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Sectoral spillovers and the price of land: a cost analysis

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Abstract

Under factor mobility, firms locate where local attributes enhance their productivity, but, in equilibrium, those gains are offset by higher local input prices. I study the variation in local input costs to identify production amenities across sectors in two ways. I estimate, first, hedonic rent and wage equations from individual households and workers and, second, local cost functions for different sectors across the US States and across Metropolitan Statistical Areas. I find evidence of externality gains from both a sector's and overall concentration of activity and from a better educated population. These gains are bigger in sectors with higher local land shares in the sample, finance and nondurable goods. © 2000 Elsevier Science B.V. All rights reserved.

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1. Introduction

In equilibrium, agglomeration effects lead to both productivity gains and higher local prices. Firms locate in areas where they enjoy productivity gains due to economies of scale, pecuniary externalities and having a specialized or highly skilled labor force, among other things, but prices for local inputs — land rents and wages — increase because of the pressure exerted in local markets by the

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increased demand (e.g., Roback, 1982; Beeson and Eberts, 1989; Rauch, 1993). Accordingly, the variation in local prices emerges as an appropriate measure to identify the exact sources of externality gains among the list of potential candidates that the agglomeration literature has developed. Moreover, input prices may be studied separately for each sector to capture the particularities of externalities effects in each sector.

In this paper I follow two strategies to study how differences in local costs reflect the importance of local production amenities across sectors. First, I estimate hedonic rent and wage equations using a sample from the 1990 Census. After controlling for housing and workers characteristics, I use measures of sectoral and total activity, sectoral diversity and average human capital for each Metropolitan Statistical Area (MSA) to account for differences in returns to local inputs. Since externality gains potentially differ across sectors, I estimate separate wage equations for the subsamples of workers in the finance and the manufacturing sectors, as well as in the durable and nondurable goods subsectors.

As a second exercise, I construct a weighted cost variable for each sector, using land rents and sectoral wages in each region. This measure reflects variation in costs only due to local inputs and abstracts from prices of tradable inputs, which are similar across locations. I study the relation of this local cost variable to measures of local attributes for both the US states from 1969 to 1992 and Metropolitan Statistical Areas (MSAs) in 1990.

Three findings stand out. First, the finance sector and the nondurable goods subsector profit the most from all types of externalities. Second, a higher level of human capital crucially enhances productivity across all sectors. Finally, measures of economic activity at the state level, rather than at the metropolitan or the regional level, are the most relevant to explain the variance in local costs. By contrast, measures of sectoral diversity or population size do not fare as well as theoretically expected.

The paper is organized as follows. Section 2 presents a model of regional production and describes the two estimation strategies to identify the importance of local externalities using variation in local input costs. Section 3 introduces the types of externalities under study. Section 4 presents evidence from hedonic equations from household and individual data. Section 5 presents the estimated local sectoral costs equations for both the US states and the MSAs. Section 6 follows with some concluding comments.

2. A model of local externalities

Consider, first, a model showing how differences in local productivity should reflect in local prices, both wages and land rents. This model is an adaptation of local public goods models like those in Henderson (1987, 1988) or Roback (1982).