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International R&D Spillovers and Marginal Social Returns on R&D*

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Abstract

This study analyzes the effects of international R&D spillovers on recipient countries from the viewpoint of social and private returns on R&D. Investment in R&D is the basic source of growth of Total Factor Productivity in a globalizing world. Our study is novel in three aspects. First, we divide the aggregate R&D stock into the R&D stocks of the business, government and education sectors and examine the effects of these sectoral R&D stocks on Total Factor Productivity. Secondly, we enlarge the coverage of sample countries to include relatively new EU accession states, which are of great interest in the view of European integration Thirdly, we endogenize the accrual of the R&D stocks by estimating R&D investment functions. This all enables us to compute the marginal social returns on R&D by incorporating the channel through which a change in the R&D stock of one country affects the R&D activities of other countries. To the best of our knowledge, this is the first attempt to estimate marginal social returns on R&D, taking account of the interplay of R&D activities across countries.

We find that the marginal social returns on R&D are much larger than the marginal private returns for R&D-intensive countries. The marginal social returns on aggregate R&D in R&D-intensive countries are on average even twice as large as the marginal private returns. On the other hand the marginal social returns are lower than the marginal private returns for some of the less R&D-intensive countries. R&D-intensive countries have a larger gap between marginal social returns and the marginal private returns. It implies that R&D intensive countries are expected to generate more spillovers at the margin, but the observed R&D stock is smaller than the socially optimal level.

JEL Classification Numbers: E22, O32, O33, O47.

Keywords: R&D, spillovers, total factor productivity, social returns, private returns.

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