

Technology Adoption and Inventive Adaptation in Follower Countries

Yasuyuki TODO

This paper builds an endogenous growth model with quality improvement, focusing on a follower country behind the world technology frontier which adopts new technologies with adaptation to local circumstances. There are two forms of adaptation, minor and inventive, and the magnitude of each form is determined by local conditions, such as the knowledge level. In practice, adoption of new technologies with minor adaptation is often accomplished by multinational enterprises (MNEs), while inventive adaptation is conducted by R&D activities by MNEs or by local firms with licensing agreements with foreign firms. We assume that adoption with minor adaptation does not require local knowledge, while the degree of technology adopted through inventive adaptation is positively correlated with the local knowledge level. Further, based on recent empirical results, it is assumed that the future local knowledge level does not improve by current minor adaptation but by current inventive adaptation. Our major result is that an economy with a low initial level of local knowledge or a low initial amount of skilled labor converges to an equilibrium only with minor adaptation. On the other hand, when the initial level of local knowledge and skilled labor is high enough, the economy depends more on minor adaptation at the outset but gradually raises its dependence on inventive adaptation. Moreover, because of dynamic externalities in inventive adaptation, subsidizing inventive adaptation may increase output per capita in the long run. Empirical evidence from country-level panel data is presented to support some of the assumptions and results of the model.