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R&D internationalization, R&D collaboration and public knowledge institutions in small economies: Evidence from Finland and the Netherlands

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Abstract

This paper investigates domestic and foreign innovating firms' determinants of R&D collaboration with domestic universities and public knowledge institutes in Finland and the Netherlands. We put particular emphasis on the impact of incoming academic spillovers on the probability to co-operate with these public R&D institutes.

Based on data from Community Innovation Surveys we find that foreign firms in the Netherlands are less likely to co-operate with domestic public knowledge institutions than domestic firms, while in Finland no significant difference can be detected. Another result is that incoming knowledge spillovers are an important determinant for R&D collaboration with domestic public knowledge institutions in both countries. In case of foreign firms in Finland, incoming knowledge spillovers affect the probability to co-operate with public knowledge institutions more positively compared to domestic firms. For the Netherlands no substantial difference could be found in this respect. Further, innovating firms in Finland that require academic or basic knowledge do not co-operate significantly more with public knowledge institutions than those that need applied knowledge. At the same time they are willing to share knowledge with public R&D partners. In the Netherlands innovating firms that require relatively more basic than applied knowledge, increase the probability of co-operation with Dutch universities and public knowledge institutions but there is reluctance to share proprietary knowledge with public R&D partners. For both countries no significant difference between foreign and domestic firms with regard to academic knowledge requirements could be found. This raises the issue whether Finnish innovation policies with a strong focus on R&D co-operation provide incentives for strategic behaviour by domestic public partners to put more emphasis on applied research.
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1. Introduction

Research and Development (R&D) collaboration is a means to increase the impact of R&D on economic growth through enhanced R&D productivity and technological diffusion. More specifically, R&D collaboration

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between innovating firms and public R&D institutions, i.e. universities and/or public R&D institutes, is a channel through which academic R&D spillovers can be internalized by innovating firms. Innovation policies aimed at stimulating R&D co-operation between innovating (foreign) firms and domestic universities and public knowledge institutes, are important instruments to encourage academic spillovers to innovating firms and hence contribute to their innovative contribution to the domestic economy.

An increasing number of studies deal with R&D collaboration between firms and public knowledge institutions. Most of these studies focus on the large economy of the United States (e.g. Mansfield, 1980, 1991, 1995; Hall et al., 2003). Less attention has been paid to R&D co-operation between innovating firms and public knowledge institutions in small countries. This is an important issue as in small countries a larger part of domestic production and R&D is done by foreign firms than in large nations. Increased competition and the increasing complexity of technologies stimulate innovating Multinational Enterprises (MNEs) to relocate R&D investments such as to access knowledge in foreign public knowledge institutions and research talent. This encourages them to co-operate with other firms and public knowledge institutions both domestically and abroad (Archibugi and Iammarino, 1999; World Investment Report, 2005).

As MNEs are much more footloose than domestic firms (Blomstöm and Kokko, 2003), it is more pressing for small countries to be an attractive location for innovating foreign firms as a means to increase national innovative capacity (Furman et al., 2002).

This study investigates the determinants of R&D collaboration of innovating firms with public knowledge institutions in Finland and the Netherlands. We distinguish between foreign and domestic innovating firms and put particular emphasis on incoming academic knowledge spillovers that are expected to lead to higher rates of return than non-academic spillovers (Adams, 1990). Further, we relate the results to different innovation policies between these two countries.

The choice of comparison between Finland and the Netherlands is motivated by their small size and differences in innovation policies.[1] In Finland, more weight is attached to networking and integrating firms and universities into a national innovation system than in the Netherlands. Consequently, Finnish policy-induced collaboration can be expected to link innovating firms to the domestic public knowledge institutional structure, i.e. universities (including academic hospitals) and public R&D institutes, more effectively than Dutch innovation policies. In other words, innovating firms in Finland will – ceteris paribus – more often co-operate with domestic knowledge institutions and hence benefit more from academic knowledge spillovers than in the Netherlands (Hjerppe and Kiander, 2004; Nieminen and Kaukonen, 2001).

In order for these innovation policies to be effective it is important to investigate whether (academic) knowledge spillovers is an important motive of innovating firms to co-operate with universities and public knowledge institutes. When innovating firms do not consider academic knowledge spillovers as an important incentive to co-operate with public knowledge institution, the theoretically expected higher benefits of academic spillovers for economic growth might not materialize.

We first investigate whether foreign innovating firms are less or more involved in R&D co-operation with domestic universities and public R&D institutes than innovating domestic firms. As foreign firms are more mobile or footloose than domestic firms it can be expected that foreign firms are less connected to the domestic public knowledge institutions than domestic firms. Then, we examine whether incoming knowledge spillovers and the firms' needs for academic or basic research affect the probability to collaborate with domestic public knowledge institutions and particularly, whether the effects are different when distinguishing between foreign and domestic firms. Incoming knowledge spillovers are measured by the use of publicly available information sources in the firm's innovation process. The academic character of spillovers is measured by the need of basic relative to applied research.

The contribution of this paper is twofold. First, it investigates differences between domestic and foreign firms' intensities to collaborate with public knowledge institutions with a special emphasis on academic knowledge spillovers. Second, it compares the results of two small open economies with different innovation policies by using large-scale cross-industry data.

Our results are based on Dutch and Finnish Community Innovation Survey (CIS) data for the second half of the 1990s. They show that in Finland no difference exists between foreign and domestic firms in the probability to co-operate in their research activities with domestic public knowledge institutions. In the Netherlands innovating foreign firms' probability to co-operate with domestic public knowledge institutions is lower as compared with domestic innovating firms. Incoming knowledge

[1] Although the Netherlands has twice as many inhabitants as Finland, it is still considered a small country in the European Union.

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