

SIMULATING THE PROSPECTS OF TECHNOLOGICAL CATCHING UP*

José Castro Caldas, DINAMIA and ISCTE (jmcc@iscte.pt)
Manuel Mira Godinho, CISEP and ISEG (mgodinho@iseg.utl.pt)
Ricardo Pais Mamede, CISEP and ISCTE (ricardo.mamede@iscte.pt)

Abstract

Local increasing returns associated with static and dynamic scale effects, knowledge spillovers, polarisation effects and the distance that separates different regions are among the most important driving forces behind the dynamics of economic and technological convergence. This paper puts forward a computational simulation model that seeks to integrate these factors. The modelling exercise was designed to achieve a better understanding of the relationship between the aspects underlying the specific trajectories of regional technological accumulation and the aggregate convergence/divergence patterns stemming from these trajectories. Analysis of the simulation's results allows us to draw several conclusions. Firstly, it is shown that the opportunities for interaction and the resulting knowledge spillovers are a necessary but not sufficient condition for convergence. Moreover, up to a certain point, an increase in the opportunities for interaction between regions may lead to further divergence. Secondly, when spatial friction in the interactions is either relatively low or high, regions which could be “losers” for a given initial distribution of technological capabilities may become “winners” for another one (“history matters”). Conversely, for intermediate levels of spatial friction leading to central polarisation, history is largely irrelevant – irrespective of the initial space distribution of technological capability and sequence of chance events, a polarised centre-periphery pattern emerges. Finally, when spatial distance imposes high friction on interactions between regions, and when they do not have to be very similar in their levels of technological capabilities in order to learn from each other, regions in the core of “continental masses” benefit in terms of increased technological capability (“space matters”).

* The support from the EU TSER programme (contact SO E2-CT98-2047) is acknowledged.