

Summary

The analysis of knowledge spillover has been a subject of study in various fields, theoretically and empirically, dating back to Marshall (1890). However, the specific mechanisms by which knowledge moves from one agent to another remain elusive. Based on this problem, I investigate “how” countries or firms are connected to identify knowledge spillovers accurately. This dissertation comprises five chapters. In the first chapter, I explain the background of knowledge spillovers and the overview of three studies described in chapters 2, 3, and 4.

The second chapter examines whether the structure of global value chains (GVCs) affects international spillovers of research and development (R&D). Although previous studies have confirmed the presence of hub countries in GVCs, the role of these hub countries in the diffusion of technology has not been analyzed. Using a sample of 21 countries and 14 manufacturing industries from 1995–2007, I explore the role of hubs as the mediator of knowledge by classifying countries and industries based on a centrality measure. In particular, to capture the effects from hub countries both in imports and exports, I classify exporters into three categories: High, Middle, and Low. I find R&D spillovers from exporters with High centrality to be the largest, suggesting that hub countries play an important role in gathering and diffusing knowledge. I also find that countries with Middle centrality are becoming essential to the diffusion of knowledge. Finally, I observe positive effects from own R&D only in the G5 countries.

In the third chapter, I present new findings regarding diverse international R&D spillovers from members of regional trade agreements (RTAs) and other countries, analyzing a dataset covering 44 countries and 1 region between 1995 and 2017. I construct the R&D stock of RTA partners and that of other countries separately and find spillovers from RTA partners to be more substantial

than those from other countries when considering the import dependency of each country. Additionally, I further investigate the effects of RTA partners in more detail, focusing on the types and depth of content of RTAs. The results imply that signing economic integration agreements (EIAs) is crucial for international R&D spillovers. In addition to the conclusion of an RTA, I also find that the depth of the RTA content is important for spillover effects.

The fourth chapter explores the significance of inventor connections and the critical partners for inventors to engage with regarding knowledge spillovers across firms. To quantify the strength of these connections among firms, I construct an inventor network based on co-invention relationships using U.S. patents from 1980 to 2003. I assign a weight to each link in proportion to other firms' R&D activities, aiming to estimate their impact on firm output. In the empirical analysis, I address concerns about the potential endogeneity of other firms' R&D activities and network formation using an instrumental variable (IV) strategy. The findings indicate that spillover effects from the top inventors surpass those of other inventors, and inventors who serve as bridges between various inventors play a particularly significant role. Moreover, it is vital for small firms to establish connections with other firms, more so than for large firms.

In the fifth chapter, I conclude the dissertation with an overall summary and perspectives on future research.