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Railroad Economics

by **Brian W. Sloboda**

Railroad Economics, volume 20 in Elsevier's Research in Transportation Economics series, is a pleasant read concerning the latest research in railroad economics. Edited volumes often become mélanges of contributions stitched together by a not-so-obvious theme. The articles in this volume, however, provide an array of research in railroad economics which has some serious policy implications in railroad economics. The editors lay out the rationale for the book, its organization, the main points of the chapters, and how each chapter fits into the scope of research in railroad economics. As such, this book could be of value to researchers and practitioners in transportation economics, transportation policy-makers, and students.

Railroads have played a prominent role in the economic development of countries and regions since the 19th century because of the massive capital investments required to develop these systems. These investments were in steel, timber, machinery, iron, and other materials. The acquisition of these materials allowed these industries to develop and improve the economic development of a nation and/or region. The first chapter by Waters, "Evolution of Railroad Economics," provides a comprehensive overview of railroad economics since the 19th century. The earliest assessments in railroad economics delved into the links between railroads and economic development of nations and/or regions. Then the literature shifted to the increasing returns and the implications for market structure and efficiency which provided the rationale for government market intervention in railroads. In fact, railroad pricing was the precursor to multi-product pricing theory and data from railroads helped foster cost function estimation in railroad economics as well as other areas in economics. The government's development of a regulatory framework for railroads led to the study of regulatory economics and its impacts on the firms. Once deregulation was completed for railroads, the debate turned to policy on government intervention or promoting additional competition to increase efficiency in railroads.

Because of the extent of regulation of railroads by the government, railroads always needed more detailed cost data. Additionally, railroads required detailed cost data to set rates, to determine profitability of various components of their operations, and to make investment decisions. Bitzan and Wilson in their paper, "Hedonic Cost Function Approach to Estimating Railroad Costs," use a hedonic railroad cost function which allows for differences in marginal cost across different outputs with different shipping characteristics. Their research examined the elasticity of cost with unit train output and showed results of all outputs of .60, which indicates significant economies of density. In fact, the elasticity measures for way and through service and unit train service were shown to be inelastic. The authors also apply the hedonic cost approach to derive results disaggregated by commodity shipped by railroad.

Train and Wilson, in "Spatially Generated Transportation Demands," discuss the demand for freight transportation. Demand for freight transportation is a derived demand which entails what mode to use to ship freight. The spatial demand models show that the demand for transportation occurs at different points geographically with access to different modes of transportation. The authors estimated an empirical model using a modal choice model for rail and barge. If the shippers do not have access to one or both modes, the shippers would need to ship by truck and incur truck (access) costs. Their empirical results reveal that access costs, barge and rail rates, and shippers' attributes do matter significantly in the determination of mode choice for the shippers. Once the choice model is developed, this model is augmented by rate functions defined over space and are used to derive spatially generated modal demand functions.

Econometric demand models for passenger railways have, for years, followed a time series approach. In the paper by Wardman, Lythgoe, and Whelan, "Rail Passenger Demand Forecasting: Cross-Sectional Models Revisited," the authors develop a rail passenger model following a cross-sectional rather than time series approach. There are three main contributions to their empirical work. First, the models are extended to allow a detailed analysis of catchment areas; the ticket-sales data that are used to estimate these models only cover journeys between stations. Second, access to and egress from stations are investigated by refining functions of population and accessibility to stations separately from rail service quality. The best models are achieved with inverted s-shaped access and egress functions rather than assuming constant elasticity. Third, station choice is modeled using a multinomial logit model that yields fresh insights into rail travel demand.

One of the major drivers of railroad deregulation under the Staggers Act was the impact of rail rates on railroads and shippers. In fact, railroads reversed their losses (as measured by ton-miles) to the motor carrier industry, regained their profits and costs, and reduced prices as well. The paper by Ivaldi and McCullough, "Railroad Pricing and Revenue-to-Cost Margins in the Post-Staggers Era," examines empirically the effects of the Staggers Act by investigating the relationship between car-type specific marginal costs and car-type specific rates. These are used in the development of the Lerner indices that are the traditional methods for examining pricing behavior. These indices are also used in the examination of market conditions in commodity-specific markets and to help determine if a railroad's revenues are adequate to cover rail costs. Their empirical results indicate that the Lerner Index averaged about 1.06 between 1981 and 2004.

Vertical separation is often seen as a remedy to instill competition in the rail freight industry. The advantage of the option of complete vertical separation is that it removes any incentives for the infrastructure operator to discriminate among different "upstream" competitors. That is, a track company vertically integrated into train operations would favor its own trains over the trains of another company running over its tracks. The most obvious disadvantage of vertical separation is that it eliminates the economies of scope enjoyed by an enterprise controlling both track and trains. The paper by Pittman, "Options for Restructuring the State-Owned Monopoly," suggests three approaches short of full vertical separation to allow for greater competition among freight train operators: (1) encouragement of intermodal competition wherever economically feasible; (2) having parallel or source competition among restructured vertically integrated railroads; and, as a less preferred option, (3) opening up the infrastructure of the vertically integrated railways to use by nonintegrated train operating companies.

The most common safety issues are occupational injuries to employees, not problems with collisions and derailments. In fact, statistics show that accident rates decreased throughout the 20th century. More important, the injury rates of employees fell and grade crossing fatalities also decreased. Yet the railroads are subject to considerable safety regulation despite the fact that travel by train is safer than driving. The paper by Savage, "Trespassing on the Railroads," shows that more than half of all the fatal injuries on the railroads in the United States are sustained by trespassers. This paper provides a statistical assessment over time of the demographics of trespassers, their activities, and the causes of their injuries. The results of this analysis determined that the risk of injury or death were significant for males in their 20s and 30s. In fact, the number of casualties has been stable for the past few decades, a fact attributed to increasing affluence, which tends to make people more risk averse.

U.S. railroad mileage has declined significantly in the past several decades. Railroad abandonment has negative benefits that are more problematic in rural areas which rely on railroads for outbound shipments of goods and inbound shipments of inputs. The paper by Babcock and Bunch, "Energy Use and Pollutant Emission Impacts of Shortline Railroad Abandonment," develops a model that measures wheat transport modal ton-mile shifts resulting from hypothetical shortline abandonments. Additionally, they assess modal energy use and emissions resulting from hypothetical shortline abandonment. Ton-mile changes resulting from abandonment of Kansas shortlines were computed using minimum transportation and handling costs for moving Kansas wheat from

farms, through the grain elevators, and through railroad locations to export terminals in Houston, Texas. Total ton-miles are about the same in the simulated shortline abandonment and no shortline abandonment cases, with the abandonment scenario generating 2% fewer ton-miles. However, the energy consumption is almost identical in the two scenarios. Finally, all these results are attributable to the dominance of Class I railroads in the logistics system for wheat.

Since the implementation of the Staggers Act in 1980, there have been positive impacts on shareholders and shippers, namely an increase in rates of return on investment and lower real rates and improved service. However, there have been some negative impacts on labor: (a) decline in bargaining power, (b) loss of jobs, and (c) erosion of labor protection programs. However, managerial earnings received little negative impact because the performance of the industry greatly improved after the implementation of the Staggers Act. In "Earnings Differentials of Railroad Managers and Labor," Peoples and Talley study the earnings differentials of railroad managers and labor under regulation and under deregulation. Their results indicate that weekly earnings of railroad nonunion labor (except for nonunion conductors) experienced a greater decline during the deregulation period than the earnings of union labor. Their empirical results also indicate the percentage decline in the earnings of managers since the deregulation period was smaller than for union and nonunion labor.

Deregulation in railroads has provided great savings to shippers as well as increased flexibility. The major benefit of deregulation has been the reduction of transportation costs. In addition, the railroad industry became more profitable after deregulation. Despite the multitude of positive benefits from deregulation in the railroad sector, some interesting policy issues resulted. This volume examines some of those issues. While readers may choose to peruse papers of interest to them, there is value in these papers as a collection because these papers provide the latest, comprehensive research in railroad economics.

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