

Regional economic integration and R&D investment[☆]

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Abstract

We analyze the influence of a regional economic integration agreement (REIA) on a firm's investments in research and development (R&D). A country's entry into a REIA creates two competing influences on the firm's R&D investments. On the one hand, increased competition in product markets after the REIA would induce the firm to invest in internal R&D to improve its distinctive technological competitiveness. On the other hand, better access to sources of inputs in factor markets after the REIA would induce the firm to purchase external R&D because it can outsource technology more easily. Surprisingly, the empirical analysis shows that the REIA's impact on R&D investment is driven primarily by product markets rather than by factor markets. After the REIA, product markets induce firms not only to invest more in internal R&D but also purchase more external R&D. In contrast, after the REIA factor markets have limited influence on internal or external R&D investments.

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1. Introduction

We analyze the influence of regional economic integration agreements (REIAs) on the firm's investments in research and development (R&D). REIAs are intergovernmental treaties through which signatory countries agree to more advantageous conditions in the conduct of their mutual trade and investment relationships than those conditions applied to other, non-signatory, partners (adapted from [World Trade Organization, 2003a](#), p. 26). They take different forms, from free trade areas such as NAFTA in North America, to custom unions like MERCOSUR in South America, to economic unions like the European Union, to name but a few. REIAs have been spreading throughout the world at an increasing pace. By the end of 2002, there were 176 in force, an additional

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70 in operation but not yet officially informed to the Organization, and another 70 under negotiation, among the 144 World Trade Organization (WTO) members (WTO, 2003b, p. 46). Only four years earlier, in 1998, there were just 69 agreements in force (WTO, 1998). Most countries belong to several agreements. By the end of 2002, only four WTO members, Hong Kong, Macao, Taiwan, and Mongolia, were outside a notified REIA. Despite the widespread existence of REIAs, there are no studies of their impact on the firm's R&D investment decisions.

A REIA induces the firm to improve its competitiveness. The REIA provides opportunities for the expansion of operations and better use of existing resources, since the firm has easier access to a larger market to sell its products. It also creates the opportunity to improve efficiency, since the firm enjoys better access to foreign suppliers. However, at the same time, the REIA also creates threats to the firm's profitability and survival because of the increase in competition, which results from the reduction of barriers that previously protected domestic firms from foreign ones (Robson, 1998; Eden, 2002).

The firm can invest in R&D to improve its technological capabilities and competitiveness (Helfat, 1997). However, it is not clear how the firm's investment in R&D will be affected by the REIA. Previous analyses studied how a technological change in the industry renders the firm's technological capabilities obsolete and induce the firm to develop new ones (e.g., Pisano, 1990; Nagarajan and Mitchell, 1998). These studies indicate that the more disruptive the technological change is, the higher the likelihood that the firm will use external methods rather than internal ones to develop the new technology.

In contrast, a REIA alters not only the industry or product market but also the suppliers in the factor market. As a result, the firm faces competing influences on its investment in R&D. On the one hand, increased competition in product markets after the REIA would induce the firm to invest in internal R&D to improve its distinctive competitiveness. On the other hand, better access to sources of inputs in factor markets after the REIA would induce the firm to purchase external R&D because it can outsource technology more easily.

We analyze these competing influences on a sample of industrial firms' R&D investments before and after a REIA. Surprisingly, the empirical analysis shows that the REIA's impact on the firm's R&D investment is driven primarily by product markets rather than by factor markets. After the REIA, product markets induce firms not only to invest more in internal R&D but also purchase

more external R&D. In contrast, after the REIA factor markets have limited influence on internal or external R&D investments.

The rest of the paper is organized as follows. In Section 2 we discuss the impact of REIAs on the firm's investments in R&D and present two hypotheses. In Section 3 we describe the research design, and in Section 4 the results of the analysis. In Section 5 we provide our conclusions, the contribution and limitations of the current paper, and avenues for future research.

2. Regional economic integration agreements and R&D investment

We argue that a REIA alters both the product and factor markets in which the firm operates and as a result, the impact of the product and factor markets on the firm's R&D investment varies. We first provide the definition of R&D investments and of REIAs that we use in this paper and draw links with previous literature. We then discuss how the impact of product markets and of factor markets on R&D investments changes after the country enters a REIA and generate hypotheses. We use multiple theoretical approaches to provide a more complete understanding of the phenomenon, building on the complementary insights of different theories (e.g., Poppo and Zenger, 1998; Un and Cuervo-Cazurra, 2005).

2.1. Changes in the firm's environment and R&D investment

We analyze the firm's investments in R&D as a way to develop technological capabilities. Technological capabilities are the ability to develop and exploit technological know-how, which is the application of scientific knowledge for commercial purposes (Pisano, 1990, p. 153). The firm can develop its technological capabilities using several learning approaches (Malerba, 1992, p. 848). We focus on investments in R&D because of its importance in generating new knowledge, which can help the firm achieve an advantage that is difficult to replicate by competitors (Helfat, 1994).

The company can invest in R&D internally or externally. Internal R&D investments are expenditures on personnel and assets in the firm dedicated to the creation of new scientific or technological knowledge or to the development of commercially-viable innovations. External R&D investments are expenditures paid to other firms, to universities, or to other entities dedicated to scientific or technological research, to create new scientific or technological knowledge or to develop commercially-viable innovations for the firm. Thus,

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