachusetts: Edward Elgar. 905 + xviii. ISBN 978-1-84720-203-1, $330.

This handbook reviews the most recent and state-of-the-art advances in transportation economics. The 37 papers by the leading experts in the field cover the most important policy issues in all transport sectors. The papers are grouped into five parts. Of course I expected the papers in each part to share a common theme, and the five themes together to cover the scope of research in transportation economics. As the volume is a handbook, I expected the papers to review current research topics, recent advances in research methodologies and theories that are relevant to the topics, and the most recent findings. With such an expectation in mind, I will review the book part by part, and also discuss the current status of transportation economics research.

The five parts are: "Transport and Spatial Economy"; "The Demand for Transport"; "The Cost of Transport"; "Optimal Public Decisions"; and "Competition and Regulation." In the first, two papers, one by Miren Lafourcade and Jacques-François Thisse and one by Takatoshi Tabuchi, explain the important role of transport costs in shaping regional trade patterns and urban spatial structure in the framework of the New Economic Geography (NEG). The authors demonstrate how transportation researchers can benefit from theoretical advances in other fields. With the NEG framework, one can study various policy issues, test theoretical predictions empirically, and construct structural empirical models in order to quantify the impacts of transport costs on regional economic development. It is surprising to me that none of the papers in part I reviews empirical studies under the NEG framework. The only paper in this part that reviews empirical studies is by Alberto Behar and Anthony Venables, who review studies that identify the impacts of transport costs on bilateral trade using the reduced-form gravity equation. Their paper does not reflect recent advances that have offered theoretical foundations for gravity equations (e.g., Eaton and Kortum, 2002). Compared to the reduced-form gravity model, structural gravity models derived from such theoretical foundations can lead to richer estimation and better interpretation of the estimated coefficients.

Papers in part I also do not reflect the revival of the Ricardian model in trade theory during the last decade. As Eaton and Kortum (2002) demonstrate, in the New Ricardian model transport costs affect trade through the interaction with relative productivity levels of regions instead of through the interaction with increasing returns to scale, as in NEG. The New Ricardian framework provides an alternative tool to study policy questions. For example, consider improvement in transport infrastructure. It can affect interregional trade through two channels. First, given relative productivity levels, it affects trade through reducing transport costs; second, it can affect trade through changing relative productivity levels.

Guided by advances in both economic theory and empirical methods, empirical researchers have generated some exciting works that measure the impacts of transport on the spatial economy. Donaldson (2010) applies Eaton and Kortum's framework to measure the benefits of railways in nineteenth-century India. Duranton, Morrow, and Turner (2011) apply Anderson and Wincoop's gravity theory to estimate the effects of interstate highways on the level and composition of trade for U.S. cities. Duranton and Turner (2012) develop a theory of evolution of employment and roads in a system of cities and then bring the theory to data to estimate the effects of interstate highways on the growth of U.S. cities. Under the older frameworks of Alonso, Mills, and Muth, Baum-Snow (2007) estimates the effect of interstate highways on suburbanization in the U.S. In these examples empirical models are closely linked to economic theories, and authors discuss clearly empirical strategies that lead to convincing identification. For example, in Duranton et al. (2011), a city's stock of highways is likely to be endogenous, because decisions to build highways could depend on expectations of future needs for trade, so the authors use the 1947 highway construction plan and historical maps of railroads and roads as instruments for 1983 highways. These two features

represent the current trends in empirical research, but such trends are not reflected in papers in this handbook.

I am not very enthusiastic about the two other papers included in part I. Johannes Bröcker and Jean Mercenier introduce computable general equilibrium (CGE) models and outline possible ways to incorporate transport sectors into them. The paper reads like a manual on how to apply a one-size-fits-all CGE model, and it offers limited room for readers to think about pros and cons of CGE models. Michael Wegener introduces recently developed simulation models of spatial economic development. These models are treated as standard toolboxes that can be applied without knowing underlying theoretical foundations and assumptions.

Part II of the handbook is on demand, one of the core research areas in transportation economics. Three papers here are very useful. David Hensher reviews the history, theoretical foundations, estimation methods, and empirical evidences of value-of-time (VOT) studies. VOT is a parameter used to measure travelers' willingness-to-pay for travel-time savings. This parameter plays an essential role in quantifying benefits from transport projects, and normally it is estimated by using discrete choice models. Joan Walker and Moshe Ben-Akiva review the most recent advances in discrete-choice modeling—the mixture-choice models, which are a class of discrete-choice models with random parameters. Compared to the classical discrete-choice models, they have more flexible substitution patterns and can be used to measure heterogeneity in preferences. However, specification of them usually relies on *ad hoc* distribution assumptions. Walker and Ben-Akiva describe behavioral mixture-choice models that use behavioral rationales to guide the specification. Finally, André de Palma and Mogens Fosgerau introduce the basics of Vickrey's bottleneck model, the standard approach to model congestion dynamics, and then discuss the possible extensions. Modeling congestion dynamics is essential for designing policies such as time-varying congestion pricing.

The remaining two papers are not good fits for this part of the book. Abdul Rawoof Pinjari and Chandra Bhat review activity-based travel demand models, which could be more consistent with economics than the current utility-based demand modeling approach. However, currently available activity-based models are mainly forecasting tools developed by transport engineers and have been widely used by transport planners. Such approaches are mainly for operational purposes and they are not ideal frameworks to answer economic questions. The paper by Michel Beuthe is on economics of transport logistics. Although such a topic is interesting, I cannot see reasons why it belongs in a group about demand.

One important research question not discussed in part II is the research design in modeling travel demand and estimating value of time. In practice, two types of data—revealed preference (RP) and stated preference (SP) data, are used to develop discrete-choice models. RP data are normally obtained by asking respondents about actual travel choice behavior, SP data by observing respondents' choices in hypothetical situations such as lab experiments. Statistical inferences based on RP data face several challenges: collinearity among variables, measurement errors in key attributes such as travel times, and endogeneity caused by omitted attributes or unobserved tastes. SP data are tainted by doubt whether actual behavior will be the same as exhibited in hypothetical situations. The important question on research design is how to combine the strengths of RP and SP data to achieve a convincing identification. One application combining RP and SP in estimating value of time is Small, Winston, and Yan (2005). Recently Train and Wilson (2009) proposed a new design—SP-off-RP.

Transportation researchers largely have ignored important contributions to discrete-choice modeling from the field of empirical industrial organization, and that is reflected in this handbook. Berry, Levinsohn, and Pakes (1995, hereafter BLP) propose a way to estimate discrete-choice models using the general method of moments (GMM). Their approach has appealing features: choice models are estimated by using market share data, and endogeneity caused by omitted product attributes can be addressed by using instrument variables. As a result, the BLP approach has been extremely influential in empirical industrial organization and marketing research. Berry and Jia (2010), Yan and Winston (2012), and others have applied it to air travel. Researchers in both transportation economics and civil engineering have made substantial contributions to discrete-choice modeling by developing choice models with flexible substitution patterns and incorporating behavioral rationales. They also expend much effort to collect disaggregate choice data, but endogeneity concerns remain.

For example, in Small et al.'s (2005) estimation of a route-choice model, travelers' responses to prices of the express lane may reflect their unobserved preferences for departure times. In such a case, price is correlated with the error term of the indirect utility function. Such endogeneity concerns have seldom been discussed in transportation literature, and the BLP framework is useful to account for endogeneity issues.

Part III of the handbook, on the cost of transport, covers both production costs of operations and external costs. Estimating production cost functions of operators such as airlines, railways, and trucking companies has a long history, and the estimates help answer important questions regarding economies of scale and operator efficiency. The first two papers in this part, one by Leonardo Basso, Sergio Jara-Diaz, and William G. Waters II and the other by Tae Hoon Oum, Katsuhiro Yamaguchi, and Yuichiro Yoshida, cover these topics. The remaining six papers in this part are on the theory of external costs and empirical estimates of various external costs of transport and energy consumption. Empirical studies of the effects of various policies to reduce external costs and energy consumption— such as gasoline taxes, emission standards, and subsidies to public transport and alternative fuels— are totally omitted in this handbook.

The eight papers in part IV, on the theme of optimal public decisions, are on congestion pricing, intelligent traveler information systems, and project evaluation. Simon Anderson and Régis Renault describe the basics of price discrimination, which is very useful because transport firms make wide use of various price discrimination strategies, a familiar and notable example being airlines' revenue management practices. Understanding the relationship between price discrimination strategies and market competition has important policy implications. However, in my view, Anderson and Renault's paper would be a better fit in part V, which is about competition and regulation. Jonathan Gifford reviews travel demand models that incorporate psychological factors. Such a paper would fit better in part II. One research question omitted in part IV is the role of time horizon and uncertainties in evaluation.

Part V on competition and regulation has a very clear structure; three papers cover topics related to public-private relationships, and seven describe theory, empirical studies, and institutional background of competition and regulation in each of the major transport sectors. Several papers are very useful. Elisabetta Iossa and David Martimort introduce the theory of incentives and discuss how the theory can be applied to design optimal mechanisms of public–private partnership. Today, in countries such as the United States it is a normal practice for government to delegate the task of building transport infrastructure to private firms through competitive bidding processes. Efficiency of the infrastructure depends, then, on how the procurement mechanism is designed. For example, Lewis and Bajari (2011), in a study of state highway departments in the U.S., show that contract designs with explicit time incentives can reduce highway construction time by 30–40 percent. Iossa and Martimort's paper is an ideal starting point for anyone wanting to study such questions of incentives in procurement design. Richard Arnott introduces the economics of parking, and offers an analytical framework to investigate policy issues. Parking is an essential element of urban transport, but applying economic principles to analyze related problems started only recently. Anming Zhang, Yimin Zhang, and Joseph Clougherty convey a very important message: airports and airlines cannot be treated separately in analyzing competition and regulation in air transport. Their message is also applicable to maritime transport, where ports and shipping operators interact with each other through a vertical relationship.

Overall, the handbook is very timely and important for the field of transportation economics. It demonstrates that transportation economics should be an important and exciting field in economics, important because transportation sectors are important in the national and world economy, and exciting because transportation sectors are complex and raise issues closely related to policymaking. The handbook also demonstrates there is no real difference between transportation economics and other branches of applied microeconomics. Transportation economics overlaps with other fields such as urban and regional economics, public economics, environmental economics, development economics, international trade, and industrial organization; transportation economists borrow tools from other branches of economics and develop tools that are used by economists in other fields. On the other hand, this handbook indicates that researchers in transportation economics have not paid much attention to advances in empirical methodologies in related fields. In the past decade, we have witnessed the progress in other fields of applied microeconomics where empirical studies bring

theories to data and research designs to achieve convincing identification are always highlighted. I hope the next edition or a second volume of the handbook can incorporate examples of such empirical work on transportation.

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REFERENCES

Baum-Snow, Nathaniel. 2007. "Did Highways Cause Suburbanization?" *Quarterly Journal of Economics*, 122, 775–805.

Berry, Steven, James Levinsohn, and Ariel Pakes. 1995. "Automobile Prices in Market Equilibrium," *Econometrica*, 63, 841–890.

Berry, Steven and Panle Jia. 2010. "Tracing the Woes: An Empirical Analysis of the Airline Industry," *American Economic Journal: Microeconomics*, 2(3), 1–43.

Donaldson, Dave. 2010. "Railroads of the Raj: Estimating the Impact of Transportation Infrastructure," Working Paper 16487, National Bureau of Economic Research, Cambridge, Massachusetts.

Duranton, Gilles and Matthew Turner. 2012. "Urban Growth and Transportation," *Review of Economic Studies*, 79, 1407–1440.

Duranton, Gilles, Peter Morrow, and Matthew Turner. 2011. "Roads and Trade: Evidence from the U.S.," unpublished paper, Economics Department, University of Toronto.

Eaton, Jonathan and Samuel Kortum. 2002. "Technology, Geography, and Trade," *Econometrica*, 70, 1741–1779.

Lewis, Gregory and Patrick Bajari. 2011. "Procurement Contracting with Time Incentives: Theory and Evidence," *Quarterly Journal of Economics*, 126, 1173–1211.

Small, Kenneth, Clifford Winston, and Jia Yan. 2005. "Uncovering the Distribution of Motorists' Preferences for Travel Time and Reliability," *Econometrica*, 73, 1367–1382.

Train, Kenneth and Wesley Wilson. 2009. "Monte Carlo Analysis of RP-off-SP Data," *Journal of Choice Modeling*, 2, 101–117.

Yan, Jia and Clifford Winston. 2012. "Designing a Market for Privatized Airports: The Case of the San Francisco Bay Area," unpublished paper, School of Economic Sciences, Washington State University.