

**Of Trees and Monkeys.  
The evolution of 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. Within an evolutionary perspective, we believe that a region is most likely to develop new industries or new technologies if they are closer to its pre-existing specialization. The theoretical framework behind this approach is a mix of “recombinant innovation” (RI, Weitzman 1998) and “localised technological change” (LTC, Atkinson and Stiglitz 1969): new technologies emerge from the recombination of existing knowledge, skills and competences, while technological, spatial and social proximities favour the development of *new* knowledge.

Our research builds on a stream of literature (Hausman and Klinger, 2007; Hidalgo et al. 2007) on country-level industrial specialisation. We refocus this line of analysis on the regional European knowledge space in order to investigate the evolution of regional specialisation.

More specifically, our paper aims at mapping the technological trajectories of EU regions over the period 1980-2010, 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 complementary dimensions: the first one, at the micro level, is technology-based and shaped by the proximity of technology classes suggested by co-classification information contained in patent documents (Kogler et al. 2015); the second one, at the macro level, is geography-oriented and based on information on co-specialisations in regions (Hidalgo et al. 2007). These two representations of the knowledge space are then used to analyse the evolution of the specialization process, measured in terms of the sector-region relative technological advantage (RTA), as a function of RI and LTC indicators and spatial, technological and socio-cognitive proximity.

Preliminary econometric results based on the estimation of dynamic spatial models, show that both LTC and RI significantly influence the sector-region RTA. However, while LTC of first order proximate sectors is relevant for both macro and micro representations of the knowledge space, the LTC of higher order neighbouring sectors is relevant only in the former case and RI is effective only in the latter one. We also find evidence of negative spatial spillovers, possibly due to competition effects, and positive externalities generated by socio-technological proximity.

**Keywords:** technology/knowledge space, localised technology change, recombinant innovation, European regions, patent analysis, dynamic spatial models, evolutionary economic geography

**JEL codes:** O14 O31 O33 O52 R11 R12 C21

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