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Scientific Research and the Location of Foreign R&D Investments: Quality, Basicness, and Research versus Development

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Abstract

Nazareno Braitto-KULeuven, Department of Managerial Economics, Strategy and Innovation September 2014-September 2018 (nazareno.braitto@kuleuven.be) State-of-the-art Scientific research at universities has been shown to have a positive influence on the innovative performance of firms (Mansfield, 1995, 1998; Belderbos et al., 2004; Leten et al., 2011). In order to benefit from university research, proximity is important, as it facilitates transfer of tacit and uncodified knowledge and various forms of university-firm interaction (Abramovsky et al, 2007; Belenzon and Shankerman, 2013). Since proximity of firms' R&D activities to universities has advantages, the presence of university research is likely to be a factor of importance in firms' location decisions for new R&D units. A number of studies have found empirical evidence for this (Cantwell and Piscitello, 2005; Belderbos et al., 2014). Research gap and arguments At least two issues have not received due attention in the literature so far. First, the characteristics of scientific research at universities will matter: the quality of this research and the orientation in terms of a focus on basic or applied research. Second, the role of university research is likely to differ depending on the type of R&D investment undertaken, in particular whether projects focus on research activities, or development activities. We expect that applied scientific research is particularly relevant for development activities. Method and Data This paper examines the role of heterogeneous scientific research at universities in attracting inward research and development investments

by multinational firms. It does so by examining location decisions by multinational firms in the United States at a fine-grained regional level – Metropolitan Statistical Areas, which take into account commuting patterns. Drawing on cross-border investment data provided by the FDI Markets database published by the Financial Times, we analyze location decisions for 139 research and 286 development projects, 2003–2012. We use unique data on geocoded scientific publications from Thomson Reuters’ Web of Science to calculate the scientific research strength of MSAs, the quality of these publications (citations received), the basic or applied orientation of research based on the CHI classification scheme developed by Hamilton (2003), and the relevance for R&D across industries utilizing a concordance between science fields, technologies, and industries. We estimate mixed logit models (Head et al. 1995; Alcacer and Chung, 2007 & 2014) and identify effects of scientific research. We adapt a model that separates effects of agglomeration levels from agglomeration economies stemming from labor, supplier and customer specialization (Alcacer and Chung, 2014; Glaeser and Kerr, 2009) and apply this to R&D investments, treating scientific research as an input to the R&D process. Results Our preliminary findings show that specialization of university research in domains relevant for the focal R&D investment project has a positive impact on R&D location decisions. A focus on applied scientific research attracts investments in development projects but research investments are indifferent to the basic or applied orientation of research. On the other hand, the quality of both basic and applied research has positive effects on the probability that a MSA is chosen for all types of R&D investments. Our results allow us to draw a number of policy implications. References Abramovsky L., Harrison R., Simpson H. (2007). University research and the location of business R&D. *Economic Journal*. 117(519): 114-141. Alcacer J., Chung W. (2007). Location strategies and knowledge spillovers. *Management Science*. 53(5): 760-776. Alcacer J., Chung W. (2014). Location strategies for agglomeration economies. *Strategic Management Journal*. 35(12): 1749-1761. Belderbos R., Carree M., Lokshin B. (2004). R&D cooperation and firm performance. *Innovation and new technology. Research Policy*. 33(10): 1477-1492. Belderbos R., Van Roy V., Leten B., Thijs B. (2014). Academic research strengths and multinational firms’ foreign R&D location decisions: Evidence from foreign R&D projects in European regions. *Environment and Planning*. 46(4): 920-942. Belenzon S., Schankerman M. (2013). Spreading the word: Geography, policy and knowledge spillovers. *The Review of Economics and Statistics*. 95(3): 884-903. Cantwell J., Piscitello L. (2005). Recent location of foreign-owned research and development activities by large multinational corporations in the European regions: The role of spillovers and externalities. *Regional Studies*. 39(1): 1-16. Glaeser E, Kerr W. 2009. Local industrial conditions and entrepreneurship: how much of the spatial distribution can we explain? *Journal of Economics and Management Strategy*. 18(3): 623-663. Hamilton K. (2003). Subfield and level classification of journals. CHI Report No. 2012-R. Head K., Ries J., Swenson D. (1995). Agglomeration benefits and location choice: Evidence from Japanese manufacturing investments in the United States. *Journal of International Economics*. 38(3-4): 223-247. Leten B., Kelchtermans S., Belderbos R. (2011). Do firms benefit from investing in basic research? An empirical investigation for pharmaceutical firms. In F. De Beule, & I. Nauwelaerts, *Innovation and creativity: the driving force of Europe’s economy?* Edward Elgar. Mansfield E. (1995). Academic Research Underlying Industrial Innovations: Sources, Characteristics, and Financing. *The Review of Economics and Statistics*. 77(1): 55-65. Mansfield E. (1998). Academic research and industrial innovation: An update of empirical findings. *Research Policy*. 26(1): 773-776.

The quality and orientation of university research and its attraction to inward investments in research and development

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State-of-the-art

Scientific research at universities has been shown to have a positive influence on the innovative performance of firms (Mansfield, 1995, 1998; Belderbos et al., 2004; Leten et al., 2011). In order to benefit from university research, proximity is important, as it facilitates transfer of tacit and uncodified knowledge and various forms of university-firm interaction (Abramovsky et al, 2007; Belenzon and Shankerman, 2013). Since proximity of firms' R&D activities to universities has advantages, the presence of university research is likely to be a factor of importance in firms' location decisions for new R&D units. A number of studies have found empirical evidence for this (Cantwell and Piscitello, 2005; Belderbos et al., 2014).

Research gap and arguments

At least two issues have not received due attention in the literature so far. First, the characteristics of scientific research at universities will matter: the quality of this research and the orientation in terms of a focus on basic or applied research. Second, the role of university research is likely to differ depending on the type of R&D investment undertaken, in particular whether projects focus on research activities, or development activities. We expect that applied scientific research is particularly relevant for development activities.

Method and Data

This paper examines the role of heterogeneous scientific research at universities in attracting inward research and development investments by multinational firms. It does so by examining location decisions by multinational firms in the United States at a fine-grained regional level – Metropolitan Statistical Areas, which take into account commuting patterns. Drawing on cross-border investment data provided by the FDI Markets database published by the Financial Times, we analyze location decisions for 139 research and 286 development projects, 2003-2012. We use unique data on geocoded scientific publications from Thomson Reuters' Web of Science to calculate the scientific research strength of MSAs, the quality of these publications (citations received), the basic or applied orientation of research based on the CHI classification scheme developed by Hamilton (2003), and the relevance for R&D across industries utilizing a concordance between science fields, technologies, and industries. We estimate mixed logit models (Head et al. 1995; Alcacer and Chung, 2007 & 2014) and identify effects of scientific research. We adapt a model that separates effects of agglomeration levels from agglomeration economies stemming from labor, supplier and customer specialization (Alcacer and Chung, 2014; Glaeser and Kerr, 2009) and apply this to R&D investments, treating scientific research as an input to the R&D process.

Results

Our preliminary findings show that specialization of university research in domains relevant for the focal R&D investment project has a positive impact on R&D location decisions. A focus on applied scientific research attracts investments in development projects but research investments are indifferent to the basic or applied orientation of research. On the other hand, the quality of both basic and applied research has positive effects on the probability that a MSA is chosen for all types of R&D investments. Our results allow us to draw a number of policy implications.

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