



POLICY NOTE OF WORKING PAPER 4.18

DO LABOUR MOBILITY AND TECHNOLOGICAL COLLABORATIONS FOSTER GEOGRAPHICAL KNOWLEDGE DIFFUSION? THE CASE OF EUROPEAN REGIONS

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OBJECTIVE

The goal of this paper is twofold: first, we aim to assess the role played by inventors' cross-regional mobility and collaborations in fostering knowledge diffusion across regions and subsequent innovation. Second, we intend to evaluate the feasibility of using mobility and co-patenting information to build cross-regional interaction matrices to be used within the spatial econometrics toolbox.

SCIENTIFIC METHODS

To achieve the objectives above, we depart from a knowledge production function where regional innovation intensity is a function not only of the own regional innovation inputs but also external accessible knowledge stocks gained through interregional interactions. Differently from much of the previous literature, cross-section gravity models of mobility and co-patents are estimated to use the fitted values to build our 'spatial' weights matrices, which characterize the intensity of knowledge interactions across a panel of 269 regions covering most European countries over 6 years.

As it is customary assumed in the literature, distance matters so as the interdependences between units are stronger if they are closer in the space. Our tenet in this paper states, however, that distance matters precisely because labour mobility of skills and interpersonal formal ties tend to be regional in nature. With this idea in mind, we estimate a series of gravity models to explain both mobility and collaboration phenomena, using a set of geographical, administrative and cognitive variables. In so doing, a thorough analysis to choose the adequate estimation method is performed. Thus, we estimate year by year cross-sectional gravity models which allows us assessing the changing role of selected bilateral variables in explaining both mentioned phenomena. Afterwards, the fitted values of these estimations are used to build our weights matrices to characterize cross-regional R&D diffusion patterns, which may explain a sizeable part of patent production heterogeneity across regions.

POLICY VALUE-ADDED

As a first main result, we obtain that the geographical distance and the technological/cognitive distance are negative, as expected, and strongly significant. We find that both greater geographical as well as cognitive distances between two regions tend to hamper knowledge workers' mobility.

More important for our purposes are the significant and positive parameters obtained for the two variables proxying the available stock of knowledge from other regions; on the one hand, the elasticity of patenting activity with respect to R&D stocks in the rest of the European regions weighted by the mobility of researchers between each pair of regions, and the elasticity of patenting with respect to R&D stocks in the rest of European regions weighted by the intensity of collaborative networks across regions. The results seem to confirm that the production of knowledge in regions depends not only on its own research efforts and internal factors, but also on the knowledge available in other regions, accessible through mobile inventors and bilateral collaborations. In addition, it seems that among the two mechanisms through which knowledge diffuses and which we have explicitly considered in this paper, regions benefit more from external knowledge stocks when the transmission is

through networks of collaboration than through the movement of highly skilled workers. The impact of the later is one third of the former.

Already in the design of the *Innovation policy in a knowledge-based economy* (European Commission, 2000, p. 5), the European Commission made emphasis on knowledge mobility, since “the importance of tacit and specialised knowledge calls for greater mobility of knowledge workers”. Equally, it was highlighted that “European heterogeneity or variety can be exploited through networking of firms and scientists, to create a vibrant learning culture in which many different ideas and approaches are available as inputs to firms’ innovation and learning” (p. 6). In our paper we have empirically confirmed that policies fostering mobility and collaborations across inventors allow higher innovation outputs. Thus, policies that facilitate the mobility of knowledge among firms, stimulate collaborations among firms in their knowledge activities and foster senior knowledge workers visiting other institutions, even when crossing the borders of a region, has a benefit for the whole EU.

The importance of R&D policies has already been underlined by the 3% target of the Lisbon strategy, whereas for diffusion policies remain a further need for action for policy makers. This paper gives empirical confirmation that knowledge externalities flow easily among regions whose individuals are in contact thanks to the mobility of skilled workers or thanks to technological collaborations, irrespective of their geographical proximity, and so, policies with this target seems to be well founded.

In short, the empirical analysis undertaken here support the hypothesis concerning the importance of collaborations and, to a lesser extent, of labour mobility as the means fostering the geographical diffusion of knowledge. Hence, from a policy perspective, these results illustrate that, not only R&D and human capital efforts are important to generate innovations at the regional level, but also the degree of connectivity of agents with the outside world, which give them access to global knowledge hotspots is useful for innovation. Such idea of connectivity, among others, is precisely in the core of the ‘smart specialisation’ strategy recently launched by the European Commission.