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# The impact of geographic differences in human capital on service firm formation rates

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## Abstract

Although human capital externalities are a key variable in theories of economic growth, there has been little investigation of the mechanism by which these externalities are realized. We examine the relationship between the local levels of human capital and firm formation rates and find that formation rates differ with the share of adults with college degrees, especially for industries that normally require college-educated founders. They also differ strongly with the local concentration of existing establishments in the same sector, especially for industries serving non-local markets, suggesting that an important mechanism is the spillover of relevant knowledge.

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## 1. Introduction

This study refines our earlier investigation of the impact of differences in local human capital resources on local differences in new firm formation rates (Armington and Acs [4]). Since the mid-eighties the role of education and human capital externalities has been recognized as a key variable in theories of economic growth. Models posited by Romer [28], Lucas [23] and Krugman [19] link such externalities within a geographically

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bounded region to higher rates of growth. Lucas [22] emphasizes that the economies of metropolitan areas are a natural context in which to understand the mechanics of economic growth, and an important factor contributing to this growth is the catalytic role of human capital externalities within the cities. While the benefits of human capital to individuals have been extensively studied, economists are now realizing that individuals do not capture all of the benefits from their own human capital. Some benefits spill over to their colleagues and observers—through discussions, example, publications, and even more positive attitudes toward change, risk, and new knowledge.

Several interesting findings provide some groundwork for our study. First, Rauch [25] finds that cities with higher average levels of human capital also have higher wages and land rents. Second, Glaeser et al. [13] find that for a cross section of cities a key economic determinant of growth is level of schooling, just as has previously been found for countries. They suggest that higher education levels influence later growth, not through increased savings, but by promoting higher rates of growth of technology through spillovers. Finally, Simon and Nardinelli [29,30] find historical evidence for both the United States and the United Kingdom that cities with more knowledgeable people grow faster in the long run because (a) knowledge spillovers are geographically limited to the city and (b) knowledge is more productive in the city within which it is acquired.

However, none of these studies asks the question, “What type of activity do agents pursue that leads to faster economic growth?” This question is important because if we wish to explain how growth occurs we need to identify the transmission mechanism from human capital to growth. Jovanovic and Rob [16] develop a model where individual agents augment their knowledge through pairwise meetings at which they exchange ideas. In each time period, each individual seeking to augment his knowledge meets an agent chosen randomly from a distribution of agents. The higher the average level of human capital of the agents the more “luck” the agents will have with their meetings and the more rapid will be the diffusion and growth of knowledge. If this knowledge contributes to technical innovations, new products, processes, or markets, we have a microeconomic foundation not only for the impact of human capital externalities on total factor productivity, but also for making those external effects dependent on both the average level of human capital and the local intensity of individuals with relevant knowledge or examples to share.

This paper extends research reported in Armington and Acs [4] that focused on firm formation in six sectors: distributive, manufacturing, business services, extractive retail trade and local market. The current paper focuses on the rapidly growing service sector and subsectors of service industries that are defined by their educational requirements and primary markets. The authors were fortunate to have limited access, through the Center for Economic Studies of the US Bureau of the Census, to comprehensive US microdata on recent service firm formations, which they grouped into labor market areas for this analysis. These data were crucial for our primary goal—to examine how the sensitivity of firm formation rates to local differences in human capital and other local economic conditions varies as a function of the market segment and location and the entrepreneurial characteristics typical of various industry subsectors. We empirically investigate how the new firm formation rates for various subsectors of service industries are influenced by human capital differences in 394 labor market areas, while controlling for other regional characteristics that are also likely to affect firm formation rates. This analysis contributes

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