

Where is innovation registered? Measuring the headquarters effect in innovation

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Abstract

Studying the different sources of productivity and growth have been one of the traditional topics of interest in the field of Economics since Adam Smith. Within this framework, there are multiple factors that have been highlighted. For example, the generation of human capital (see Mankiw et al., 1992), the quality of institutions (see Roberto and Rodríguez-Pose, 2019), flexibility of the labour market, the proportion of savings or the size of the public sector are usual factors that have been discussed to understand the evolution of the economy in the short and long run. However, within all these examples, the investment in innovation and development across the chain of production could be considered as one of the most renowned factors. This component is considered a key element of economic activity, specially in the long run. As explained in the traditional Solow-Swan model (see Solow, 1956), innovation is directly link to the increment of productivity of labour in the long-run. This result is created under the assumption of a constant movement of the production function of the Economy. This movement of the production function defines a steady state in the economy with a constant growth of production per capita equal to the growth of technology.

As explained in Basu and Weil (1998) or Los and Timmer (2005), the natural growth of labour productivity depends on the ‘assimilation of technologies’, the ‘creating potential’ and the ‘localized innovation’. The first one is the ability of a territory to improve their knowledge about an existent technology, the ‘creating potential’ indicates the potential growth that can be obtained through upgrades the technology and capital. The last one indicates the creation of new specific technologies in the territories, creating non-existent technologies, and moving the frontier. From the perspective of a production function, the first component could be seen as approaching the frontier with the same relation of capital per labour, the second one would increase this coefficient, while the last one would move the frontier given by the level of technology. It can be seen that innovation, or at least, the application of existent technologies is crucial for the improvement of productivity – therefore the rent of the population.

Given enough time to adjust for the possible destruction of obsolete jobs, these investments can easily create new opportunities for firms in terms of higher profitability in existing markets and/or access to new markets, boosting production and rent at a macroeconomic level

The importance of innovation is also one of the key elements in the development of Regional Economics. From Marshall (1890), there has been a body of literature highlighting the importance of the concentration of activity in order to boost innovation in an economy thanks to the availability of specialized workers,

specialized suppliers, knowledge spillovers or the possibility of having additional social interactions. Some of the most well known models, as in Venables et al. (1999) or Fujita and Thisse (2013) explain how concentration processes of the activity can easily create gains in productivity that are justified in terms of imperfect competition and the development of new ways of production. These gains in productivity have been tested in multiple empirical papers, like Ciccone and Hall (1996), Ciccone (2002), P P Combes et al. (2011) or Pierre Philippe Combes and Gobillon (2015) among many others.

Despite the importance of this component in the theoretical literature, there are important difficulties to accurately measure it, given that most of the firms tend to locate their headquarters in the capital of countries. This tendency to move their headquarters to the capital of the country is usually linked to the facilities for firms created by having most of the public institutions in the same city, different taxation and/or additional private administrative services essential for the headquarters. However, it easily creates a false image about the real location of economic investments, given, that most of them are reported in the headquarters region. The result is a bias in innovation figures, crucial for policy makers.

This bias can easily mislead regional governments about the real impact of their policies to boost this indicator, changing their decisions, or the importance of this variable to increase economic activity in a region. A biased measure of innovation creates an additional layer of dissuasion for regional governments trying to improve their economy, given that the consequences of these investments can already imply assuming a high risk, with no direct economic returns in many investments - e.g. in the initial or theoretical phases of research - and even when they do produce economic benefits, they are usually created over long periods of time, as explained in Mazzucato (2013). The result is a public sector extremely reluctant about these investments and easily accused of inefficiency in its investments when they are done. So, adding an identification problem of their capacity to boost private investments on research and development to this uncertainty can easily dismiss these policies through an illusion of ineffectiveness.

We propose a methodology based on Gutiérrez-portilla et al. (2019), where the authors measured the importance of headquarters effect on Foreign Direct Investment. In this research, the authors could observe that 64% of all the Foreign Direct Investment registered in Spain was assigned to the capital, Madrid. As in Research and development, firms register their foreign investments in the capital, creating artificial figures for this variable. They relate foreign investment with a set of independent variables, such as Gross domestic product, wages and road infrastructure, obtaining the headquarters-effect of Madrid using a dummy variable for this region.

Through this paper we estimate regional headquarters effect in innovation from 1990 through a panel specification with spatial effects. Firstly, we propose to explain private Research and Innovation assuming a production function of this output which depends on a series of favourable inputs like the percentage of workers in sectors with different innovation intensities, human capital as percentage of population with different degrees of education, the public investment in Research and development, gross domestic product per capita, size of research institutions, mean size of firms, barriers to make investments and the weight of economic sectors. This information is provided by Eurostat from 1990. We propose to

measure the headquarters effect as a consistent percentage of difference in each region in comparison with the capital which is not explained by any of the inputs in the model. The result should allow us to evaluate what regions tend to be more affected by this type of problem in their indicators and create a new set of corrected research and development figures. In a last step we provide additional explanations about the sources of this problem to understand why some regions could be more affected by this bias than others.

Through these estimations we hope to show an approximate real regional value of the innovation. These estimations should not only be useful to measure the importance of the headquarters-effect from an academic point of view, providing evidence about the reasons that could increase its importance. But we think it could be a guide for policy makers about the efficiency of their efforts. Through these results we expect that they can easily identify a more realistic level of innovation in their region, which could be used to motivate the creation of additional innovation policies in the future.

Keywords: Headquarters, innovation, productivity, spatial econometrics

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