

Title: Transport networks and accessibility: complex spatial interactions

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Abstract:

A worker might respond to an unfortunate local labour market situation by commuting or migrating to a zone with better prospects. This decision depends on the labour market accessibility of the worker's current residential location. Labour market accessibility is represented in our model by a measure of generalised distance with weights given by a logistic distance deterrence function. This introduces a set of parameters reflecting the response of spatial interaction to labour market accessibility. We focus on the impact of these parameters in discussing the effects of changes in the road transportation infrastructure and in the spatial distribution of basic sector jobs.

The spatial distribution of local sector activities reflects shopping decisions and the residential location pattern. Shopping behaviour, in turn, affects labour market accessibility. Highly accessible locations might attract shopping due to agglomeration benefits. We use a function that allows the local sector density to be higher in the central business district than in the suburbs and periphery. This provides an opportunity to study how important different aspects of accessibility and agglomeration benefits are in determining the degree of urbanization and the development in rural areas.

A general spatial equilibrium model is applied, capturing simultaneously all the three forms of spatial interaction, in addition to determining an equilibrium spatial distribution of employment and population. The analysis is based on numerical examples, experimenting with characteristics of the road transportation network and the spatial distribution of basic sector jobs. We study how the effects of such shocks depend on behavioural responses to different aspects of labour market and local sector accessibility. We also study the cumulative causation aspect of accessibility; whereby highly accessible areas attract jobs and workers, further enhancing such zones' accessibility. We consider predicted changes in accessibility when we assume fixed locations for jobs and workers, and compare these predictions to a situation where we account for relocation effects.