IS RETURNS TO SCALE WITH VARIABLE NETWORK SIZE ADEQUATE FOR TRANSPORT INDUSTRY STRUCTURE ANALYSIS?

Leonardo J. Basso and Sergio R. Jara-Díaz

Departamento de Ingeniería Civil – Universidad de Chile
Casilla 228-3, Santiago, Chile; lbasso@ing.uchile.cl – jaradiaz@ing.uchile.cl

This paper is now forthcoming in *TRANSPORTATION SCIENCE*.

Its working title was:

Requiem for Returns to Scale with Variable Network Size in Transport Industry Structure Analysis

Abstract

It is customary to analyze transport industry structure using two indices: economies of density and *economies of scale with variable network size* (*RTS*). The latter has been defined to analyze the behavior of costs when output and network size expand simultaneously. After reviewing in detail what is intended with the calculation of *RTS* under this definition, we show analytically that, when the spatial aspects underlying transport production are taken into account, the seemingly reasonable conditions imposed on the aggregate output descriptions and the network variable in fact conceal implicit output expansions that are not uniquely defined: they happen to depend on the specification of variables and on the evaluation point. Furthermore, most of the multiple output expansions analyzed correspond to cases that are hardly instructive. We conclude that this index is inherently ambiguous, hardly contributes to an adequate analysis of transport industry structure and should be replaced by the calculation of economies of spatial scope. (*JEL* L91, L11, D40).

Acknowledgments: We would like to thank Markus von Wartburg, Tom Ross, Gabriela Morales Anming Zhang, Tae Oum, and seminar participants at The University of British Columbia, Universidad de Chile, University of Maryland and the World Conference on Transport Research for helpful comments and suggestions. This research was partially funded by Fondecyt-Chile, grant 1050643, and the Millennium Nucleus “Complex Engineering Systems”.