

DISSERTATION DEFENSE

Essays on Urban Agglomeration

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Friday, October 21, 2011

2:00 pm

388 Posner Hall

This thesis examines several distinct aspects of agglomeration externalities within an urban economy. In particular, the work focuses on location decisions of agents who face trade-offs between advantages in dense locations versus cheaper land prices available in suburban and exurban regions of the city. Two general equilibrium models of location are presented which study different aspects of location choice in urban areas.

In chapter 1, we develop a new dynamic general equilibrium model to explain firm entry, exit, and relocation decisions in an urban economy with multiple locations. We characterize the stationary distribution of firms that arises in equilibrium. The parameters of the model can be estimated using a nested fixed point algorithm by matching the observed distribution of firms by location and the one implied by our model. We implement the estimator using unique data collected by Dun and Bradstreet for the Pittsburgh metropolitan area. Firms located in the central business district are older and larger than firms located outside the urban core. They use more land and labor in the production process. However, they face higher rental rates for office space which implies that they operate with a higher employee per land ratio. Our estimates imply that agglomeration externalities increase the productivity of firms by one to two percent. Economic policies that subsidize firm relocations can potentially have large effects on economic growth and firm concentration in central business districts.

In Chapter 2, I develop and estimate a general equilibrium model of business and residential location in the presence of agglomeration externalities and commuting costs. The model is based on the theory introduced by Lucas and Rossi-Hansberg (2002), but adds a congestion cost in addition to a distance cost of commuting. This specification allows for the investigation of the effect of different transportation technologies (i.e. transit or automobile infrastructure) on the spatial structure of cities. In addition, other modifications are made in order to make empirical analysis tractable. I introduce data on commercial and residential densities, commuting times, and wages paid, to illustrate the structure of cities and highlight the trade-offs faced by businesses and individuals in location decisions. The model is estimated using a method of moments procedure, and the estimates are used to illustrate the quantitative aspects of equilibrium, including the importance of congestion in commuting costs. Policy experiments show that decreasing congestion costs relative to distance costs (a policy akin to increasing transit provision) increases the relative concentration of employment in the center city and increases residential density in inner ring suburbs.