



Of Trees and Monkeys. The evolution of product space and the technological specialization of European regions

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The technological and productive specialization of regions has always been an important issue both from a theoretical and empirical viewpoint. While globalisation and the ICT revolution have transformed the geography of production, contrary to some early prophecies (such as “the World is Flat” and “the Death of Distance”), which forecast the irrelevance of location, they have spurred the importance of regional specialisation in order to compete (or even survive) in the global arena.

The question about how regions develop and evolve along their productive and technological path has been recently raised in many scientific fields from international economics, to economic geography, from industrial economics to regional science. Within an evolutionary perspective, we believe that a region is most likely to develop new industries or new technologies which are closer to its pre-existing specialization. The theoretical framework behind this approach is a mix of “recombinant growth” (RG, Weitzman 1998) and “localised technological change” (LTC, Atkinson and Stiglitz, 1969): new technologies emerge from the recombination of existing knowledge, skills and competences, and that technological, spatial and social proximities are crucial to develop new knowledge, skills and competences.

Our research builds on a stream of literature (Hausman and Klinger, 2007; Hidalgo et al. 2007; Hidalgo and Hausman, 2008) initially conceived for a country-based analysis in order to map the evolution of industrial specialisation based mainly on trade flows. We refocus this line of analysis on the regional European technology/knowledge space in order to investigate the evolution of regional specialisation in terms of the interaction of (i) endogenous processes of knowledge recombination, (ii) exogenous technological paradigm shifts and (iii) trans-regional spatial and technological spillovers and networking dynamics.

More specifically, our paper aims at mapping the technological trajectories of EU regions over thirty years, from 1980 to 2010, by using data on 121 patent sectors in 198 NUTS2 regions of 11 innovative European countries plus Switzerland and Norway. We map the knowledge space according to two – possibly complementary - dimensions: one, at the micro level, is technology-based and is shaped by the proximity of



technology classes suggested by the co-classification information contained in patent documents (as in Kogler et al., 2015); the other one, at the macro level, is more geography-oriented and is based on information on co-specialisations in regions (as in Hidalgo et al., 2007). These two representations of the knowledge space are then used for understanding the evolution of the specialization process, measured in terms of the sector-region relative technological advantage (RTA), and for modelling its dynamics as a function of spatial, technological and socio-cognitive proximity.

Preliminary econometric results show that both LTC and RG significantly influence the sector-region RTA. However, while LTC of first order proximate sectors is relevant for both the macro (regional co-specialisation) and the micro (co-classification in patents) representations of the knowledge space, the LTC attributable to higher order neighbouring sectors is relevant only in the former case and RG is effective only in the latter case. This result signals the importance of accounting simultaneously for both the micro and the macro-level determinants of RTA. We also find evidence of negative spillovers generated by proximity in space, possibly due to competition effects, and positive externalities generated by socio-technological proximity. Finally, it is worth emphasising that the effects maintain their significance even when we control for inertia in the sector-region RTA by means of estimating dynamic spatial specifications.