Emerging market multinationals in the European Union – A location choice analysis

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Emerging market multinationals in the European Union – A location choice analysis

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Abstract: The European Union (EU) is one of the largest recipients of outward foreign direct investment (OFDI) from emerging economies. We apply a discrete choice model to analyze the location choice of emerging market firms in the EU27. In particular, we test to what extent these firms' location choices are related to agglomeration economies and knowledge externalities because these have been suggested as potential sources for technological catching-up for emerging market firms. Our results indicate that emerging market firms' location choices differ from the choices of other investors. Emerging market firms place, on average, a higher value on urbanization, diversification economies and sector-specific human resources. However, we find evidence for heterogeneity in the location choices of emerging market firms depending on the home region and the sector of investment.

Keywords: Outward FDI, location choice, emerging economies, European Union

Introduction

The growth of outward foreign direct investments (OFDI) has been phenomenal in the recent era of business globalization. The role of developed/advanced-economy multinational enterprises (DMNEs) is generally considered pivotal to this development, both in terms of cross-border capital and knowledge flows. Recently, however, emerging-economy multinational enterprises (EMNEs) have progressively increased their share in the global OFDI.[1] This new development has become one of the key discussions in international business (IB) studies, particularly on the determinants of OFDI location choice.

A large body of IB scholars has argued that the EMNES are fundamentally different from their counterparts (Wells 1983, Lall 1983, Mathews 2002, Child and Rodrigues 2005, Dunning 2006, Goldstein 2007, Ramamurti 2012) and thus their location strategies are peculiar to their countries of origin (Dunning 1998, Rugman 2009). In addition to the traditional location determinants, scholars have argued for the importance of knowledge-seeking OFDI motives for the international ventures of EMNEs (Makino et al. 2002, Mathews 2002, 2006, Luo and Tung 2007, Rugman 2009). Specifically, it is argued that EMNEs lack the strength of ownership advantages (e.g., international experience and technological, managerial and marketing competencies) traditionally held by DMNEs (Mathews 2002, Ramamurti and Singh 2009). Accordingly, this relative disadvantageous competitive position may prompt EMNEs to improve their technological and commercial capabilities by following learning-based knowledge-seeking OFDI strategies aimed at catching up with the global business pace (Mathews 2006, Rugman 2009, Li 2010).

A vast empirical literature supports the notion of EMNEs' knowledge-driven OFDI location activities at the national level (e.g., Buckley et al. 2007). While it is necessary to examine the factors driving knowledge-seeking OFDI at the subnational level, it is equally important to understand to what extent the location decisions of EMNEs differ from those of DMNEs. Moreover, the technological and knowledge spill-overs emerging from the agglomeration of economies at the regional level are considered particularly relevant to the knowledge-seeking investment activities in the new economic geography literature (Krugman 1991, Venables 1996, and Fujita et al. 1999) and the knowledge-based view of the firms (Cantwell 1989, 1995, Kuemmerle 1997, Cantwell and Janne 1999, Cantwell and Piscitello 2002, 2005).

Therefore, we contribute to this debate in at least three important ways. First, our study investigates knowledge-seeking OFDI location determinants at the regional level, particularly for EMNEs. The majority of this literature focuses on cross-country examinations in macro-economic environments (Kumar 1998, Makino et al. 2002, Mathews 2006). Little or no attention has been given to knowledge-seeking OFDI locations at the regional level.

Second, our study contributes to the literature on the relevance of agglomeration-related technological and knowledge spill-overs of knowledge-seeking investment activities. Previous studies have largely concentrated on the knowledge-seeking activities of DMNEs (e.g., Cantwell and Piscitello 2002, 2005). To our knowledge, no studies have investigated the

[1] For example, global share of OFDI stock from the emerging markets rose from 4% in 1980 to approximately 16% in 2010 (UNCTAD 2011)

role of agglomeration-related spill-overs for the capability-building of EMNEs through learning at host locations.

Third, our study empirically contributes to the growing debate on the particular relevance of knowledge-seeking OFDI for EMNEs with regard to the potential differences between DMNEs and EMNEs ownership characteristics and how these differences may affect their valuation of location-specific, knowledge-related factors.

Specifically, we examine the extent to which EMNEs differ from DMNEs regarding knowledge-seeking OFDI at the subnational level in the European Union (EU). Thus, we derive our hypotheses under the assumption that EMNEs are essentially different from DMNEs in regard to their different ownership advantages as suggested by the extant OFDI location literature.[2] Categorically, we hypothesize that the knowledge seeking OFDI is likely to be attracted by different sources of region specific positive spill-overs (intra-industry, inter-industry and knowledge spill-overs) stemming from the agglomeration economies.

The EU was selected for this study due to its growing importance as a prime investment destination. Its single market potential and liberal trade regimes have drawn the majority of the current OFDI stocks and flows, both from DMNEs and EMNEs (WIR 2011). Hence, researchers have shown a growing interest in analyzing the OFDI location determinants in the EU. The literature identifies different OFDI determinants in terms of regional comparative advantages, such as market, supply and agglomeration factors. However, researchers have not explored a whole EU-level analysis, with some notable exceptions.[3] Furthermore, only a few studies have examined the effects of technological and knowledge spill-overs on the knowledge-seeking OFDI location choice (e.g., Cantwell and Piscitello 2005).

Empirically, we employ a utility maximization framework to model OFDI location selection using McFaddens's conditional-logit estimation technique (1974). We utilize a firm-level database pertaining to the location of 31,500 affiliates (Greenfield and acquisitions) from a large set of advanced and emerging economies in 93 regions of the EU between 1996 and 2010.[4] The firm-level information is matched with a rich set of regionally disaggregated data. Furthermore, we identify key spill-overs that may influence the location of these affiliates in the regions of the EU.

The remainder of the paper proceeds as follows: In the next section, we set out the theoretical framework and develop our hypotheses about the role of technological and knowledge spill-overs for the knowledge-seeking OFDI location choice. In section 3, we provide data information on the extent of OFDI projects in the regions of the EU. In section 4, we explain our econometric methodology employed to test our main hypotheses. Section 5

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[2] The difference between advanced and emerging economies has been established as defined by the International Monetary Fund (IMF 2012)

[3] For example, Mayer and Mucchielli 1999, Head and Mayer 2002, Disdier and Mayer 2004. However, most of the empirical investigations focus on the regions of a single EU country (e.g., Crozet et al. 2004, Childlow et al. 2009, Castiglione 2012). Some studies have analyzed the location of OFDI in regions of several EU countries (e.g., Basile 2008).

[4] A list of emerging and advanced countries is presented in the Annex.

shows and explains the main results. We discuss our empirical findings and conclude in the last section.

Literature review and research hypotheses

Background theory

In the mainstream IB theory, it is suggested that the OFDI location is driven by the firms' desire to exploit existing capabilities or learn new competencies by augmenting previously acquired capabilities. The traditional IB context accentuates the role of firms' ownership advantages (sophisticated production, innovation and commercial competencies) in exploiting the new markets, essentially by offsetting the costs of foreign entry amongst the market asymmetries at the host locations (Caves 1971, Hymer 1976 Buckley and Casson 1976 and Dunning 1977, 79).

Contrary to the traditional context, the knowledge-seeking approach of firms suggests that ownership advantages do not necessarily exhibit the extent of OFDI location dynamics. The knowledge-seeking approach proposes that firms may not only be interested in exploiting their competitive advantages at host locations but may also learn through augmenting their weaker capabilities at locations with higher levels of knowledge activity (Cantwell 1989, 1995, Cantwell and Janne 1999). In this way, firms accumulate knowledge through a learning-based evolutionary process in order to increase their ownership-related competitiveness.

In the recent location literature, the knowledge-seeking context of the OFDI location has been further emphasized in regard to the distinct ownership characteristics of EMNEs (Dunning 2006, Ramamurti 2009, Rugman 2009, Hennart 2012). Scholars have argued that EMNEs are relatively newer in international business, start from relatively earlier levels of value-added activities and lack organizational experience (Johansen and Vahlne 2009, Clarke et al. 2012). It is further suggested that the ownership characteristics of firms are idiosyncratic to their home countries (Dunning 1998, Ramamurti and Singh 2009). Such country-specific idiosyncrasies discern the location choice of EMNEs from their international business peers (Rugman 2009). Unlike EMNEs, DMNEs have acquired strong ownership advantages with their sustained presence in international business. Their capabilities for exploiting host markets reside in their core competencies; *inter alia*, extensive experience, strong branding, innovation and managerial capabilities.

In contrast to traditional multinational firms, EMNEs generally arise from highly imperfect markets with lower levels of technological and institutional development, and rely mainly on the home country-specific benefits for the earlier stages of their international dispersion activities (Kogut 1985, Rugman 2009). EMNEs have unique capabilities in low-cost, large-scale production due to their country-specific attributes. These firms benefit from cheap input factors, preferential access to local resources and government support. Therefore, EMNEs primarily develop products and innovations best suited to their home markets in the early stages of their internationalization (see among others Aubert 2004, Zhou et al. 2007, Luo et al. 2011). However, the dependence on country-specific benefits is only temporarily beneficial, and firms must develop firm-specific ownership capabilities in order to be globally competitive in the new markets (Lessard and Lucea 2009, Dunning 1977).

It is essential for EMNEs to develop new capabilities to increase their competitiveness, both at host and home locations (Child and Rodrigues 2005, Kedia et al. 2012). Thus, EMNEs are more likely to be involved in capability-building through knowledge-driven OFDI activities by learning, acquiring or leveraging knowledge resources not available at home locations (Mathews 2002, 2006, Luo and Tung 2007, Luo and Rui 2009, Li 2010). The knowledge-seeking context has been empirically validated in the cross-country examinations in which firms from less technologically developed countries tend to invest in technologically advanced countries (see among others Kogut and Chung 1991, Kumar 1998, Makino et al. 2002, Mathews 2006). Recently, however, the subnational regions within national boundaries have been considered more important in regard to location-specific economic dynamics (Porter 2003, McCann and Mudambi 2005).

Regarding the relative importance of regions, the new economic geography literature (Porter 1990, Krugman 1991, Fujita et al. 1999) provides a comprehensive analysis of the factors that lead to the regional agglomeration of firms. The literature further emphasizes that the concentration of firms in a given region is due to the intrinsic advantages of regions (localized demand and supply factors). Firms tend to co-locate with similar firms in a cumulative causation process (Markusen and Venables 1999). Over time, firms' clustering yields agglomeration economies consisting of specialized infrastructure, labor markets and positive externalities characterized by different technological and knowledge spill-overs (Teece 1986, Glaeser et al. 1992, Krugman 1991, Venables 1996, Cantwell 1989). The spill-overs arising from agglomeration economies are considered beneficial for foreign investors in at least two ways:

1) Foreign investors are faced with difficulties in the new markets (Johanson and Vahlne 1977, Clarke et al. 2012) and must choose locations that reduce risks and uncertainties attached to the new investments. The presence of agglomeration economies not only facilitates new entrants in off-setting the costs of new ventures but also reduces the risk attached to the investments in the new locations in the proximity of the relevant supply and demand factors (Mariotti and piscitello 1995, Guimarães et al. 2000, Devereux et al. 2007).
2) The role of agglomeration economies is considered particularly relevant for knowledge-driven OFDI activities because the technology and innovations are considered to be geographically bounded (Teece 1986, Jaffe et al. 1993, Keller 2002) and produce spatially bounded spill-overs that are beneficial to the new entrants. Thus, foreign investors can learn new or improve previously acquired production and managerial capabilities diffused through their affiliates (Cantwell 1989, 1995, Almeida and Kogut 1999, Kumar 1998, Head et al. 1999).

However, it is suggested that effective learning at host locations occurs in the presence of the knowledge accumulation capabilities of the firms (Inkpen 2000). The knowledge accumulation capabilities are based on the absorptive capacities of firms and affiliates and rely on the stock of prior knowledge related to persistent ownership capabilities (Cohen and Levinthal 1990). In the foreign markets, firms with stronger competitive advantages with higher levels of prior knowledge can efficiently accumulate new capabilities while compensating for their liabilities of foreignness (Cantwell 1989, Kuemmerle 1999). Therefore, firms with different ownership characteristics may differ in their learning capabilities at host locations. Firms with weaker capabilities are more likely to seek new knowledge or augment previous knowledge (Cohen and Levinthal 1990, Rosenkopf and Nerkar 2001). It could be of particular relevance to EMNEs as these firms are characterized by their new arrival in international business with relatively lower levels of learning capabilities related to their home-country development levels (Hoskission et al. 2000).

In line with these arguments, while the tendency of knowledge-seeking is more likely to prevail in EMNEs, we assume that the learning capabilities of EMNEs and DMNEs are essentially different pertaining to their different ownership characteristics arising from the prevailing idiosyncrasies among their home countries. We test this assumption against the effects of different agglomeration-related spill-overs, specifically technology and knowledge spill-overs, on the location choice of foreign affiliates in the subnational regions of the EU. We seek to examine to what extent EMNEs value knowledge-related aspects of the host locations relative to their weak learning capabilities compared to DMNEs.

Determinants of knowledge-seeking OFDI in the European Union

The recent consecutive enlargements of the EU, policies implementing economic integration among member states and liberalized trade regimes have positioned the EU pivotal to international capital flows. The EU's consolidated market remains the largest recipient of OFDI despite the burgeoning importance of developing countries. However, the recent economic recession has induced a significant reduction in the EU's global share of OFDI, but new OFDI projects have been on increasing terms since 2012.[5]

Regional competitiveness within the boundaries of the EU has emerged through a protracted history of market and industrial strengths. Relocation of international production in the regions of the EU has traditionally been supported through a multitude of skilled labor, dynamic consumer markets and industrial bases. The EU15 economies are generally subscribed with the bulk of investments. Recently, however, new member states have drawn OFDI with their rapid developments in infrastructure, communication and attractive investment policies. Furthermore, emerging countries are increasingly becoming sources of OFDI in the EU (EUROSTAT 2009-2012).

A number of empirical studies have examined the different effects of the agglomeration of economies on the location decisions of firms in the EU, but limited systematic empirical evidence exists regarding the effects of different sources of technological and knowledge spill-overs arising from the industrial competitiveness of the EU regions.[6] Moreover, the studies do not fully address to what extent the different sources of agglomeration-related spill-overs affect the knowledge-seeking location choice of investors from emerging economies.

Apart from the general effects of agglomeration economies, agglomeration-related technological and knowledge spill-overs are widely believed to exert a positive effect on the location choice of foreign firms (Caves 1971, Krugman 1991, Cantwell 1995, Cantwell and

[5] According to the World Investment Report (2012), 27.6% of global OFDI stocks and 35.6% of global OFDI flows were directed at the EU by the end of 2011. UNCTAD (2012) reports that the EU's share of OFDI has declined from 28.6% in 2011 to 22.4% in 2012. However, according to Ernst & Young's annual European attractiveness survey (2012), there were 1,586 new OFDI projects in the first half of 2012 compared to 1.296 in the first half of 2009.

[6] For example, Head et al., 1995, Guimarães et al., 2000, Crozet et al., 2004, Head and Mayer, 2004

Immarino 2000, Frost 2001). Moreover, it is suggested that the different sources of technological and knowledge spill-overs are not mutually exclusive and thus can affect location choices simultaneously (Paci and Usai 2000, Cantwell and Piscitello 2005). The extant literature identifies different sources of technological and knowledge spill-overs emanating from agglomeration economies at the regional level (e.g., Cantwell and Piscitello 2005):

i) Intra-industry spill-overs
ii) Inter-industry spill-overs
iii) Knowledge spill-overs

Drawing upon the "localization economies" of Marshall (1890), regional specialization externalities arise from the geographical and industrial concentration of firms from the same sector in a given region (Arrow 1962, Romer 1986, Glaeser et al. 1992, Batista and Swann 1998). The clustering of similar firms leads to the development of the intra-industrial localized linkages (e.g., labor pooling, supply inputs) attributed with specialized intra-industry spill-overs analogous to the region. Locations comprised of specific intra-industry capabilities are more likely to attract foreign investors from similar industries (Cantwell and Immarino 2000). Foreign firms may draw benefits of geographically localized technological development by locating their affiliates in these specialized regions (Cantwell 1989, Barrios et al. 2006). Therefore, we posit for the location selection of foreign investors in the EU regions:

H1: If intra-industry spill-overs arising from the specialization externalities are important, foreign investors should locate their affiliates in the industrially specialized regions.

In contrast to the specialization externalities, Jacobs (1969) argues that co-location of firms from different industries generates diversity externalities. The clustering of businesses from different sectors yields inter-industry spill-overs characterized by the interactions between diverse industries. In such regions, firms can learn new knowledge, innovative ideas and skills emerging from disparate economic activities (Cantwell and Iammarino 2001, Cantwell and Piscitello 2003, Devereux et al. 2007). Moreover, inter-industrial interactions stimulate urbanization of economies that favors the generation of diversified knowledge across sectors and the population (Feldman and Audretsch 1999, Barrios et al. 2006, Devereux et al. 2007). In addition, foreign firms may locate their affiliates in the urbanized regions to benefit from cost-effective production in the presence of a large labor pool (O'Sullivan 2003). Hence,

H2a: If inter-industry spill-overs arising from diversification externalities are important, foreign investors should locate their affiliates in the industrially diversified regions.

H2b: If inter-industry spill-overs arising from urbanized economies are important, foreign investors should locate their affiliates in urbanized regions.

In addition to the spill-overs associated with specialization and diversification externalities, Cantwell (1989) suggests the importance of knowledge spill-overs arising from the interaction between the external sources of knowledge and industry, and labor mobility across industries for OFDI location selection. These spill-overs arise from regional knowledge creation in terms of research and educational endowments, skilled labor mobility and science-industry/technology linkages (Jaffe et al. 1993, Nelson 1993, Nelson and Rosenberg 1999, Feldman and Audretsch 1999, Cantwell and Piscitello 2002). Foreign investors can benefit from the spill-overs generated through the high level of knowledge activities in a given region specifically attributed with 1) spill-overs associated with the research interactions between regional science and industry bases and 2) spill-overs associated with the flow of knowledge characterized with the inter-industry labor interactions. Foreign firms can learn new and market-specific technological, managerial and retailing competencies by locating their affiliates in such regions (Cantwell 1989, Cantwell and Janne, 1999). Therefore,

H3a: If knowledge spill-overs arising from science-industry interactions are important, foreign investors should locate their affiliates in regions with higher research endowments.

H3b: If knowledge spill-overs arising from inter-industry interactions are important, foreign investors should locate their affiliates in regions with more highly skilled labor.

Data

Our firm-level data come from the AMADEUS database (online version 2012). We define foreign ownership, in our research context, as a firm based in one of the EU countries with the owner being located in any EU or non-EU advanced or emerging economy. The owner is either a direct shareholder (with a minimum of 10 per cent equity) of the firm or an ultimate owner (with a minimum of 25 per cent indirect ownership)[7]. To analyze the sub-national location of foreign affiliates in the EU, we use the EUROSTAT system of regional classification – Nomenclature of Territorial Units of Statistics (NUTS). We adopt a uniform breakdown of level 1 of NUTS classification in 27 member states of the EU.

Our empirical analysis is based on 31,500 new OFDI projects (Greenfield/acquisition affiliates) started in the 93 NUTS-1 regions of the EU between 1996 and 2010. The data contain investments made in all industrial sectors by investors from a number of advanced and emerging economies. Moreover, our data report the national location (country of both investor and affiliate), subnational region (NUTS-1), year of entry and industrial sector of each OFDI project.

Table A1 (in the Annex) presents the distribution of affiliates according to the destination country and investor being a DMNE or EMNE. Great Britain is the top recipient of new OFDI projects with 16.7% of all investments. Romania, Germany, France, Spain and Italy also attracted a considerable share of total OFDI investments in the EU between 1996 and 2010.[8] Great Britain also hosts the highest share of foreign affiliates of DMNEs, whereas Romania hosts the highest share of EMNE affiliates.

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[7] OECD (2012).

[8] The high proportion of affiliates in Romania is slightly against the OFDI stock statistics of EUROSTAT (2012). In the empirical estimation, we account for this issue by testing the robustness of our results by excluding Romania (see the results section).

Table A2 (in the Annex) displays the yearly distribution of foreign affiliates in the subnational regions of the EU. Table A3 (in the Annex III) presents the yearly distribution of affiliates according to the origin group of the foreign investors. On average, the number of OFDI projects per year in the EU is more than 2,000. However, the decline in investments after 2008 clearly shows the impact of economic recession on investors. The highest number of affiliates (2,927) was established in 2000, with the lowest (1,110) in 2009, right after the recession began. The impact of the recession among the EU investors was the highest after 2008. Nevertheless, the investors from other non-EU countries were also restricted to a lower number of investments due to the Financial Crisis.

Table A4 (in the Annex) presents industrial level disaggregation of our sample.[9] It shows that the majority (64.77%) of subsidiaries established in the EU are from the service sector, whereas in the EU, 28.95% of subsidiaries are established in the manufacturing sector. A large concentration of the OFDI in the service sectors is persistent among the investors from both advanced and emerging economies.

In regards to regional level OFDI activities, Table A5 (in the Annex) represents the geographical distribution of foreign affiliates in the NUTS-1 regions of the EU from 1996 to 2010. The OFDI projects are largely concentrated in or around the global cities of the host countries. Among the original 15 members of the EU (EU15), the largest concentration of subsidiaries is found in the "Greater London" region (NUTS-1: UKI) of Great Britain followed by the "Île-de-France" region of France (NUTS-1:FR1). There are 1,014 subsidiaries concentrated in the "Italia nord-occide" region of Italy (NUTS-1: ITC). In the new member states, the largest numbers of subsidiaries (6.03%) are located in the "Macroregiunea trei" region of Romania, followed by 1,199 (3.81%) subsidiaries in the "Macroregiunea unu" region. In Poland, 819 (2.6%) subsidiaries are located in the "Centralny" region.

Econometric methodology

Model

We assume a simplified model for the decision making process of a firm with regard to the regional location choice in light of the existing literature (e.g., Devereux and Griffith 1998, Basile et al. 2008,). The main assumptions of the model are a follows. First, a firm (investor) makes a decision about serving the foreign market. Second, the firm decides the means of investment. That is, the firm decides whether to serve the foreign market through licensing, alliances, joint ventures or by foreign direct investment. Then, the firm decides about the potential location for its future activities through the most relevant type of investment. For our analysis, it is OFDI. Our analysis is restricted to the final stage of this process, which is the location choice for OFDI in the EU.

In our analysis, locations are "regions" at NUTS-1 level in the EU. We assume that the selection choice of a particular region by investor depends on the potential profits associated

[9] Statistical classification of economic activities in the European Community, *Nomenclature statistique des activités économiques dans la Communauté européenne*, generally referred to as NACE is the European equivalent of NAICS (North American Industrial classification system) consisting of up to 4-digit industrial classification. We have used the first two digits of NACE (Rev.2) to divide our sample into respective sectors.

with the host region compared to other alternatives. Subsequently, we assume that the profits of a firm are affected by region-specific factors. Moreover, we assume that region-level determinants of OFDI apply uniformly across all NUTS-1 regions in the EU.

The random utility maximization framework has been used as a basis for studying firm-level discrete choice problems since McFadden (1974). This framework takes into consideration the assumption that the evaluation of a decision maker among available alternatives can be represented by a utility function and decision makers choose an alternative with the highest utility. In our analysis, the region-level location choice is a discrete choice problem where profit- (utility) maximizing firms choose locations from a distinct set of NUTS-1 regions. Given that our analysis is based on choices between 93 NUTS-1 European regions, we employ the conditional-logit estimation technique. It enables us to include the location attributes of a large number of alternatives along with the investors' choice of preferring a specific region. It relies on the assumption that each location decision is a discrete choice made among different alternatives. Coefficients in CLM are estimated by maximum likelihood procedures.

Applying the model specified by Guimarães et al. (2004) at the regional level, we assume the existence of *j* choices among NUTS-1 regions with *j=1,....,j* and *N* investors with *i=1,.....,N,* then the profit derived by investor *i* by locating in region *j* is given by

$$\pi_{ij} = \beta' z_{ij} + \epsilon_{ij},$$

Where β is a vector of unknown parameters, z_{ij} is a vector of observed explanatory variables, and $\in_{ij}$ is a random term. Thus, the profit for the investor *i* of locating in region *j* is composed of a deterministic and a stochastic component. The investor will choose the region that will yield the highest expected profit. If the $\in_{ij}$ is independently and identically distributed (iid), it can be shown that

$$P_{ij} = \frac{e^{\beta' z_{ij}}}{\sum_{j=1}^{J} e^{\beta' z_{ij}}}$$

Where P_{ij} is the probability that the *investor I* if he locates in region *j*. If we let $d_{ij} = 1$ in case investor *i* chooses choice *j* and $d_{ij} = 0$ otherwise, then we can write the log likelihood of the conditional logit model as

$$\log L_{cl} = \sum_{i=1}^{N} \sum_{j=1}^{J} d_{ij} \log P_{ij} .$$

In our model, the expected profit derived by investor *i*, if the investor locates in region *j,* is given by specification:

$$(I)\ \pi_{ij} = \beta_1 SPE_{jt_{i-1}} + \beta_2 DIV_{jt_{i-1}} + \beta_3 PDENS_{jt_{i-1}} + \beta_4 R\&D_{jt_{i-1}} + \beta_5 HRSTO_{jt_{i-1}} + \beta_6 MKT_{jt_{i-1}} + \beta_7 TAX_{jt_{i-1}} + \beta_8 WAGE_{jt_{i-1}} + \beta_9 LAB_{jt_{i-1}} + \beta_{10} INF_{jt_{i-1}} + \beta_{11} PROXIMITY_j + \epsilon_{ij} ,$$

where our dependent variable π_{ij} is a binary variable of choice. SPE is our measure for spill-overs arising from the regional industrial specialization externalities corresponding to our first hypothesis (H2). DIV is the Herfindahl-Index, which measures the effects of spill-overs associated with the regional industrial diversification externalities relating to our hypothesis (H2a), and PDENS is the measure of spill-overs emerging from the regional urbanization associated with our hypothesis (H2b). R&D and HRSTO measure the effects of knowledge spill-overs connected to the science-industry and inter-industry labor interactions, respectively, corresponding to our last set of hypothesis (H3a and H3b).

The control variables employed in our model constitute from β_6 to β_{11}. MKT is the regional *gross domestic product* as a proxy of the regional market demand. TAX is the regional tax policy variable measured by regional corporate tax. WAGE is the average hourly wage in the region and represents regional labor costs. LAB is the raw labor supply. INF is the proxy of communication infrastructure. Finally, PROXIMITY is the geographical distance between the capital city of country *j* with region in question, and the capital city of the country of investor *i*. $\in_{ij}$ is a random term.

Apart from $\beta_{11,}$ all explanatory variables are measured at t_{-1} as the year preceding the entry of investor *i*. By lagging the respective explanatory variables, we address a possible endogeneity issue between the investment of firms and region-specific effects. A detailed list of all variable names, abbreviations, measurements and sources is provided in Table A6 (in the Annex).

In line with our main theoretical assumption that EMNEs and DMNEs may value location factors (main hypotheses) differently, we account for heterogeneity in the nationality of investors. Thus, we estimate apart from the base line model a second model that includes interaction terms between country of origin effects and the main exogenous variables:

$$(II)\, \pi_{ij} = \beta' z_{ij} + \gamma' Originrdum_i * v_{ij} + u_{ij}.$$

Results

Table A7 (in the Annex) presents the summary and collinearity statistics of our explanatory variables. The variance inflation factor was calculated before and after. The estimations and the mean VIF is 1.65, which suggests that multicollinearity is not a concern in our analysis.

Table 1 displays the CLM estimation results for the location choice of foreign investors in the sub-national EU regions. As discussed, the signs and coefficients of our explanatory variables provide us with insights into the importance of regional determinants of OFDI location selection of foreign investors through a maximum likelihood procedure. Several models are tested under varying specifications to check the robustness of our models and the relative importance of our individual hypothesis.

In the first model, we seek to assess the effects of the different sources of agglomeration-related spill-overs while controlling for other traditional location determinants on the location choice of foreign investors in the EU regions regardless of their nationalities. Thus, Column 1 of Table 1 contains the estimation results of our specification (I). The model exhibits a high overall explanatory power and most variables are statistically significant. Consistent with Hypotheses 1, 2b and 3b, the coefficients of industrial specialization (SPE), regional urbanization (PDENS) and Skilled Labor (HRSTO) are positive and statistically significant ($p < 0.001$).

These results suggest that foreign investors were positively affected by the regional prospects of intra-industry spill-overs, inter-industry spill-overs (essentially arising from the regional urbanization economies) and knowledge spill-overs (essentially associated with the inter-industry interactions). However, the significantly positive and negative coefficients of industrial diversification (DIV) and regional research endowments (R&D), respectively, do not lend support to hypotheses 2a and 3a.

Concerning our control variables, we find a significantly positive effect of regional market demand (MKT) and a significantly negative effect of regional corporate tax (TAX) on the location of foreign affiliates (at $p < 0.001$). Furthermore, the coefficient of our labor cost variable (WAGE) is negative and statistically significant ($p < 0.001$). Moreover, geographical proximity (PROXIMITY) exerted a strong negative effect on location choice. Most of our control variables support the traditional theory in which OFDI is aimed at accessing large markets, and profit maximization is associated with reduction in transaction costs. However, regarding the other efficiency-related aspects, we do not find support for the positive effects of the availability of raw labor (LAB) and communication infrastructure (INF) on the location probability. The effects of our control variables are found largely consistent with comparable studies in the European context (e.g., Head et al. 1999, Crozet et al. 2004, Devereux et al. 2007).

On the origin of investors

The remaining Columns (2-6) of Table 1 present the results under the assumption that there are differences between investors from the emerging and advanced economies corresponding to our Specification (II). Therefore, additional models are estimated to examine the differences in the effects of different sources of technological and knowledge spill-overs on the knowledge-seeking OFDI location selections. The estimation results are obtained by estimating interaction effects of our key explanatory variables against different control groups. Specifically, interaction Model (2) estimates the interaction effects of EMNEs, Model (3) estimates the interaction effects for EU-EMNEs and Model (4) estimates the interaction effects for non-EU-EMNEs against the control group of all DMNEs. Furthermore, Model (5) estimates the interaction effects for non-EU-DMNEs against the control group of EU-DMNEs and finally, Model (6) estimates the interaction effects for non-EU-EMNEs against the control group of non-EU-DMNEs.

Column 2 reports that the effect of SPE was smaller and the effects of PDENS and HRSTO were larger on the location probability of EMNEs compared to the DMNEs control group. The effect of DIV was negative on the location choice of EMNEs against the control group. Furthermore, a large negative effect of R&D can be observed in the case of EMNEs. These results support our assumption that investors from emerging and advanced economies value location factors differently. In addition to the support for Hypotheses 1, 2b and 2c, we find support for Hypothesis 2a when we differentiate investors from the emerging economies. Although EMNEs location decisions were less responsive to intra-industry spill-overs, these firms tended to locate their affiliates in regions associated with the presence of inter-industry spill-overs arising from diversification externalities, urbanization economies and skilled labor mobility.

Table 1 CLM regression results

	(1)	(2)	(3)	(4)	(5)	(6)
SPE	7.388***	7.500***	7.501***	7.567***	6.586***	7.703***
	(0.167)	(0.179)	(0.179)	(0.179)	(0.225)	(0.323)
DIV	4.652***	5.056***	4.969***	4.756***	5.268***	3.392***
	(0.317)	(0.333)	(0.333)	(0.334)	(0.415)	(0.626)
PDENS	0.000249***	0.000229***	0.000235***	0.000220***	0.000116***	0.000157***
	(0.00000979)	(0.00000996)	(0.0000102)	(0.0000102)	(0.0000121)	(0.0000165)
R&D	-0.322***	-0.288***	-0.312***	-0.290***	-0.419***	0.108*
	(0.0250)	(0.0261)	(0.0263)	(0.0262)	(0.0324)	(0.0433)
HRSTO	0.00853***	0.00654***	0.00637***	0.00693***	0.00676***	0.00969***
	(0.000757)	(0.000810)	(0.000810)	(0.000809)	(0.00101)	(0.00139)
Control Variables:						
MKT	0.617***	0.652***	0.649***	0.639***	0.497***	0.847***
	(0.00752)	(0.00787)	(0.00795)	(0.00791)	(0.00927)	(0.0144)
TAX	-0.0499***	-0.0491***	-0.0477***	-0.0483***	-0.0460***	-0.0550***
	(0.000987)	(0.000987)	(0.00102)	(0.00101)	(0.00105)	(0.00168)
WAGE	-0.0422***	-0.0419***	-0.0412***	-0.0387***	-0.0372***	-0.0239***
	(0.000999)	(0.00100)	(0.00104)	(0.00102)	(0.00106)	(0.00163)
LAB	-0.000291	-0.000156	0.000524	-0.000600	0.00116**	-0.00326***
	(0.000390)	(0.000390)	(0.000408)	(0.000404)	(0.000428)	(0.000673)
INF	-0.0987***	-0.0974***	-0.102***	-0.0881***	-0.0933***	0.0325***
	(0.00539)	(0.00538)	(0.00558)	(0.00555)	(0.00582)	(0.00905)
PROXIMITY	-0.922***	-0.894***	-0.865***	-0.827***	-0.832***	-1.179***
	(0.0109)	(0.0111)	(0.0113)	(0.0116)	(0.0117)	(0.0322)
Interactions:						
SPE		-1.085*	-2.966***	0.505	0.859*	0.522
		(0.520)	(0.825)	(0.653)	(0.387)	(0.725)
DIV		-5.970***	-16.02***	-3.116*	-0.880	-2.382
		(1.123)	(2.108)	(1.308)	(0.715)	(1.490)
PDENS		0.000206***	0.000212***	0.000183***	0.000230***	0.0000597**
		(0.0000176)	(0.0000346)	(0.0000202)	(0.0000119)	(0.0000214)
R&D		-0.322***	-0.142	-0.237**	0.331***	-0.483***
		(0.0687)	(0.108)	(0.0874)	(0.0474)	(0.0975)
HRSTO		0.0156***	0.0270***	0.00580	-0.00103	0.00485
		(0.00226)	(0.00338)	(0.00298)	(0.00168)	(0.00321)
Firms	31,500	31,500	29,402	29,975	27,877	11,503
N	2792219	2792219	2597105	2653053	2457939	1069779
AIC	262567.6	262042.8	243952.0	250473.0	230846.6	92758.8
BIC	262708.9	262261.1	244169.1	250690.4	231062.8	92960.8
Log lik.	-131272.8	-131004.4	-121959.0	-125219.5	-115406.3	-46362.4
Chi-squared	20230.3	20613.0	19469.0	18612.2	19024.4	12282.2

Standard errors in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

We further account for the within-heterogeneity among investors from the emerging economies in interaction Models 3 and 4. In Column 3, we find that investors from emerging

EU economies valued SPE less than the DMNEs control group. A significantly larger negative effect of DIV, a slightly larger effect of PDENS and a larger effect of HRSTO can be observed in the case of EU-EMNEs against the control group of DMNEs. Furthermore, column 4 reports that the coefficient of DIV is positive and smaller than DMNEs for the investors from non-EU emerging economies. Moreover, the positive effect of PDENS is slightly larger and the negative effect of R&D is significantly larger compared to the control group. These results suggest that location strategies among EMNEs were not generalized. We find stronger supports for Hypotheses 2a, 2b and 2c when we account for EMNEs from the EU. However, compared to the EU-EMNEs, the effect of regional urbanization was smaller for non-EU EMNEs and these firms were generally not affected by other sources of technological and knowledge spill-overs. Therefore, membership in the EU and close proximity to countries significantly affected the location behaviour of firms.

To ascertain the effect of EU membership and to further account for investors' heterogeneities, we distinguish between the investors from EU and non-EU economies. The results are presented in column 5. They show a stronger effect of SPE among non-EU DMNEs compared to EU-DMNEs. The effect of PDENS is slightly larger and the effect of R&D is positive and slightly larger than the control group. These results suggest that the non-EU DMNEs were more likely to locate their affiliates in regions with intra-industry spill-overs and the intra-industry spill-overs associated with the urbanization externalities. Interestingly, the non-EU DMNEs tended to locate their affiliates in regions with the presence of knowledge spill-overs consisting of science-industry research interactions.

Finally, column 6 reports the results of our interaction Model (6) by distinguishing between investors from non-EU and emerging economies. A slightly stronger effect of PDENS and a significantly large negative effect of R&D can be observed. The results suggest that non-EU EMNEs valued inter-industry spill-overs associated with the regional urbanization economies slightly more for their OFDI location selection compared to their counterparts.

Robustness Checks

Because we used a large set of firms from diverse sectors in our dataset, the OFDI location decisions of investors may vary across industrial sectors. Therefore, we resort to split-sample estimation techniques to control for sector heterogeneity of OFDI projects and to further examine the robustness of our main estimations, thereby splitting our sample following the two digit NACE industrial classification. Specifically, we have re-estimated our main models (1-6) for the OFDI projects in the (1) service industry and the (2) manufacturing industry.

The results are reported in tables A8 and A9, respectively (in the Annex). The results were robust across different sets of estimations. We, however, find that the manufacturing affiliates were more likely to be located in the industrially specialized regions, possibly to benefit from the intra-industry spill-overs encompassing the localization of the economies. Furthermore, the location of manufacturing affiliates were more responsive to the availability of skilled labor and less affected by the regional urbanization compared to the location of services industry affiliates.

In terms of investor heterogeneity, investors from emerging economies were particularly interested in the inter-industry spill-overs arising from the urbanization of economies in the manufacturing sector and the availability of skilled labor. Moreover, we find that the location decisions of the EU-EMNEs were positively influenced by the inter-industry spill-overs and availability of skilled labor in the manufacturing sector than in the service sector. In terms of non-EU EMNEs, the urbanized regions had a slightly higher effect in the service sector investments. Regarding the differences between the investors from the EU and non-EU economies, industrial specialization significantly affected the location of affiliates in the service sector compared to the manufacturing sector, whereas the availability of skilled labor was an important determinant in the manufacturing sector.

We have further accounted for the estimation bias potentially posed by a large number of affiliates in Romanian regions. Thus, we have re-estimated models (1-6), excluding affiliates established in Romania, and found our results consistent, as reported in Table A10 (in the Annex).

Discussion and conclusion

This study examined the effects of different sources of technological and knowledge spill-overs on the location choice of foreign investors in the subnational regions of the EU in regards to the debate of knowledge-seeking OFDI (Cantwell 1989, Cantwell and Janne 1999). Although the relevance of the knowledge-seeking OFDI from EMNES has been well established in the extant scholarship (Makino et al. 2002, Luo and Tung 2007), little is known about to what extent EMNEs differ from DMNEs. Therefore, we focused particular attention on the differences that may exist between investors from emerging and advanced economies related to their different ownership characteristics (Dunning 1998, Child and Rodrigues 2005, Mathews 2002, 2006).

We have contributed to this debate by empirically analyzing the location decisions of 31,500 foreign affiliates in 93 regions of the EU. In our analysis, we categorically hypothesized on the relevance of intra-industry, inter-industry and knowledge spill-overs for the knowledge-seeking OFDI location selection at the regional level, in contrast to existing studies (Kumar 1998, Makino et al. 2002, Mathews 2006). We tested our arguments at regional level by employing discrete choice estimations within the framework of the utility maximization approach (McFadden 1974, Guimarães et al. 2000). Although the proposed hypotheses were generally supported in this study, we found significant differences once we controlled for the heterogeneity of investors' nationalities. The results of our empirical analyses are summarized as follows.

Overall, the results confirmed the potential role of agglomeration economies on the location choice of foreign investors in the EU regions (e.g., Barrios et al. 2006, Devereux et al. 2007). Generally, our results confirm the role of agglomeration economies for the knowledge-driven international relocation activities (Jaffe et al. 1993, Keller 2002) and the notion that different sources of agglomeration-related spill-overs are not disjunctive for the location decisions (Paci and Usai 2000).

Specifically, our empirical findings confirmed that the location behaviors of multinational enterprises were influenced by the (i) intra-industry technological spill-overs designated to the industrial specialization externalities typically emanating from the localization of economies in industries with a higher value added over other sectors in the region, (ii) inter-industry spill-overs essentially originated from the urbanization economies associated with the population, and (iii) regions with highly skilled labor reflecting the importance of inter-industry knowledge spill-overs. Although we found that the influence of the subnational agglomeration characteristics on the location decisions is isomorphic to a degree, the magnitude significantly varied across investors from different countries, especially investors from the emerging and advanced economies. This evidence suggests that the firms' location decisions are affected by home-country specific factors (Dunning 1998).

In regards to technological spill-overs, we expected that with a higher share of a particular sector in a given region, the likelihood of the foreign-affiliate location would increase, depicting the importance of intra-industry spill-overs arising due to the localization of economies. While our findings generally support the notion that foreign investors are interested in the prospects of economies of scale through specialized input factors (Cantwell and Immarino 2000, Barrios et al. 2006), investors from the emerging economies are less affected by the prospects of intra-industry spill-overs, which can be related to their weaker absorptive capacities in specialized knowledge (Cohen and Levinthal 1990). For industry dimensions, we found that the OFDI projects in the manufacturing sector were more responsive to the regional potentials in the intra-industry spill-overs.

We further expected that the regions with a higher propensity for spill-overs associated with the industrial diversity and urbanization economies would have a positive effect on the location likelihood of foreign affiliates. Our results suggest that foreign enterprises value the labor-related aspects of urbanized economies for their affiliates in the EU regions more highly than the innovation-related aspects, as most of the OFDI projects during the time of analysis were located in large urban centers. This finding may be related to the fact that the majority of affiliates in our data belonged to service sectors where retailing is an important component in the regional economic activities. However, our empirical findings suggest, to some extent contrasting to the DMNEs, tendencies among EMNEs to benefit from inter-industrial spill-overs arising from diverse industrial interactions in regard to the new innovations, ideas and skills. Additionally, it is worth observing that investors from the EU-member emerging economies were particularly interested in the inter-industry spill-overs. This finding may be explained by the argument that the paramount pressure of EU integration on these investors has somehow forced them to look to increase their innovative competitiveness to save their existing markets. Moreover, unlike other emerging economies, their traditional host markets consist of highly competitive regional markets of the EU.

Concerning the importance of the knowledge spill-overs arising from inter-industry labor mobility and interactions, our empirical evidence suggests that foreign investors are largely interested in the knowledge spill-overs typically associated with inter-industry labor interactions, especially in the manufacturing sector. We found a slight preference among EMNEs for the regions attributed with inter-industry spill-overs, providing some support to the knowledge-based view (Cantwell and Janne 1999). This finding may again be related to the high concentration of investments in the service sector where human resources are among the core components. However, the importance of knowledge spill-overs associated with the science-industry research interactions was not prevalent except among the DMNEs from non-EU member countries. The negative effect of the regional research endowments is partly in agreement with previous studies (e.g., Chung and Alcácer 2002). However, our results do not show a positive impact of knowledge spill-overs emerging from science industry-interaction among EMNEs in this regard.

The empirical analysis presented in this chapter offers some important implications related to knowledge-seeking through OFDI. First, the usefulness of a regional level location choice analysis is acknowledged through our robust analysis. Second, it is important to distinguish between different sources of spill-overs associated with agglomeration economies, as our results suggest the particular relevance of certain spill-overs on the location choice of foreign investors. Third, and most importantly, EMNEs are substantially different from DMNEs regarding knowledge-driven location decisions at the regional level. In general, EMNEs are more inclined toward the creation of new knowledge than toward enhancing prior knowledge compared to their counterparts. Thus, EMNEs place a higher value on the spill-overs connected to the urbanization, diversification and inter-industry human resource interactions. Fourth, when considering the knowledge-seeking location dynamics, the location decisions of firms in general and EMNEs in particular may not be generalized due to the potential within heterogeneity among EMNES investors moderated through specific home-country characteristics or geographical locations.

We should note some of the limitations of our study. Our dataset contains substantive empirical limitations regarding the country-level and firm-level characteristics of foreign investors, thereby restricting the extent to which we could isolate significant differences or similarities in the location decisions pertaining to the specific characteristics of the investors and their nationalities. Moreover, our level of analysis is on the NUTS-1 regions of the EU. Future research should consider analysis on the NUTS-2 or NUTS-3 level that may provide some useful insights on the policy implications of the location attractiveness. Furthermore, our empirical strategy relies on the conditional logit approach due to data limitations. However, CLM is associated with the assumption of independence of irrelevant alternatives. Future researchers, depending on data availability, may employ alternative empirical strategies, such as nested-logit or mixed-logit strategies.

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Annex

A1 Affiliates distribution according to the destination countries and source country groups

Destination Country	OFDI Projects	% of total	DMNEs	EMNEs
Austria	826	2.62	776	50
Belgium	759	2.41	736	23
Bulgaria	306	0.97	245	61
Cyprus	15	0.05	12	3
Czech Republic	855	2.71	658	197
Germany	3,726	11.83	3,398	328
Denmark	530	1.68	514	16
Estonia	421	1.34	362	59
Spain	2,382	7.56	2,242	140
Finland	380	1.21	360	20
France	2,839	9.01	2,677	162
Great Britain	5,249	16.66	4,710	539
Greece	412	1.31	287	125
Hungary	354	1.12	331	23
Ireland	439	1.39	419	20
Italy	1,729	5.49	1,634	95
Lithuania	469	1.49	349	120
Luxembourg	175	0.56	167	8
Latvia	344	1.09	226	118
Malta	13	0.04	13	0
Netherlands	1,448	4.6	1,302	146
Poland	1,936	6.15	1,753	183
Portugal	458	1.45	436	22
Romania	4,240	13.46	3,166	1,074
Sweden	831	2.64	805	26
Slovenia	150	0.48	141	9
Slovakia	214	0.68	158	56
Total	**31,500**	**100**	**27,877**	**3,623**

Source: Own calculations based on AMADEUS Database (2012)

A2 Rates of annual entry into the EU by year of entry within the sample

Year of Entry	AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI	FR	GB	GR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	Total
1996	54	60	16	0	87	232	33	33	152	20	261	379	31	37	18	102	44	17	22	0	99	183	41	137	23	16	17	2,114
1997	75	62	25	2	70	266	30	36	179	27	239	383	37	44	35	126	42	10	24	0	96	204	37	174	51	13	23	2,310
1998	74	68	25	1	53	294	37	35	232	38	221	398	28	44	28	129	34	11	25	0	103	188	43	210	67	14	22	2,422
1999	64	70	31	0	65	332	50	34	241	36	224	462	29	38	40	145	30	21	21	0	120	225	24	268	77	11	12	2,670
2000	84	68	35	0	56	338	55	37	267	37	285	505	51	53	34	166	31	9	16	0	125	212	48	297	85	10	23	2,927
2001	55	67	22	0	62	273	45	33	188	24	231	364	41	25	23	158	33	10	27	1	104	134	32	254	79	13	25	2,323
2002	51	50	25	3	43	255	43	18	162	33	206	349	36	17	31	104	39	13	16	1	90	140	30	280	60	12	9	2,116
2003	52	48	28	1	43	220	38	31	151	26	164	333	22	17	33	116	42	8	18	0	81	109	40	280	33	11	19	1,964
2004	68	50	22	2	57	231	43	40	142	34	200	369	26	26	28	113	37	15	23	3	87	147	37	369	57	10	29	2,265
2005	58	39	35	1	59	253	32	37	154	29	153	351	30	21	34	130	41	15	31	0	121	146	30	377	54	17	21	2,269
2006	49	53	15	3	72	240	27	28	155	21	183	376	30	18	36	110	24	13	20	3	128	93	30	383	61	5	9	2,185
2007	40	55	18	0	61	251	34	18	122	18	164	362	22	13	38	141	24	13	13	3	121	62	24	393	64	7	5	2,086
2008	47	19	8	1	56	218	27	17	105	19	130	242	16	1	22	99	18	7	28	1	78	31	19	326	51	6	0	1,592
2009	32	29	1	0	33	136	18	14	80	9	82	191	5	0	20	44	16	5	36	0	48	25	11	241	31	3	0	1,110
2010	23	21	0	1	38	187	18	10	52	9	96	185	8	0	19	46	14	8	24	1	47	37	12	251	38	2	0	1,147
Total	826	759	306	15	855	3,726	530	421	2,382	380	2,839	5,249	412	354	439	1,729	469	175	344	13	1,448	1,936	458	4,240	831	150	214	31,500

Source: Own calculations based on AMADEUS Database (2012)

A3 Rates of annual entry into the EU by year of entry within the sample

Year	DMNEs	EMNEs
1996	1,939	175
1997	2,125	185
1998	2,221	201
1999	2,438	232
2000	2,658	269
2001	2,072	251
2002	1,873	243
2003	1,743	221
2004	1,992	273
2005	1,982	287
2006	1,890	295
2007	1,776	310
2008	1,309	283
2009	929	181
2010	930	217
Total	**27,877**	**3,623**

Source: Own calculations based on AMADEUS Database (2012)

A4 Aggregations of industrial classifications for whole sample by origin of investors (by NACE Rev.2 codes)

Sector	Sample	% in total	DMNEs	EMNEs
Manufacturing	9122	28.95	8,175	947
Services	20400	64.77	17,997	2,392
Other	1978	6.27	1705	284
Total	**31500**	**100%**	**27,877**	**3,623**

Source: Own calculations based on AMADEUS Database (2012)

A5 Distribution of foreign affiliates according to NUTS level 1 region

NUTS-1 Code	No.	%	Manufacturing Sector	Services Sector	NUTS-1 Code	No.	%	Manufacturing Sector	Services Sector	NUTS-1 Code	No.	%	Manufacturing Sector	Services Sector
AT1	391	1.24	63	312	ES6	152	0.48	28	103	PL2	329	1.04	159	133
AT2	129	0.41	47	75	ES7	54	0.17	4	47	PL3	96	0.3	55	31
AT3	306	0.97	93	198	FI1	380	1.21	108	247	PL4	312	0.99	160	121
BE1	184	0.58	18	159	FR1	1,297	4.12	142	1,110	PL5	216	0.69	134	59
BE2	456	1.45	106	336	FR2	328	1.04	178	136	PL6	164	0.52	96	60
BE3	119	0.38	42	68	FR3	172	0.55	76	86	PT1	458	1.45	94	327
BG3	90	0.29	57	26	FR4	226	0.72	118	97	RO1	1,199	3.81	696	401
BG4	216	0.69	88	113	FR5	159	0.5	75	77	RO2	461	1.46	239	163
CY0	15	0.05	3	11	FR6	137	0.43	46	81	RO3	1,900	6.03	442	1,243
CZ0	855	2.71	358	438	FR7	284	0.9	117	151	RO4	680	2.16	421	179
DE1	464	1.47	159	297	FR8	236	0.75	54	169	SE1	506	1.61	47	438
DE2	647	2.05	174	451	GR1	31	0.1	19	6	SE2	251	0.8	61	181
DE3	183	0.58	19	153	GR2	18	0.06	7	10	SE3	74	0.23	19	48
DE4	70	0.22	26	35	GR3	356	1.13	33	309	SI0	150	0.48	45	98
DE5	42	0.13	11	31	GR4	7	0.02	2	5	SK0	214	0.68	107	95
DE6	205	0.65	20	173	HU1	228	0.72	33	181	UKC	107	0.34	48	51
DE7	473	1.5	102	363	HU2	74	0.23	56	16	UKD	339	1.08	117	206
DE8	45	0.14	14	29	HU3	52	0.17	36	10	UKE	258	0.82	91	150
DE9	220	0.7	82	124	IE0	439	1.39	61	357	UKF	251	0.8	95	144
DEA	871	2.77	261	584	ITC	1,014	3.22	332	627	UKG	339	1.08	121	203
DEB	100	0.32	40	56	ITD	340	1.08	183	141	UKH	362	1.15	95	250
DEC	43	0.14	12	25	ITE	284	0.9	100	162	UKI	2,063	6.55	112	1,851
DED	105	0.33	55	44	ITF	63	0.2	33	27	UKJ	909	2.89	163	704
DEE	86	0.27	49	32	ITG	28	0.09	6	12	UKK	235	0.75	71	136
DEF	94	0.3	25	64	LT0	469	1.49	181	258	UKL	114	0.36	54	54
DEG	78	0.25	41	34	LU0	175	0.56	17	146	UKM	219	0.7	42	147
DK0	530	1.68	124	389	LV0	344	1.09	82	236	UKN	53	0.17	16	33
EE0	421	1.34	163	228	MT0	13	0.04	5	8	**Total**	**31,500**	**100**	**9,122**	**20,400**
ES1	102	0.32	48	36	NL1	51	0.16	12	34					
ES2	228	0.72	110	102	NL2	190	0.6	50	134					
ES3	955	3.03	98	803	NL3	901	2.86	103	754					
ES4	96	0.3	53	30	NL4	306	0.97	70	220					
ES5	795	2.52	207	553	PL1	819	2.6	187	565					

Source: Own calculations based on AMADEUS Database (2012)

A6 List of variables

Variable	Symbol	Definitions
Dependent Variable:		
Choice	CHOICE	Binary variable. 0: no entry, 1: entry*
Independent Variables		
Industrial Specialization	SPE	Regional index of industrial specialization, computed in terms of the share of value added of a given industry over total gross value added (deflated in Euro 2000). 1: Highly specialized industry, 0: No industry specialization***
Industrial Diversification	DIV	Herfindahl-Index: Computed as the sum of the squared share of the regional value added of all sectors. 0: Highly diversified industry, 1:No industrial diversification***
Population Density	PDENS	Regional population density per square kilometer**
R&D intensity	R&D	The regional public R&D endowments as percentage of the regional GDP**
Skilled Labor	HRSTO	Share of the highly skilled labor employed in science and technology in the total regional sector/industrial employment**
Market Demand	MKT	Regional GDP in Millions Euro**
Corporate Tax	TAX	Regional corporate tax as percentage**
Labor Costs	WAGE	Regional hourly wage rate****
Labor	LAB	Tertiary students (ISCED5-6) - share over all students in a given region**
Infrastructure	INF	Length of roads in km per km^2 in a given region**
Geographical Proximity	PROXIMITY	Euclidean distance in km between capital of home region and the alternative's capital*****

Source: *AMADEUS (2012), ** EUROSTAT (2012), *** IGEAT-Free university of Brussels (2012), **** EU KLEMS (2012, OECD only for Bulgaria and Romania), ***** Own calculations

A7 Collinearity Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max	1	2	3	4	5	6	7	8	9	10	11	VIF
1. SPE	2792219	0.086402	0.0702678	0	0.487999	1											1.16
2. DIV	2792219	0.088753	0.0246523	0.058048	0.264032	0.0336	1										1.08
3. PDENS	2792219	392.054	892.2411	5.9	6702.1	0.0726	0.3246	1									1.61
4. R&D	2792219	0.569302	0.3133634	0.03	2.17	0.1112	0.2205	0.2448	1								1.3
5. HRSTO	2792219	27.27099	16.83653	0.7	95.8	0.4961	0.0652	0.0834	0.1654	1							1.18
6. MKT	2792219	11.01795	1.093777	7.92081	13.23918	0.1228	0.1001	0.1044	0.4047	0.0663	1						1.34
7. TAX	2792219	33.06825	9.21547	10	56.8	0.0594	0.1518	0.1632	0.2864	0.062	0.318	1					1.2
8. WAGE	2792219	16.29442	10.43574	0	156.9272	0.0997	0.1831	0.1696	0.4408	0.1552	0.5712	0.3548	1				1.36
9. LAB	2792219	52.18655	18.02763	7.5	131.2	0.0792	0.0817	0.3775	0.3756	0.0829	0.3055	-0.1377	0.1303	1			1.27
10. INF	2792219	1.409319	1.754237	0.070957	11.67081	0.0523	0.1443	0.6665	-0.0173	0.0041	0.0997	-0.0079	0.2055	0.2017	1		1.48
11. PROXIMITY	2792219	7.490799	1.035002	4.023441	9.818352	0.0274	0.0281	-0.0559	-0.0559	0.056	-0.0916	-0.0683	-0.0699	-0.0159	-0.0896	1	1.01
																	MVIF:1.65

Source: Own calculations

A8 CLM regression results for the services sector

	(1)	(2)	(3)	(4)	(5)	(6)
SPE	4.248***	4.216***	4.219***	4.297***	3.113***	4.571***
	(0.196)	(0.210)	(0.210)	(0.211)	(0.270)	(0.363)
DIV	7.910***	8.070***	7.991***	7.758***	8.132***	7.535***
	(0.371)	(0.397)	(0.396)	(0.397)	(0.505)	(0.687)
PDENS	0.000216***	0.000198***	0.000205***	0.000186***	0.0000929***	0.000139***
	(0.0000117)	(0.0000119)	(0.0000121)	(0.0000122)	(0.0000141)	(0.0000198)
R&D	-0.0669*	-0.0206	-0.0512	-0.0281	-0.0779*	0.211***
	(0.0300)	(0.0313)	(0.0316)	(0.0315)	(0.0387)	(0.0515)
HRSTO	0.0152***	0.0141***	0.0138***	0.0146***	0.0141***	0.0188***
	(0.000866)	(0.000928)	(0.000928)	(0.000925)	(0.00115)	(0.00156)
<u>*Control Variables*</u>:						
MKT	0.751***	0.806***	0.802***	0.790***	0.651***	0.954***
	(0.00952)	(0.0101)	(0.0101)	(0.0101)	(0.0120)	(0.0181)
TAX	-0.0570***	-0.0559***	-0.0546***	-0.0548***	-0.0527***	-0.0643***
	(0.00125)	(0.00125)	(0.00129)	(0.00129)	(0.00133)	(0.00207)
WAGE	-0.0444***	-0.0436***	-0.0422***	-0.0391***	-0.0372***	-0.0243***
	(0.00130)	(0.00131)	(0.00136)	(0.00134)	(0.00139)	(0.00207)
LAB	0.00281***	0.00302***	0.00384***	0.00264***	0.00441***	-0.000638
	(0.000471)	(0.000472)	(0.000494)	(0.000492)	(0.000520)	(0.000799)
INF	-0.0622***	-0.0601***	-0.0654***	-0.0490***	-0.0609***	0.0539***
	(0.00663)	(0.00663)	(0.00685)	(0.00687)	(0.00718)	(0.0111)
PROXIMITY	-0.889***	-0.842***	-0.810***	-0.752***	-0.785***	-1.243***
	(0.0141)	(0.0145)	(0.0148)	(0.0153)	(0.0154)	(0.0410)
<u>*Interactions*</u>:						
SPE		-0.524	-1.995*	0.530	1.360**	-0.0243
		(0.588)	(0.917)	(0.770)	(0.444)	(0.843)
DIV		-4.491***	-15.13***	-1.372	-0.157	-1.334
		(1.236)	(2.461)	(1.466)	(0.821)	(1.673)
PDENS		0.000192***	0.000212***	0.000157***	0.000222***	0.0000474*
		(0.0000191)	(0.0000365)	(0.0000225)	(0.0000131)	(0.0000240)
R&D		-0.395***	-0.173	-0.320**	0.0999	-0.400***
		(0.0817)	(0.124)	(0.107)	(0.0562)	(0.119)
HRSTO		0.00826**	0.0199***	-0.000398	-0.00101	-0.00182
		(0.00253)	(0.00368)	(0.00345)	(0.00190)	(0.00369)
N	1809921	1809921	1686994	1712309	1589382	740391
AIC	166151.5	165587.6	154207.3	157352.9	145320.3	61723.4
BIC	166288.0	165798.6	154417.0	157562.9	145529.1	61919.2
Log lik.	-83064.8	-82776.8	-77086.6	-78659.4	-72643.2	-30844.7
Chi-squared	17300.3	17666.4	16824.5	16497.0	16280.7	11398.9

Standard errors in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

A9 CLM regression results for the manufacturing sector

	(1)	(2)	(3)	(4)	(5)	(6)
SPE	18.84^{***}	18.46^{***}	18.50^{***}	18.42^{***}	17.36^{***}	18.79^{***}
	(0.735)	(0.783)	(0.783)	(0.782)	(0.950)	(1.430)
DIV	0.730	1.280	1.157	1.070	1.354	-0.741
	(0.678)	(0.702)	(0.704)	(0.704)	(0.869)	(1.406)
PDENS	0.000120^{***}	0.0000998^{***}	0.000101^{***}	0.0000958^{***}	-0.0000624	0.0000196
	(0.0000251)	(0.0000263)	(0.0000266)	(0.0000264)	(0.0000369)	(0.0000389)
R&D	-0.987^{***}	-0.987^{***}	-1.003^{***}	-0.987^{***}	-1.356^{***}	-0.0439
	(0.0559)	(0.0582)	(0.0588)	(0.0583)	(0.0725)	(0.0929)
HRSTO	0.0226^{***}	0.0208^{***}	0.0214^{***}	0.0210^{***}	0.0237^{***}	0.00630
	(0.00233)	(0.00245)	(0.00245)	(0.00246)	(0.00308)	(0.00432)
Control Variables:						
MKT	0.386^{***}	0.398^{***}	0.394^{***}	0.391^{***}	0.266^{***}	0.665^{***}
	(0.0144)	(0.0149)	(0.0151)	(0.0149)	(0.0174)	(0.0273)
TAX	-0.0249^{***}	-0.0248^{***}	-0.0236^{***}	-0.0248^{***}	-0.0225^{***}	-0.0237^{***}
	(0.00181)	(0.00181)	(0.00187)	(0.00184)	(0.00191)	(0.00310)
WAGE	-0.0364^{***}	-0.0364^{***}	-0.0365^{***}	-0.0346^{***}	-0.0349^{***}	-0.0237^{***}
	(0.00182)	(0.00182)	(0.00189)	(0.00184)	(0.00194)	(0.00300)
LAB	-0.00330^{***}	-0.00325^{***}	-0.00281^{***}	-0.00370^{***}	-0.00236^{**}	-0.00666^{***}
	(0.000807)	(0.000807)	(0.000842)	(0.000825)	(0.000871)	(0.00143)
INF	-0.180^{***}	-0.179^{***}	-0.181^{***}	-0.173^{***}	-0.158^{***}	0.00563
	(0.0114)	(0.0114)	(0.0119)	(0.0116)	(0.0121)	(0.0180)
PROXIMITY	-0.930^{***}	-0.928^{***}	-0.902^{***}	-0.893^{***}	-0.862^{***}	-0.960^{***}
	(0.0196)	(0.0199)	(0.0202)	(0.0205)	(0.0207)	(0.0593)
Interactions:						
SPE		2.906	-0.955	3.990	1.766	3.660
		(2.258)	(4.122)	(2.641)	(1.697)	(2.904)
DIV		-6.289^{*}	-10.86^{*}	-5.297	-1.437	-3.707
		(2.485)	(4.576)	(2.952)	(1.593)	(3.225)
PDENS		0.000193^{**}	0.0000244	0.000217^{***}	0.000285^{***}	0.0000527
		(0.0000614)	(0.000168)	(0.0000652)	(0.0000436)	(0.0000645)
R&D		-0.0270	0.157	-0.0196	1.114^{***}	-0.795^{***}
		(0.160)	(0.281)	(0.189)	(0.107)	(0.206)
HRSTO		0.0176^{*}	-0.00158	0.0222^{*}	-0.0113^{*}	0.0322^{***}
		(0.00757)	(0.0140)	(0.00879)	(0.00510)	(0.00962)
_N_	806172	806172	748512	776394	718734	283185
AIC	76846.6	76832.4	71546.0	74391.9	68391.7	26095.5
BIC	76974.2	77029.6	71741.9	74588.5	68587.0	26274.9
Log lik.	-38412.3	-38399.2	-35756.0	-37179.0	-34178.9	-13030.8
Chi-squared	4907.3	4936.1	4564.5	4421.9	4679.3	1511.8

Standard errors in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

A10 CLM regression results excluding affiliates in Romania

	(1)	(2)	(3)	(4)	(5)	(6)
SPE	7.868***	7.748***	7.726***	7.796***	6.645***	8.444***
	(0.192)	(0.203)	(0.203)	(0.203)	(0.261)	(0.347)
DIV	4.421***	4.309***	4.339***	4.126***	5.303***	1.948**
	(0.362)	(0.385)	(0.385)	(0.385)	(0.484)	(0.703)
PDENS	0.000143***	0.000130***	0.000139***	0.000127***	0.0000229	0.000114***
	(0.0000103)	(0.0000105)	(0.0000107)	(0.0000107)	(0.0000126)	(0.0000172)
R&D	-0.0589*	-0.0326	-0.0562*	-0.0500	-0.118***	0.197***
	(0.0260)	(0.0270)	(0.0272)	(0.0271)	(0.0336)	(0.0445)
HRSTO	0.00587***	0.00480***	0.00453***	0.00501***	0.00392***	0.00829***
	(0.000823)	(0.000870)	(0.000871)	(0.000870)	(0.00110)	(0.00145)
<u>*Control Variables:*</u>						
MKT	0.733***	0.757***	0.758***	0.747***	0.629***	0.909***
	(0.00818)	(0.00855)	(0.00861)	(0.00858)	(0.0102)	(0.0155)
TAX	-0.0399***	-0.0398***	-0.0390***	-0.0393***	-0.0384***	-0.0495***
	(0.00106)	(0.00106)	(0.00109)	(0.00108)	(0.00112)	(0.00176)
WAGE	-0.0355***	-0.0352***	-0.0354***	-0.0321***	-0.0315***	-0.0147***
	(0.00107)	(0.00107)	(0.00111)	(0.00109)	(0.00113)	(0.00168)
LAB	0.000765	0.000803	0.00172***	0.000972*	0.00282***	-0.00350***
	(0.000435)	(0.000435)	(0.000450)	(0.000447)	(0.000467)	(0.000735)
INF	-0.0358***	-0.0351***	-0.0424***	-0.0317***	-0.0442***	0.0642***
	(0.00576)	(0.00576)	(0.00595)	(0.00591)	(0.00615)	(0.00953)
PROXIMITY	-0.917***	-0.911***	-0.902***	-0.857***	-0.886***	-1.109***
	(0.0122)	(0.0123)	(0.0124)	(0.0128)	(0.0127)	(0.0361)
<u>*Interactions*</u>:						
SPE		0.937	0.871	0.118	1.476***	-0.370
		(0.620)	(0.983)	(0.817)	(0.427)	(0.880)
DIV		0.148	-4.003	0.838	-2.112**	2.287
		(1.127)	(2.127)	(1.430)	(0.809)	(1.621)
PDENS		0.000149***	0.000120***	0.000149***	0.000249***	0.0000152
		(0.0000177)	(0.0000350)	(0.0000210)	(0.0000122)	(0.0000223)
R&D		-0.290***	-0.207	-0.152	0.138**	-0.286**
		(0.0770)	(0.124)	(0.0981)	(0.0496)	(0.108)
HRSTO		0.00996***	0.0233***	-0.00195	0.000368	-0.00310
		(0.00263)	(0.00409)	(0.00343)	(0.00179)	(0.00365)
N	2310946	2310946	2168724	2227809	2085587	943044
AIC	221125.6	220930.9	207347.2	213264.1	198956.2	83154.7
BIC	221264.7	221146.0	207561.3	213478.6	199169.6	83354.6
Log lik.	-110551.8	-110448.5	-103656.6	-106615.1	-99461.1	-41560.3
Chi-squared	20703.6	20845.6	19930.5	20002.9	19847.0	12341.4

Standard errors in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Host countries (ISO codes as per ISO 3166-1 standard) and Investing country groups

Host countries		**Investor country groups**		
Name	ISO	DMNE	EMNE	
Austria	AT	Australia	Algeria	Malta
Belgium	BE	Austria	Argentina	Malaysia
Bulgaria	BG	Belgium	Brazil	Mexico
Cyprus	CY	Canada	Bulgaria	Morocco
Czech Republic	CZ	Denmark	Chile	Pakistan
Denmark	DK	Finland	China	Peru
Estonia	EE	France	Czech	Philippines
Finland	FI	Germany	Republic	Poland
France	FR	Greece	Egypt	Romania
Great Britain	GB	Iceland	Estonia	Russia
Germany	DE	Ireland	Hong Kong	Saudi Arabia
Greece	GR	Italy	Hungary	Singapore
Hungary	HU	Japan	India	Slovakia
Ireland	IE	Luxembourg	Indonesia	South Africa
Italy	IT	Netherlands	Israel	South Korea
Latvia	LV	New Zealand	Jordan	Taiwan
Lithuania	LT	Norway	Latvia	Thailand
Luxembourg	LU	Portugal	Lithuania	Turkey
Malta	MT	San Marino	Malaysia	Ukraine
Netherlands	NL	Spain	Cyprus	Yemen
Poland	PL	Sweden		
Portugal	PT	Switzerland		
Romania	RO	United		
Slovakia	SK	Kingdom		
Slovenia	SI	United		
Spain	ES	States		
Sweden	SE			

Source: International Organization for Standardization, 2012