Varieties of Regional Innovation Systems (RIS) around the world and Catch-up by Latecomers

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The objectives and research questions

The Innovation has been discussed as a key engine of catching-up growth. Among the innovation-focused studies, the National Innovation Systems (NIS) is a key concept in Schumpeterian economics (Freeman, 1987; Lundvall, 1992; Nelson, 1993). However, the analysis of RIS (regional innovation systems) is necessary to explain the heterogeneity of innovation systems in the same border of nation (Asheim et al., 2019).

Lee and Kim (2022) compares three Asian regions, Shenzhen, Penang, and Taipei, using similar variables developed for NIS but measured at regional or city level. They find the fact that there are two different cases of economic catch-up, such as slow catch-up (Penang), and fast catch-up (Shenzhen). The key different factor between the two regions is whether or not a region generates a sufficient number of locally-owned firms and their formed local knowledge base after it learned from FDI or MNCs at its early stage of development. In other word, Shenzhen excelled owing to its generation of basis for local knowledge creation and diffusion associated with the rise of locally-owned firms, whereas Penang have kept dependent upon MNCs.

This research aims to generalize this fact to identify paths for catching up by latecomer cities/regions, using the data and RIS measurement of more than 30 regions/cities around the world.

The methods

Data from 30 regions around world are collected, such as seven European regions (Berlin, Munich, London, Cambridge, Stockholm, Paris, Milan, Moscow), four USA regions (Silicon Valley, Boston Area, Austin, Houston), thirteen Asian regions (Shenzhen, Penang, Taipei, Tokyo, Beijing, Osaka, Seoul, Daejeon, Gyeonggi-do, Bangalore, New Delhi, Tel Aviv, Hong Kong, Shanghai, Singapore), and three Latin American regions (Santiago, Sao Paulo, Mexico City). Cluster analysis using RIS variable (internationalization, diversification, knowledge decentralization, local ownership of knowledge, and relative cycle time of technologies) is applied to classify these 30 regions into several clusters/groups and to identify catching versus mature regions with different characteristics. Using the result of cluster analysis, regression will be conducted, using the system GMM estimation, to find out which group tends to show a higher economic growth.

The main results

The four major groups are identified by the cluster analysis, such as Mature RIS group, Catching-up 1 RIS group, Mixed RIS group, and Catching-up 2 RIS group. The catching-up RIS 2 is characterized by a fast economic growth associated with high dependency on foreign knowledge, low diversification and localization. The catching-up 1 RIS still depends on foreign knowledge, but the level is much lower than the other group, with increasing degree of local ownership and localization, and also high diversification. Regression analysis is conducted to link the 4 group dummies to economic growth. Regions associated with two types of catching up RIS tend to show a faster rate of economic growth than the mature or mixed RIS groups.

Key words

Regional Innovation Systems, Innovation, Regional growth, Catching-up.

The present one-pager is based on the working paper entitled "Varieties of Regional Innovation Systems (RIS) around the world and Catch-up by Latecomers".