

Estimating the Size of Transport-Induced Agglomeration Effects in US Metropolitan Areas

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ABSTRACT

Venables (2007) showed that there are productivity gains from urban transport improvements which arise through agglomeration economies. The theory is that transport provision increases the strength of production-related agglomeration economies because it improves the connectivity between agents, which in turn reinforces the benefits of agglomeration externalities related to knowledge spillover effects, labour market pooling, and input-output sharing. While this interaction between transport and agglomeration economies is widely accepted, there have been very few attempts at a direct empirical quantification. The main approach of these studies has been to specify agglomeration economies as a direct function of transport networks using *market potential* type measures (e.g. Rice et al., 2006, Graham, 2007a, Graham, 2007b, Graham et al. 2010, Le Néchet et al., 2011, Holl, 2013). These studies, however, cannot measure the extent to which agglomeration effects are reinforced, or reduced, through provision of different types of transport.

In this paper we measure how much of the positive effect of urban agglomeration economies on productivity arises through the provision of transport infrastructure. We develop an empirical framework based on a system of simultaneous equations and panel data for large Metropolitan Statistical Areas (MSAs) in the US to investigate the indirect effect of road transport and public transport on labour productivity, which emerges through an increased or reduced reach of agglomeration economies.

Our most interesting finding is that the provision of public transport reinforces urban agglomeration economies, while road transport appears to weaken the benefits of urban agglomeration economies. This indicates that transport-induced urban agglomeration effects are positively reinforced by public transport but negatively affected by road transport, and highlights the importance of public transport in supporting positive urban agglomeration externalities. Road networks are associated negatively with urban agglomeration densities, a result which has also been found by previous research on transport and suburbanisation (e.g. Burchfield et al., 2006, Baum-Snow, 2007), but are found to have a direct contribution to economic productivity.

Like many previous studies, we find positive evidence of urban agglomeration economies. The direct effect of doubling employment density on worker productivity is 3.5%, while the overall effect is approximately 2%. This value is broadly consistent with the values reported in existing surveys of the empirical literature (e.g. Rosenthal and Strange, 2004, Melo et al., 2009), typically ranging between 3-8%.

JEL Classification: R11, R12, R41

Key words: Transport-induced agglomeration effects, productivity, simultaneous equations

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