

Empirical Studies on Productivity Growth and R&D Spillovers

by

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Abstract

This thesis examines R&D spillovers from various angles, looking at inter-industry spillovers, spillovers from university to industry, spillovers at the regional level, and spillovers at the international level.

It is argued that the conventional approach using total factor productivity (TFP) growth to measure the effect of spillovers used in most studies suffers from serious shortcomings. This

study aims to overcome these shortcomings by testing for the existence of R&D spillovers using not only TFP growth but also more general measures of productivity growth. Using this approach, chapter 2 examines inter-industry spillovers in Japanese manufacturing industry during the period 1970–1998. No statistically significant relationships between *rent* R&D spillovers and productivity growth are observed, but *knowledge* R&D spillovers are found to be positive and statistically significant in technical change while they are insignificant in TFP growth. The results suggest that true productivity growth in Japanese manufacturing industry is affected not by *rent* R&D spillovers but by *knowledge* R&D spillovers.

Chapter 3 examines the link between university education and research on the one hand and productivity growth in industry on the other, using a newly available data set on 12 Japanese industries for the period between 1973 and 1998. The results suggest that the supply of highly educated human capital from university to industry played an important role in productivity growth in Japanese manufacturing industry during the catch-up phase. However, the rate of return to R&D spillovers through human capital has declined in recent years.

Chapter 4 investigates the contribution of spatially mediated knowledge spillovers to productivity in Japan, using available data for the prefectures for the period 1970–1995. The findings imply that geographical R&D spillover has contributed to productivity growth at the prefectural level, moreover, the contribution of R&D spillovers to regional economic growth

increased from earlier to the later period.

Chapter 5 finally examines R&D spillovers at the international level, looking at such spillovers from Japan to Korea. Using data on the manufacturing industries of the two countries, the effects of domestic and international R&D spillovers are estimated in order to assess their relative importance in the productivity growth of Korea's manufacturing industry. The results suggest that the contribution of inter-industry R&D spillovers in the Korean manufacturing sector is low and insignificant, while Korean manufacturing industry benefits greatly from *rent* R&D spillovers from Japanese manufacturing industry.

Taken together, the different studies confirm that R&D spillovers indeed contributed to productivity growth in Japan. Moreover, R&D investment in Japan contributed not only to productivity growth at home but also in its closest neighbor, Korea.