



On the change in surpluses equivalence: measuring benefits from transport infrastructure investments

José Meléndez-Hidalgo ^{1*}, Piet Rietveld ¹, Erik Verhoef ^{1,2}

¹ Department of Spatial Economics, Free University of Amsterdam

² Tinbergen Institute

Abstract

Reductions in transport costs resulting from infrastructure improvements generate benefits that can be measured as surplus changes either at an economy-wide scale (social welfare changes) or, as is common practice in cost-benefit analysis (CBA), at a transport market level as transport users' surplus changes. In this paper we look at an economy with spatially separated markets embedded in a transport network (a spatial price equilibrium model) to study the equivalence between these two benefit measures. Three different product market competition arrangements are considered. A similar question and strategy is presented in Jara-Díaz (1986) employing a two-node network and extreme competition assumptions on the production side: perfect competition and monopolistic production with arbitrage. We extend his work by additionally considering perfect collusion (monopoly without resale) and Cournot-Nash oligopoly under flow-dependent transport costs (i.e. congestion in transport). Numerical simulations in a three-node network with and without transshipment nodes, illustrate our main results.

Keywords: Cost-benefit analysis; Indirect benefits.

1. Introduction

In recent years a renewed interest has emerged on the effects arising outside the transport market when transport infrastructures are improved (SACTRA, 1999). The interest on this issue in economics can be traced back to Tinbergen (1956) where, for a three-region economy under monopolistic production, a comparison is made between transport users' cost savings and economy-wide effects (e.g. aggregate production changes) after a reduction in the cost of transportation for a pair of regions. In a related vein of research Jara-Díaz and Friesz (1982) employed a spatial price equilibrium (SPE) model to study the equivalence between the economy-wide changes in trade surplus and the transport users' benefits for a two-region economy under perfect competition in production. Their paper initiated the use of SPE models to investigate the properties of

* Corresponding author: José Meléndez-Hidalgo (jmelendez@feweb.vu.nl)