WHERE DO FOREIGN AFFILIATES OF SPANISH MULTINATIONAL FIRMS LOCATE IN DEVELOPING AND TRANSITION ECONOMIES?

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July 2013

Abstract

In this paper we examine how different host country characteristics affect the location decision of Spanish multinational firms in developing and transition countries. Particular attention is paid to the sectoral composition of foreign direct investment, and more specifically on whether the different location determinants of Spanish multinational enterprise affiliates change when looking at manufacturing or services firms. The study focuses on a broad firm-level dataset of 4,177 Spanish affiliates established in 52 countries over the period 1990 to 2010. The results, obtained by the estimation of a set of discrete choice models, suggest that Spanish foreign direct investments (FDI) to developing and transition economies are driven by both market-seeking and efficiency-seeking factors. FDI is found to be positively related to the size of the market and negatively related to labor costs. The estimates also support the predictions of New Economic Geography, showing that Spanish investment in developing and transition countries exhibits a pronounced agglomeration effect, although the intensity of these externalities depends on both the sort of activity and the nationality of competitors. Further, our results show differences between manufactures and services in other local factors, such as human capital, per capita income, and financial risk, thereby confirming the idea that investors in each sector have different motivations for locating foreign affiliates in developing countries. Macroeconomic stability and the quality of infrastructures also appear to influence the location of FDI in these economies.

Key words: Location choice; Developing and transition countries; Multinational firms; Nested and mixed logit models.

JEL classification: F21; F23; R39

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1.- INTRODUCTION

Multinational enterprises (MNEs) and transnational investments have played a prominent role in the process of globalization. Over the last few decades, the world has seen a significant increase in the scale of multinational operations and a closer integration in their international value-added activities. Linked to this activity of MNEs, worldwide foreign direct investment (FDI) has risen considerably during this period, subsequently stimulating and exerting a decisive influence on the patterns of economic growth and development in recipient countries, and gradually changing the landscape of the global economy. Specifically, annual FDI increased six-fold from US$ 241 million in 1990 to US$ 1,451 million in 2010 (UNCTAD, 2012). In 2011, despite the global economic crisis, FDI inflows still rose by 16%.[1] This significant growth of investment flows has reflected both a rise in the size and number of individual transnational transactions as well as a growing diversification of multinational firms across economies and sectors.

The increasing relevance of developing and transition countries as recipients of these flows is one of the striking features of current trends in foreign investments. Traditionally, FDI was a phenomenon that primarily concerned highly developed economies. For decades, FDI flows from high-income developed countries to other high-income countries have been an empirical regularity of cross-country investments (Barba-Navaretti and Venables, 2004). However, this tendency has recently been inverted. Indeed, in 2010, for the first time, developing and transition economies attracted more than 50% of global FDI inflows (UNCTAD, 2012).

The last few decades have also witnessed a sharp increase in FDI in the service sector at the expense of the manufacturing industry. As can be appreciated in Figure 1, the manufacturing's share of FDI declined from 41% in 1990 to less than 30% in 2010. In contrast, FDI in services, which accounted for just 49% of world FDI in 1990, has been the highest of the inward FDI flows worldwide since the early 00s and it represents about two-thirds of total FDI flows from the mid-00s on. Additionally, as we can see in the same figure, this growth in the share of services FDI has been much higher for developing than for developed countries since 2000.

[1] See UNCTAD (2012).

INSERT FIGURE 1 HERE

In spite of this recent behavior of FDI, the location choice of services foreign affiliates in developing countries has not received a great deal of attention from researchers. Most empirical studies that analyze the location decision of MNEs have focused mainly on developed economies and on manufacturing sectors.[2] However, as Bloniguen and Davis (2004) mentioned, the factors that govern FDI inside these economies are simply very different to the case of developing countries. Similarly, the determinants of location decisions may also vary across sectors. Services are largely intangible and non-storable, and require more interaction with customers than manufacturing. Thus, as has been shown recently by Oldenski (2012), Py and Hatem (2010), and Spies (2010), the patterns of foreign production location decisions might differ significantly between manufacturing and services.

In this paper, we investigate how different host country characteristics affect the decision of Spanish MNEs to locate to a large sample of developing and transition countries. We use a broad firm-level dataset of 4,177 Spanish affiliates established in 52 countries during the period 1990 to 2010. Our attention is particularly centered on whether the relevance of location determinants of MNE affiliates changes when looking at manufacturing or services firms.

The recent behavior of Spanish FDI flows makes the case of this country particularly relevant for the study of the location determinants of foreign affiliates in developing countries by sectors. Since the mid-90s, Spain has become a big player in the world's outward FDI, changing from being a net recipient of foreign investment to a net investor. The processes of globalization and liberalization that took place during those years gave Spanish firms the opportunity to grow and to expand abroad. As a result, Spanish firms embarked on a process of expansion through new investments. According to UNCTAD figures, Spain's cumulative investment abroad represented barely 3% of its GDP in the early 80s, but by 2010 outward FDI stock had risen to above 45% of the GDP.[3] The last

[2] As is the case of Basile et al. (2008) for MNEs in Europe, Crozet et al. (2004) for France, Duranton and Overman (2008) for United Kingdom, Guimares et al. (2000) for Portugal, and Head and Mayer (2004) for Japanese MNEs in Europe.

[3] In the early nineties, the rate of Spain's cumulative investment abroad with respect to GDP rose to 12.7%.

decades were also marked by a process of internationalization of Spanish firms in developing countries. Quantitatively speaking, around 40% of total Spanish outward FDI was located in developing countries during this period. Moreover, most of these investments were focused in the services sector. Particularly, the share of Spanish foreign affiliates in services represented 79% of total Spanish investments in the sample period.

To the best of our knowledge, no studies have been conducted about the determinants of location choices of foreign affiliates across sectors with a large sample of developing and transition economies at an outward firm level for a developed country. The few studies that do analyze the divergences in the location criteria between FDI in services and manufacturing activities concentrate on developed economies. This is the case of Py and Hatem (2010) and Spies (2010), who examined the location determinants of manufacturing and services FDI in Europe and Germany, respectively.[4] Furthermore, we provide a methodological contribution by estimating both standard conditional logit models as well as other discrete choice methods that allow us to account for the possibility that firms perceive some alternatives that are more similar to one another than others, like the nested and the mixed logit models. Indeed, this latter methodology has barely been used in the recent empirical literature despite its advantages in considering more complex substitution patterns among the choices.

Furthermore, following recent empirical works, this paper analyzes the relevance of the agglomeration effects in the attraction of FDI flows jointly with other local factors that may affect the location decision of MNEs, such as the market potential, the quality of the market, the endowment of infrastructures, and the cost of workforce.[5] As a novelty in the study of the location decision of FDI in developing countries, the role played by macroeconomic instability and financial risk in this selection are also contemplated.

[4] More recently, but with a different approach, Oldenski (2012) analyzed the impact of information transmission on the export-to-FDI ratio for US multinationals in manufacturing and services industries. Few other studies have focused mainly on the services sector; examples include the case of Kolstad and Villanger (2008), who analyzed the determinants of FDI in services in a panel of developed, transition, and developing countries, or Castellani et al. (2012), who studied the specificities in the location determinants of business services in the European regions.

[5] See, for instance, the works by Basile et al. (2008), Disdier and Mayer (2004), Hilber and Voicu (2010), Pusterla and Resmini (2007), and Spies (2010).

Additionally, the evaluation of these local characteristics may provide policymakers with useful information about how to attract foreign investment flows.

The main findings of this study are as follows. Firstly, it is shown that both market size and agglomeration economies constitute important determinants for the location choice of Spanish MNEs in developing and transition economies. In line with our predictions, the positive externalities of agglomerations of foreign firms seem to dominate in the attraction of FDI. However, the behavior of these positive spillovers is observed to differ depending on both the sector activity and the nationality of the competitors. Secondly, according to our estimates, the influence of human capital on the location choice of foreign affiliates is not homogenous across sectors either. Domestic skills appear to be clearly significant for the location of services investments but not for manufacturing activities. This result is consistent with the idea that investors in each sector have different motivations for locating foreign affiliates in developing countries. Thirdly, the results obtained indicate a negative influence of higher labor costs and macroeconomic instability on the attraction of FDI, while the availability of infrastructures and distance will have a positive effect. Finally, the estimates of the nested and mixed models show that substitution patterns among alternative locations exist depending on the country risk level for multinational services firms.

The rest of the paper is organized as follows. In the next section, the theoretical literature concerning the location determinants of MNEs is reviewed. Section 3 discusses the variables to be tested as determinants of FDI in the empirical analysis. The database and the econometric methodology are described in Section 4. Section 5 presents the estimation results and the final section concludes.

2.- THE UNDERLYING LITERATURE

The academic framework which usually underlies empirical research on location patterns of MNE investment relies on different pieces and elements from diverse, but often overlapping, theories.[6] Indeed, the theoretical foundation of the location decisions of MNEs

[6] A recent survey of different theoretical models of FDI can be found in Faeth (2009).

is still quite fragmented, traditionally coming from different fields of international business and international economics,[7] and more recently from New Economic Geography (NEG).[8]

From the eclectic paradigm of Dunning[9] to the latest integrated knowledge-capital model, the literature has highlighted several factors that help to explain the location decisions of MNEs. In this literature, the motives driving firms to engage in foreign investment and the nature of firms are interrelated. The motives are classified in four groups, *strategic asset-seeking*, *resource-seeking*, *market-seeking* or *efficiency-seeking*, while this literature has traditionally distinguished between horizontally and vertically integrated MNEs.

The horizontal MNEs that produce the same goods and services in each place (*market-seeking* investment) have an advantage over single-plant national firms when the host market is large (and well developed and integrated), and transport costs are high. Thus, the horizontal MNEs location decision relies on the trade-off between maximizing proximity to customers and concentrating production to achieve scale economies: the proximity-concentration hypothesis.[10]

Alternatively, the vertically integrated MNEs, which fragment the production process by stages depending on the availability of resources, assets or appropriate factor endowments at a given location, take the decision to invest abroad with the objective of avoiding supply constraints or obtaining cost advantages in production (*resources-seeking*, *efficiency-seeking*, or *strategic asset-seeking* investment).[11] A vertical multinational structure is preferred to a national one when natural resources are available or relative labor costs are small and trade costs low. Finally, the so-called integrated knowledge-capital model unifies horizontal and vertical motivations of MNEs. In this model, not only the traditional variables that explain horizontal FDI, such as market size or distance, matter but also factor

[7] An interesting discussion on the different approaches adopted by economic geographers, international economists, and international business and management specialists on the issue of the investment location behavior of MNEs can be seen in McCann (2011).
[8] See Krugman (1991a, b).
[9] See Dunning (1977, 1980, 1981, 1998). In Dunning (1980, 1981), the author tests his OLI framework.
[10] See Brainard (1993, 1997), Horstman and Markusen (1987, 1992), and Krugman (1983).
[11] Helpman (1984, 1985), Jones and Kierzkowski (1990) or Zhang and Markusen (1999) are good examples of vertical FDI models, coming from the international trade tradition.

endowments that justify a vertical expansion of MNEs.[12] Therefore, the motives to invest abroad and the nature of MNEs, including whether they are manufacturing or services firms, to a large extent define the set and importance of characteristics of the host countries that make them more attractive for the transnational investment of these companies.[13]

More recently, additional factors from the developments of NEG related to the forces that favor the concentration or dispersion of economic activity[14] have become commonplace in the literature on the determinants of location decisions of MNEs and FDI. This literature connects and extends the models based on the proximity-concentration hypothesis. Here, the trade-off between centripetal and centrifugal forces drives the location choice of firms. From our perspective, there are two major contributions of this literature to the study of location decisions of MNEs, i.e., it emphasizes the importance of agglomeration economies, and the concept of market potential is retrieved.

The NEG has adopted Marshall's agglomeration ideas to stress the existence of positive externalities between firms located close to each other. In addition, by emphasizing the relevance of transport costs, the NEG also revitalizes a traditional concept of economic geographers,[15] namely, market potential, which highlights the fact that the relevant measure of market access of a location (country, region or city) is not limited to just its own market, but extends to other nearby markets (each of them taking an importance that is inversely proportional to the distance from the location analyzed). This economic geography framework is in fact the reference background of our empirical work.

Moreover, this perspective is coherent with the importance of location factors detected recently in a survey conducted by the UNCTAD on managers of 2,272 MNEs (among the largest in the world).[16] This survey shows that the characteristics of the local market and the accessibility to other surrounding markets explain the largest proportion of the responses by MNEs when choosing the destination of investment abroad. This is followed by the

[12] See Markusen et al. (1996) and Markusen (1997). An empirical examination of the knowledge-capital model is provided by Carr et al. (2001).
[13] A recent review of the empirical evidence can be seen in Blonigen (2005).
[14] Since the seminal work of Krugman, various authors have contributed to the development of the NEG in different fields. A synthesis of this work can be seen in Fujita et al. (1999). Among the surveys about the contributions of this literature, see Krugman (1999), Neary (2001), and Fujita and Thisse (2002).
[15] Harris (1954).
[16] UNCTAD (2009, p. 44).

presence of suppliers, partners, and competitors (location externalities), labor market conditions, macroeconomic stability, quality of infrastructures, access to natural resources and, to a lesser extent, access to capital markets or the availability of specific incentives.

3.- LOCATION DETERMINANTS

Consistent with the theoretical literature and with the underlying idea that the host country characteristic that attracts FDI depends on the motives of foreign investors, most empirical works that analyze the location determinants of foreign investments have included in their models variables like the size and the quality of the host market, the endowment of natural resources, the characteristics of the labor market (relative skills and cost of workers) or geographical proximity to consumers. They also consider the availability of some strategic assets, including the endowment and quality of the communications infrastructure, the existence of good access to regional markets, or the number of MNEs already operating in them (see Argawal, 1980, for a survey).

Based on horizontal MNE models, the location determinants related to the size of the host country market have been widely tested by the empirical literature. According to the market-seeking FDI expectations, most works support a positive association between the market size of the host economy and foreign investment inflows (Bevan and Estrin, 2004; Kang and Jiang, 2012). For Py and Hatem (2010) location decisions in both manufacturing and services are very sensitive to the size of the market, due to the fact that a larger market provides an opportunity for investors to benefit from scale economies and cost effectiveness. Under increasing returns to scale and in the presence of transport costs, the market size of a country is a good indicator of the possibilities of its being selected as a destination for a subsidiary. This is particularly true when the investment project has a horizontal orientation, and the market-seeking MNE focuses on service activities.

Moreover, Head and Mayer (2004) have recently enriched the notion of market access by introducing the importance of market potential in multinationals' location choice. According to those authors, while the ability to access a foreign market at little cost motivates firms to locate production in that country, the ability to enter other markets from that country also matters. Other authors that show the relevance of market potential in the

location decision of foreign firms include Basile et al. (2008), Crozet et al. (2004), and Pursterla and Resmini (2007), among others. For them, the larger the market potential is, the more attractive the host country will be.

The importance of agglomeration economies and the dynamic process generating industrial clusters has also been well documented in the literature. According to NEG, the attractiveness of a country is a function not only of market access but also of the existence of information spillovers arising from industrial agglomerations (Fujita and Thisse, 2002). As Disdier and Mayer (2004) mentioned, the existence of a wide range of knowledge productivity spillovers generated by agglomeration provides incentives for firms to concentrate in areas with numerous other producers. Head et al. (1999) pointed out that, all other things being equal, foreign investors will prefer locations chosen by preceding investors. For Barry et al. (2003), firms might also be attracted by the presence of existing firms, as the agglomeration of companies is sending out signals to new investors about the reliability of the host country. However, since the agglomeration effects are traditionally measured through the number of firms operating in a market, this variable might also be capturing the intensity of competition. Accordingly, the increase in the number of firms operating in a market may have a negative impact on the attractiveness of this place through increased competition (Crozet et al., 2004). Which of these two effects dominates seems to be more of an empirical question than a theoretical one. The agglomeration economies may further rest on the nationality of the competitors, as stated by Crozet el al. (2004).

The empirical literature concerning the impact of agglomeration forces on foreign investments is ample. Particularly, evidence on the agglomeration economies is found, for example, in the works of Barrel and Pain (1999) and Head and Mayer (2004) for US and Japanese firms investing in Europe, respectively; Barrios et al. (2006) for FDI in Ireland; Disdier and Mayer (2004) for French firms locating in Western and Eastern Europe; Head et al. (1999) for Japanese manufacturing investment in the United States; Hilber and Voice (2010) for Romania; Majocchi and Pressuti (2009) for FDI in Italy; Pusterla and Resmini (2007) for the CEE region; and Spies (2010) for multinational firms in Germany.

Proximity to the home country is also found to be a relevant determinant in the location choice of MNEs, although the impact of this variable on foreign investments is far from being unambiguous. Depending on the horizontal or vertical orientation of MNEs, distance, as a proxy of transport cost, is expected to have a positive or negative influence on FDI, respectively. But, this variable, as pointed out by Disdier and Mayer (2004), may also be capturing transaction costs associated with the existence of information asymmetries, cultural differences, and unfamiliarity with the legal framework.[17]

The importance of input cost in the location decision of FDI has also been confirmed by the literature. According to Kinoshita and Campos (2003), if foreign investors internationally segment part of their production process to benefit from low labor costs, the availability of cheap labor is an important stimulus for the location of FDI. In any case, the expected profitability achieved by an MNE will be higher if labor costs are lower in the host country than in the source economy (Bevan and Estrin, 2004).

From the theoretical contribution by Lucas (1990) concerning the importance of human capital on FDI flows to less-developed countries, many empirical works have also proven the role that the availability of skilled labor plays as a determinant for FDI (Noorbakhsh et al., 2001; Zhang and Markusen, 1999; Zhang, 2001). Moreover, for many authors, a minimum threshold level of human capital is viewed as necessary to benefit from the technology transfer of MNEs (Blömstrom et al., 2001; Blonigen and Wang, 2005). Moreover, human capital development is possibly more important in service FDI than in manufacturing FDI. The non-tradable nature of services makes domestic skills particularly relevant, as service MNEs are frequently forced to reproduce home country technologies in their foreign affiliates (Blomström and Kokko, 2002).

In addition to these most common factors, many empirical studies have further considered the role of the availability and quality of infrastructures in the location decision of foreign firms (Cheng and Kwan, 2000; Globerman and Shapiro, 2002; Spies, 2010). According to Alguacil et al. (2011) this factor might affect both the capacity of developing countries to

[17] According to Bevan and Estrin (2004), the costs of transport and communications, the costs of dealing with cultural and language differences, the costs of sending personnel abroad, and legal factors are all assumed to increase with distance.

attract FDI, as well as their ability to benefit from inward FDI flows. Other authors that support a positive relationship between infrastructures and FDI are Coughlin et al. (1991), Coughlin and Segev (2000), and Kinoshita and Campos (2003). However, according to Graf and Mudambi (2005), the importance of infrastructures depends on the specific requirements of the industry. In this respect, the availability of a telecommunications infrastructure may be considered an important determinant in the location decision of service FDI, while road density is probably more relevant for manufacturing FDI.

Finally, recent empirical works have identified macroeconomic instability and financial risk as discouraging factors for FDI (especially for developing and transition economies). As Demekas et al. (2007) and Zhang (2001) highlighted, MNEs will prefer to invest in countries with higher stability at the macro level, as the economic security and business opportunities increase. Some studies have also emphasized the importance of the country-risk for business strategies in foreign countries, since the success of these businesses may be largely constrained by the financial context. Forssbaeck and Oxelheim (2008), for instance, found strong evidence of the importance of financial factors in explaining cross-border investments. For Bouquet et al. (2004), services industries have to face the challenge of transferring social assets, skills, and capabilities, as well as close contacts with end-customers, to their foreign subsidiaries. This leads service MNEs to prefer low-risk economies as host countries to locate their subsidiaries.

4.- DATA AND METHODOLOGY

Data and variables

Our empirical analysis is based on a dataset that comprises 4,177 foreign affiliates of 826 Spanish parent companies which located in developing and transition countries from 1990 to 2010. Figure 2 shows the distribution of Spanish foreign affiliates established in developing and transition countries during the last two decades. As can be seen, most of them are Spanish foreign affiliates concentrated in Latin American countries, the main core being established at country level in Brazil, Mexico, and Argentina. As far as other regions are concerned, large countries also seem to attract more Spanish foreign affiliates than small countries. In Central and Eastern European countries, Spanish foreign affiliates are

mainly located in Romania, Poland, and Turkey. Asian and African countries show a lower concentration of Spanish foreign affiliates and seem to be less attractive for Spanish investments. The highest concentrations of Spanish foreign affiliates within Asia and Africa are to be found in China and Russia, and the countries bordering with Spain, respectively.

INSERT FIGURE 2 HERE

From a sectoral perspective, Spanish investments are clearly more services than manufacturing oriented. More particularly, Spanish foreign affiliates in the services sector represent 79% of total Spanish investments in the period that was analyzed. Several countries in Asian, Central and Eastern European, and African areas present the highest concentration of manufacturing foreign affiliates, while the vast majority of service sector foreign affiliates are located in Latin American countries.

The above information was compiled from the Investment Map database.[18] This source also provides information about location, ownership, and activities of foreign affiliates located in developing and transition countries, which allowed us to construct our dependent variable. More specifically, it describes the location choice of each foreign affiliate over 52 possible developing and transition country locations; it takes a value of one when MNE *i* located in region *j* during the period 1990 to 2010, and zero for all regions other than *j*.

Following previous literature, our estimate model included variables related to the size and quality of the host market, labor market characteristics, geographical proximity, availability of infrastructures, and agglomeration forces. In addition to these most common factors, we also contemplated the role of macroeconomic stability and financial risk for the location decision of MNEs.

In particular, the market potential index is added here as a proxy of the market size. This index reflects both the size of the host market and its attractiveness as a means to access other nearby important location markets. Unlike most of the empirical literature on location choice,[19] this variable is calculated in accordance with Harris (1954):

[18] International Trade Center (UNCTAD and WTO), 2011.
[19] See, for instance, the works of Crozet et al. (2004) and Spies (2010).

$$MKP_i = GDP_i + \sum_{j \neq i} \left(\frac{GDP_j}{dist_{ij}} \right)$$

where country *i* is the host country and country *j* is a neighboring country.

In some empirical works, the market demand and the quality of the target market have been measured by the income per capita (see, for instance, Kang and Jiang, 2012). This factor seems to be especially important from the perspective of the location of services activities, given the higher income elasticity of these activities. However, per capita income might be capturing the negative influence of higher labor costs on investments, especially if a specific labor cost variable is not included in the analysis, as is our case. The difficulty of having a homogeneous wage cost series for the entire sample, as well as its high correlation with GDP per capita, has prevented them from being included in our analysis.[20] On the other hand, high labor costs might be a signal of highly skilled workers, which in turn may attract the location of higher value-added foreign activities (see Castellani et al., 2012). To disentangle both effects, in this work we have included the non-income Human Development index published by UNDP (2012)[21] as a measure of the availability of skilled labor.

Concerning clusters, firm agglomeration has traditionally been measured in empirical works by the total number of firms in a region or sector (see, for instance, Head et al., 2002, and Disdier and Mayer, 2004). However, according to Pusterla and Remini (2007), the absolute measure of the total number of foreign affiliates might not be controlling for other relevant effects related with agglomeration patterns. Similarly, Head et al. (2002) showed that using an absolute measure of agglomeration may lead to the collection of the same effect as other demand variables. Taking these considerations into account, we follow Pusterla and Remini (2007) and employ Hoover's location index as a relative measure of agglomeration. To capture the different impacts of the concentration of Spanish-owned and foreign-owned firms on the attraction of FDI, we have further computed these indexes separately for Spanish and foreign affiliates. In particular, these indexes are defined as:

[20] The correlation matrix of the variables used in this work is available on request.
[21] UNDP (2011).

$$H_i^j(w) = \frac{N_i^j(w) / \sum_j N_i^j(w)}{\sum_i N_i^j(w) / \sum_i \sum_j N_i^j(w)}$$

where $N_i^j(w)$ is the total number of foreign affiliates in sector *i* and country *j*, and *w* is equal to *s* for Spanish-owned firms and *f* for foreign-owned firms. Accordingly, $H_i^j(s)$ and $H_i^j(f)$ are greater than one when a country *j* has a concentration of Spanish- or foreign-owned affiliates, respectively, in sector *i* that is higher than other countries, while these indexes are equal to zero when foreign affiliates in sector *i* are completely dispersed across countries.

In addition, we control for the distance between (the capital cities of) the home and host country. This variable is traditionally associated with transportation costs, but also with the transaction costs that arise from cultural differences and unfamiliarity with the legal framework (Disdier and Mayer, 2004). In our case, however, the vast distance from Spain to countries with probably more cultural similarities, as is the case of Latin American economies, means that this last situation is not necessarily true.[22]

Given the different infrastructure requirements for services and manufacturing FDI, two variables have been inserted in our model to account for the availability and quality of infrastructures. In the case of services FDI, the total numbers of internet users has been considered as a proxy of the accessibility of infrastructures, while for FDI in manufactures, road density has been introduced instead. The availability of infrastructure constitutes an incentive for foreign firms to consider destination countries. Hence, the effect of these variables in the location choice of MNEs is expected to be positive.

The inflation rate is also included in the host country as a measure of macroeconomic stability. High inflation is assumed to raise uncertainty, worsen the business climate, and consequently discourage the entrance of foreign capital. Finally, in order to control for the influence of the financial environment and the overall political climate on the entry of FDI,

[22] We initially included (besides distance) a dummy variable for language (equal to one for Spanish-speaking countries, and zero otherwise). However, this variable was not significant in any regression, while distance kept the positive and significant impact (results are available upon request).

a country risk variable has been used in some empirical stages. In particular, the role that a risky economic and financial environment may play in the attraction of FDI has been captured here by the Standard and Poor's index. Higher values of this index are associated with less risky countries, and hence with higher investment projects. Next, the econometric method and the estimation strategies followed in this work are presented.

Methodology

The determinants of the choice of location of foreign subsidiaries by Spanish firms are estimated in this work through a set of logit models. Consistent with the Random Utility Maximization (RUM) framework, these models assume that each investor *i* ($i \in \Omega_h$, where $h = m, s$) that faces a finite set of mutually exclusive locations selects the country *j* that yields the highest profit (i.e. $\pi_{ij} > \pi_{il} \forall l \neq j$ and $l = 1, \ldots, L$). The expected profit of firm *i* from each location *j* consists of two components, the deterministic part, V_{ij}, which depends on the observed attributes of each location choice *j*, X_{ij}, and the unobservable part, which is captured by a stochastic term, ε_{ij}.[23]

$$\pi_{ij} = V_{ij} + \varepsilon_{ij} = \beta_h' X_{ij} + \varepsilon_{ij}$$

Given that ε_{ij} is unknown, the final choice is predicted in terms of probability. Thus, the probability that firm *i* chooses location *j* can be described as:

$$\mathrm{P}_{ij} = \mathrm{P}(\pi_{ij} > \pi_{il}) \qquad \forall l \neq j \quad (l = 1, \cdots, L)$$

To solve the above equation, we need to impose a probability density function on ε_{ij}. The traditional conditional logit (CL) model assumes that it is independently and identically distributed (iid), with type I extreme value distribution (McFadden, 1974). Under these assumptions, the probability of choosing location *j* can be obtained as a closed-form expression of:

[23] In this work, we assume that in the location choice there may be different sensitivities to the different determinants according to the type of investor, i.e., service MNEs (*s*) or manufacturing MNEs (*m*).

$$P_{ij}^{CL} = \frac{e^{\beta' X_{ij}}}{\sum_{l=1}^{L} e^{\beta' X_{il}}}$$

But the iid assumption on the error term imposes the property of independence of irrelevant alternatives (IIA). According to this property, the ratio of probabilities of investing in two locations depends only on the attributes of these two locations, and is independent of the attributes of other alternatives. That is, the IIA implies that all alternatives should be comparable in terms of substitution patterns. This assumption, however, does not hold when different groups of countries have similar unobservable characteristics, so that the errors would be positively correlated across choices. However, even when researchers do not observe these characteristics, investors might not contemplate all locations as equal substitutes. In this case, the CL estimates would be biased, even when country-specific effects are considered, as shown by Herriges and Kling (1997).

The IIA assumption is partially relaxed in the nested logit (NL) model. This model allows for a variety of substitution patterns among the different alternatives, and to test for the existence of country groups with the same degree of substitutability. More specifically, the NL model allows some correlation between errors among choices within the same mutually exclusive group (nest), but maintains the hypothesis of no correlation among alternatives across nests. That is, the IIA holds within each nest, but it does not hold for the choices in different nests. The idea behind the nested model is that the comparable alternatives are grouped, such that the structure choice is set as a tree: foreign investors choose between nests on an upper level and between countries within a nest on a lower level.[24] Therefore, by estimating the NL model, we are trying to find the nesting structure supported by the data, thus enabling us to identify which groups of countries are perceived as closer substitutes by Spanish MNEs.

In particular, the NL model assumes that the utility for investor *i* in location *j* in nest *k* depends on both a set of characteristics that are specific to location *j*, *X*, and some attributes describing nest *k*, *W*.

[24] But this does not necessarily entail a sequential decision.

$$\pi_{ij} = \beta_h' X_{ij} + \delta_h' W_{ik} + \varepsilon_{ij}$$

Accordingly, the probability of a firm selecting alternative *j* can be expressed as the product of the marginal probability of choosing an alternative in nest *k* and the conditional probability of choosing *j,* given that an alternative in nest *k* is selected. That is:

$$\mathrm{P}_{ij}^{NL} = \mathrm{P}_{ij|k} \times \mathrm{P}_{ik} = \frac{e^{\beta' X_{i,jk}}}{\sum_{j \in B_k} e^{\beta' X_{i,jk}}} \times \frac{e^{\delta' W_{ik} + \lambda_k IV_k}}{\sum_k e^{\delta' W_{ik} + \lambda_k IV_k}}$$

where IV_k, called the inclusive value (IV), reflects the average profit that a firm may expect from investing within nest *k*. Its parameter, λ_k, measures the degree of independence in unobserved utility among the alternatives in nest *k*, which can be interpreted as the degree of dissimilarity between the alternatives within a nest (Train, 2003). If $\lambda_k = 1$, the alternatives are completely independent and the NL collapses to the CL model presented above. In contrast, if $\lambda_k = 0$, the nest is the relevant decision in the location choice, and the alternatives inside nest *k* are perfect substitutes.

To be consistent with a utility-maximizing behavior, all the λ parameters should be between 0 and 1. When this condition holds, alternatives within the same nest are perceived by firms as closer substitutes to one another.[25] Values of λ outside the unit interval suggest a misspecification problem with the model. This could be related with the nesting structure, the specification of the systematic component, or both.[26]

When the number of alternatives is large (as in this case), and thus the possible number of nesting structures increases, finding the appropriate nesting structure may be a difficult task. Therefore, as a more flexible way to capture any correlation pattern between alternatives, in a final stage a mixed logit (MXL) model is estimated. This methodology will make it possible both to recognize any correlation of random parameters of attributes

[25] If $\lambda k > 1$, the model is consistent with RUM for only some of the explanatory variables.
[26] Moreover, these models are based on relatively rigid substitution patterns, given that a country cannot belong to more than one nest.

that are common across alternatives, and to check the robustness of our previous results (as this is a more efficient estimation method).[27]

In the MXL model, the error term is composed of two terms: u_{ij}, which is assumed to be iid (with type I extreme value distribution), and $\alpha' Y_{ij}$, which induces heteroskedasticity and correlation across alternatives, thus relaxing the IIA assumption. Accordingly, the profit from location j is denoted as:

$$\pi_{ij} = \beta_h' X_{ij} + \alpha_h' Y_{ij} + u_{ij}$$

Y_{ij} is a vector of observed variables of each location choice and α is a vector of randomly distributed parameters with density g(.) over all firms. In this model, Y_{ij} may be seen as an error component which induces heteroskedasticity and correlation across alternatives in the unobserved component of utility. The variances of the error components capture the magnitude of these correlations.

Indeed, with an MXL model it is possible to obtain any substitution pattern among alternatives by making the appropriate choice of the variables that enter in the error components, Y_{ij}. In the CL model, however, this last term is identically equal to zero, thus implying no correlation in profits across alternatives. An NL model can also be obtained from the MXL specification by defining Y_{ij} as a vector of dummy variables, d_j^k, which are equal to one when the alternative j is in nest k and zero otherwise (see Brownstone and Train, 1998).

Specifically, the probability of choosing destination j in the mixed logit model can be obtained by estimating P_{ij} over all the possible values of α.

$$P_{ij}^{MXL} = \int \frac{e^{\beta' X_{ij} + \alpha' Y_{ij}}}{\sum_{l=1}^{L} e^{\beta' X_{lj} + \alpha' Y_{il}}} g(\alpha) d\alpha$$

Thus, a mixed logit probability is a weighted average of the logit formula evaluated at different values of α, with the weights given by the density g(.). This equation has no

[27] According to McFadden and Train (2000), the MXL model is the most efficient way to capture correlation among alternatives.

closed-form solution. Therefore, it must be solved through simulation. Note that the standard logit model is a special case of the mixed logit when g(.) is degenerate at fixed parameters.

The greater flexibility of MXL models allowing for more complex substitution patterns among alternatives makes this methodology particularly attractive for the study of the location decisions of MNEs. However, although this method makes it possible to recognize those common elements that make different locations more competitive with each other, it does not allow us to identify which countries can be grouped in terms of a greater similarity in the competition for the attraction of foreign investors, as occurs with the nested model.

4.- ESTIMATION RESULTS

As a benchmark, we begin our empirical analysis by assuming that the IIA condition holds. Thus, the probability of choosing a certain location is estimated initially through the standard conditional (fixed effect) logit model. In Table 1, the results of this estimation are reported for the whole sample. First the estimate coefficients for a baseline model are presented (Column 1). In this specification, the probability of an MNE locating in one particular country depends on the market potential, the per capita income, the distance, and the agglomeration effects. But, as shown above, a favorable economic and political environment for investing in the home country may attract FDI. To control for these local conditions, in Columns (2) and (3), the inflation rate has been included to capture the macroeconomic instability, together with a proxy of the quality of infrastructures. Here, this variable has been proxied by the road density for the manufacturing activities, and by internet users for the service activities.[28] Finally, Columns (4) and (5) show the results when the Human Development Index is added to the regressions. The estimation of this amplified specification allows an assessment to be performed of the role that human capital (regardless of its cost) plays on the location of MNEs.

INSERT TABLE 1 HERE

[28] We initially estimated the model with both variables (internet users and road density) together in the regressions. The estimates revealed the differential impact of each of these variables in the different sectors. Results are available upon request.

Similar to previous empirical studies, our outcomes clearly indicate that market potential is a key determinant of the MNEs' location choice.[29] The coefficient on this variable is positive and strongly significant in all regressions. This result indicates that the probability of a Spanish MNE choosing a location increases with both the host country market size and greater access to other potential markets that are initially closed to them. Location choice is also positively influenced by the level of income, as shown by the coefficient on per capita GDP, thus suggesting that the potential negative effects of higher labor costs are more than offset by the positive impact of a greater level of development or purchasing power in the home country. The estimates further reveal that distance is positively related to the location patterns of Spanish MNEs.[30] In the regressions where this variable is found to be significant, it shows a positive sign. This finding seems to agree more with market-seeking FDI than with efficiency-seeking FDI. Moreover, in the case of Spain, distance could also be capturing cultural similarities (faraway countries, such as those in Latin America, are more familiar with Spanish traditions than others that are closer).[31]

Additionally, consistent with our expectations, we find strong evidence of a positive influence of the agglomeration forces. The coefficients on the Hoover's location index for Spanish and foreign firms are both positive and statistically significant at the 1% level in all cases. This result corroborates our hypothesis that a higher concentration of MNE affiliates increases the attractiveness of host countries. That is, the positive spillovers arising from agglomeration are sufficiently important to more than offset the potential adverse effects of spatial clustering on increased firm competition (Hilber and Voicu, 2010).

Our findings also corroborate the harmful influence of macroeconomic instability on the location decision. As expected, the inflation rate is strongly and negatively significant in all regressions. Furthermore, the estimations show the importance of taking into consideration the role played by the local asset infrastructures as a factor of relevance in firms' location

[29] In these regressions, the sign of the parameters can be interpreted as the direction of the influence of the variable. That is, if a coefficient (β_j) is greater than zero, we can say that the probability of choosing a destination is an increasing function of the associated variable (X_j). However, the absolute value of the parameters is meaningless, as the marginal effect of X_j depends on X_j.

[30] Basile et al. (2008) also found a positive impact of the distance in the analysis of MNE location choice in 8 EU countries for non-EU MNEs.

[31] In previous estimations, we also included the variable language. However, this was not significant in any regression. This is probably due to the fact that all the Spanish-speaking countries are located far away, so distance may already be capturing this effect.

decision. Regardless of the measurement, the coefficients on the infrastructure variables are all positive and strongly significant. This result supports our initial idea that the availability of infrastructures leads to higher productivity, thus encouraging the location of MNEs.

However, contrary to our expectations, the coefficients on the human development index are statistically insignificant for the whole sample. This outcome however might be masking differences in the effect of this variable across sectors, as later found in the sectoral analysis. Table 2 presents the estimation results when the whole sample is split into two sectoral subsamples: manufacturing (Columns 1 and 2) and services firms (Columns 3 and 4). As can be seen, while HDI have a positive and significant influence on the location of services FDI, the effect of this variable in the manufacturing sector is insignificant. Therefore, it can be said that skills exert a strongly positive influence on the probability of attracting Spanish firms in the services sector, while this effect is not clear in the case of manufacturing FDI.

INSERT TABLE 2 HERE

The division of the sample between manufactures and services further reveals a negative impact of the per capita GDP on attracting a foreign investor. For services FDI, however, the harmful effect of this variable only becomes clear when the human development variable is added. This is not surprising if we consider that in the more parsimonious model, income per capita might be capturing both the positive (and very significant in the location of services investments) influence of human capital (frequently proxied in other works by per capita income) and the negative impact of higher labor costs.

Additionally, the estimates from this sectoral analysis reveal some changes for the agglomeration effects. For Spanish firms investing in manufactures, the spillovers arising from a higher concentration are greater in the case of foreign-owned firms. However, when investing in services, the coefficients on the agglomeration variables are higher for the Spanish-owned firms, which suggests that for service investors the presence of other Spanish firms in a given country is viewed as a signal of the profitability of a certain location more than in the case of foreign-owned affiliates (Basile et al., 2008).

But, as mentioned earlier, the quality of our estimations may be improved if some substitution pattern is allowed among the location choices. This is particularly true when, contrary to the IIA assumption, there are certain degrees of similarity among some of the alternatives. With the aim of testing and partially relaxing this assumption, next an NL model is estimated. In this model, the final locations are grouped or nested according to a nesting structure, so that the choice of an alternative is conditional to the choice of the nest.

Table 3 shows the results of the NL estimations when a risk-country nesting structure is imposed. More specifically, the countries have been grouped into two nests: high-risk countries and low-risk countries. The likelihood ratio (LR) test rejects the hypothesis that the IV parameters are jointly equal to one in all cases. Accordingly, the conditional and the nested logit cannot be considered as equivalents.

INSERT TABLE 3 HERE

An adequate nesting structure also requires that the inconclusive value parameter lies within the unit interval for all the nests, thus suggesting that locations within a nest are not completely independent. According to the IV parameters from our nested regressions, Spanish investors in the service sector that are looking for a location for their subsidiaries perceive countries with an analogous risk index as being more similar. However, for investments in manufactures, the values of the IV parameters are significantly larger than one, which implies that investors searching for a location for their production plants do not consider a country in a risk group more analogous to another one in the same country set, given all other determinants. In short, we can say that in the attraction of services, FDI competition seems to be higher within locations with a similar level of risk, but this does not necessarily happen in the attraction of foreign manufacturing subsidiaries.

Concerning the determinants of location choice, the results found for the manufacturing FDI are similar to those in the CL model. However, the results for the case of FDI in services are slightly different. The estimated effects present similar signs as in the previous case, although they are smaller in magnitude. That is, Spanish MNEs preferably locate in countries with higher market potential, agglomeration economies, skilled labor, level of infrastructures, and macroeconomic stability.

Given that the risk-country tree hypothesis in the MNE location decision has been rejected for the manufacturing sector, thereby suggesting that other appropriate patterns of correlation between the error terms in the location choice may exist, a mixed logit model is subsequently estimated. As previously mentioned, by introducing additional error components, the estimation of MXL models on MNEs' location choices makes it possible to consider more flexible patterns of substitution among alternatives than the standard conditional and nested logit models. Indeed, this estimation methodology allows both an improvement in the quality of the estimation, and the identification of those factors that make countries more similar from the point of view of foreign investment. Table 4 shows the results of the MXL for the manufacturing and service sectors in Columns (1) and (2), and Columns (3) and (4), respectively.

INSERT TABLE 4 HERE

The standard deviations of the new error terms in the MXL models suggest that if a country becomes less attractive (due to changes in some of its characteristics), MNEs investing in the services sector seem more likely to locate in countries sharing similar market potential, distance, availability of skilled labor force, and risk level. In the nested model, it has already been confirmed that investors contemplate countries with a similar financial risk as closer substitutes. But with the estimation of the MXL model, we go a little further by showing that this is not the only aspect that affects substitution, but rather there is a combination of different attributes. The MXL estimations also reveal that in manufacturing, MNEs tend to show a higher degree of substitution between countries with similar market potential. However, the degree of risk and the availability of skills do not seem to be relevant characteristics in the substitution pattern for manufacturing investments. These results would support the hypothesis of MNEs having different location decision patterns across sectors.

In general, the outcomes on the location determinants in the mixed logit models confirm our previous conclusions. The probability of an MNE locating in a country increases with the market potential, agglomeration effects, quality of infrastructures, and skilled workers (for the service sector), and decreases with labor costs, and macroeconomic and financial uncertainty. Overall, our estimates provide empirical support for the theoretical prediction

relating to the location choice of MNEs with both a horizontal and vertical orientation. Moreover, the results confirm the idea of a different pattern of MNE location decisions depending on the sector activity, thus suggesting that an aggregate study of this matter may provide inaccurate results.

5. CONCLUSIONS

The main objective of this research has been to investigate how different host country characteristics affect the location decision of Spanish MNEs in developing and transition economies, considering that the reasons that drive FDI into these economies largely diverge from those in developed countries. In this analysis, particular attention has been paid to the sectoral nature of firms, and more specifically to whether the different location determinants of Spanish MNE affiliates change when looking at manufacturing or services firms. The motives that lead them to invest abroad and the different composition of FDI, whether it is the case of manufacturing or services firms, to a large extent define the relevance of local factors that make recipient countries more attractive for transnational investments. Furthermore, a better understanding of these factors can guide policies of recipient economies to improve their potential for attracting foreign investment inflows.

The econometric analysis was performed using a set of logit models, which enables us to test the existence of different substitution patterns, ranging from the simpler but rigid ones displayed by the nested model to the more flexible but complex substitution pattern exhibited by the mixed one. Overall, our results show that in the case of Spain, FDI flows present similar patterns to those found for other developed economies: an increasing importance of the market- and efficiency-seeking FDI in developing countries (to the detriment of the resource-seeking FDI).

The estimates confirm the relevance of the variables identified by the NEG. The affiliates of Spanish MNEs concentrate in countries with higher market potential, which agrees with a location choice driven by market access motivation. The results also reveal that, for Spanish MNEs, the positive spillovers from firm agglomeration more than offset the negative impact of increased competition. Distance also has a positive influence on the location of Spanish firms in foreign markets. These findings allow us to characterize Spanish MNEs as horizontal and market-seeking.

Additionally, and consistent with an efficiency-seeking FDI, the sectoral analysis reveals a negative influence of higher labor costs in the attraction of investment flows. Moreover, the disaggregated study shows the greater sensitivity of service MNEs to the availability of skilled labor when deciding where to locate their affiliates. This would be consistent with the different nature of the service FDI (frequently information-intensive, as in the case of business and finance), as well as with the greater interaction with customers of these activities. The findings also provide empirical support to the view that services MNEs investing in developing and transition countries are risk averse in their location choice.

Finally, our exploration of the presence of possible substitution patterns among different locations has revealed the existence of significant differences between manufacturing and services FDI. In the case of manufacturing, the substitutability between destinations is determined by similar market potential. However, in the case of services, the existence of nests is considerably more complex, since they are a result of the combination of different attributes such as market potential, distance, skilled labor, and risk level.

Our analysis has focused on the determinants for the location choice of Spanish manufacturing and service MNEs in developing and transition economies. A greater disaggregation by industries would probably help to accomplish a more precise identification of the relevant factors in determining the location of the subsidiaries of MNEs, and the characteristics of individual companies.

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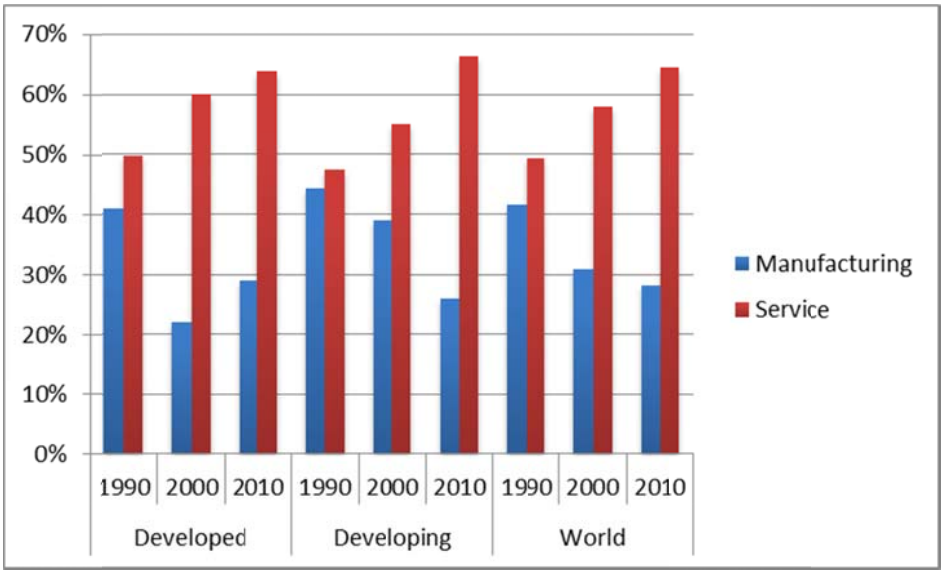
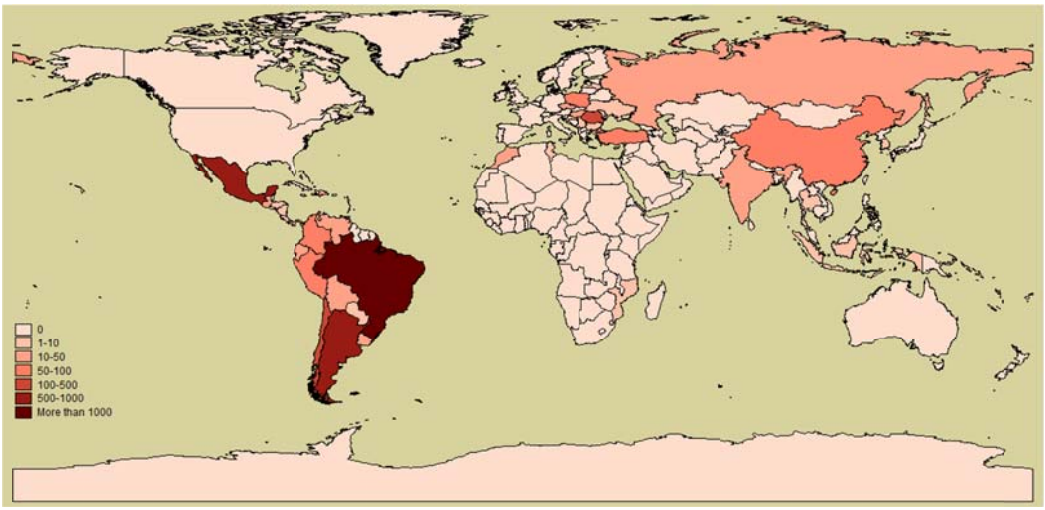
FIGURES

Figure 1. Trends in the sectoral composition of FDI inflows: share of each sector in total FDI inflows, 1990-2010.



Source: Own elaboration based on WIR 2012 (UNCTAD, 2012).

Figure 2. Distribution of Spanish foreign affiliates in developing and transition countries, 1990-2010.



Source: Own elaboration based on Investment Map database (ITC, 2011).

TABLES

Table 1. Conditional Logit: Whole sample.

	(1)	(2)	(3)	(4)	(5)
Market potential	1.039***	1.006***	1.012***	1.013***	1.010***
	(0.019)	(0.020)	(0.184)	(0.022)	(0.018)
GDP per capita	0.373***	0.136***	0.183***	0.090	0.209***
	(0.037)	(0.037)	(0.035)	(0.061)	(0.054)
Distance	-0.038	0.086***	0.093***	0.073*	0.099***
	(0.034)	(0.032)	(0.034)	(0.039)	(0.037)
H. Index Spain	1.299***	1.256***	1.327***	1.269***	1.323***
	(0.033)	(0.031)	(0.036)	(0.036)	(0.037)
H. Index Foreign	3.803***	2.668***	2.300***	2.891***	2.171***
	(0.598)	(0.606)	(0.617)	(0.654)	(0.645)
Inflation rate		-0.450***	-0.345***	-0.446***	-0.346***
		(0.036)	(0.039)	(0.037)	(0.039)
Internet users		0.557***		0.564***	
		(0.060)		(0.062)	
Road density			0.204***		0.206***
			(0.200)		(0.020)
Non Income HDI				0.380	-0.207
				(0.434)	(0.351)
Log-likelihood	-10197.0	-10096.2	-10109.9	-10095.6	-10109.7
Number of obs.	217204	217204	217204	217204	217204

Note: ***, ** and * denote significance levels at 1%, 5% and 10%. Robust standard errors in parentheses.

Table 2. Conditional Logit: Manufacturing and service sectors.

	MANUFACTURING			SERVICES		
	(1)	(2)	(3)	(4)	(5)	(6)
Market potential	1.202***	1.156***	1.198***	1.358***	1.249***	1.244***
	(0.044)	(0.047)	(0.075)	(0.039)	(0.035)	(0.032)
GDP per capita	-0.006	-0.188***	-0.355*	0.275***	0.054	-0.428***
	(0.080)	(0.071)	(0.211)	(0.040)	(0.041)	(0.069)
Distance	0.005	0.201***	0.160*	0.260***	0.294***	0.478***
	(0.058)	(0.064)	(0.088)	(0.053)	(0.047)	(0.053)
H. Index Spain	1.476***	1.60***	1.637***	4.972***	4.612***	4.022***
	(0.071)	(0.097)	(0.120)	(0.180)	(0.159)	(0.123)
H. Index Foreign	10.446***	11.638***	12.078***	2.043***	1.620***	0.730**
	(0.539)	(0.655)	(0.962)	(0.417)	(0.442)	(0.373)
Inflation rate		-0.310***	-0.277**		-0.756***	-0.700***
		(0.123)	(0.140)		(0.045)	(0.049)
Internet users					0.276***	0.472***
					(0.070)	(0.089)
Road density		0.258***	0.255***			
		(0.034)	(0.033)			
Non Income HDI			1.023			4.770***
			(1.115)			(0.631)
Log-likelihood	-2378.4	-2346.7	-2345.9	-8219.1	-8086.8	-8026.8
Number of obs.	38554	38554	38554	163060	163060	163060

Note: ***, ** and * denote significance levels at 1%, 5% and 10%. Robust standard errors are in parentheses.

Table 3. Nested Logit: Manufacturing and service sectors.

	MANUFACTURING	SERVICES
	(1)	(2)
Market potential	1.356*** (0.153)	0.742*** (0.039)
GDP per capita	-0.402** (0.189)	-0.267*** (0.040)
Distance	0.119 (0.091)	0.222*** (0.028)
H. Index Spain	1.810*** (0.233)	2.144*** (0.128)
H. Index Foreign	13.338*** (1.683)	0.363*** (0.104)
Inflation rate	-0.343** (0.153)	-0.669*** (0.039)
Internet users		0.382*** (0.039)
Road density	0.285*** (0.047)	
Non Income HDI	1.223 (0.977)	1.729*** (0.282)
IV parameters		
Risk1	1.064*** (0.109)	0.508*** (0.023)
Risk2	1.338*** (0.242)	0.575*** (0.038)
LR Test	9.38***	420.31***
Log-likelihood	-2341.2	-7816.67
Number of obs.	38554	163020

Note: ***, ** and * denote significance levels at 1%, 5% and 10%. Robust standard errors are in parentheses.

Table 4. Mixed Logit: Manufacturing and service sectors.

	MANUFACTURING		SERVICES	
	(1)	(2)	(3)	(4)
Market potential	1.41***	1.769***	2.001***	2.276***
	(0.118)	(0.173)	(0.059)	(0.071)
GDP per capita	-0.464*	-0.477**	-0.818***	-0.951***
	(0.244)	(0.217)	(0.077)	(0.081)
Distance	0.131	0.103	0.945***	0.324**
	(0.132)	(0.087)	(0.121)	(0.167)
H. Index Spain	4.82	2.018***	6.141***	5.795***
	(3.576)	(0.257)	(0.307)	(0.202)
H. Index Foreign	85.208	25.501***	0.763***	0.141
	(81.552)	(6.106)	(0.245)	(0.161)
Inflation rate	-0.199	-0.285**	-0.191***	-0.911***
	(0.213)	(0.138)	(0.057)	(0.084)
Internet users			1.051***	1.064***
			(0.089)	(0.095)
Road density	0.236***	0.277***		
	(0.032)	(0.035)		
Non Income HDI	2.005*	0.198*	7.568***	6.817***
	(1.112)	(1.141)	(0.724)	(0.741)
Risk		-17.971		-1.615
		(14.121)		(1.335)
SD				
Market potential	0.549***	0.871***	1.136***	1.321***
	(0.133)	(0.127)	(0.055)	(0.063)
Distance	0.038	0.105	1.291***	0.564*
	(0.101)	(0.083)	(0.169)	(0.329)
H. Index Spain	1.605	0.013	0.822**	0.195
	(1.336)	(0.176)	(0.286)	(0.247)
H. Index Foreign	47.016	10.258***	0.624***	0.226
	(51.705)	(3.901)	(0.152)	(0.153)
Non Income HDI	0.431	0.129	4.621***	3.824***
	(0.554)	(0.331)	(0.437)	(0.543)
Risk		16.176		6.306***
		(14.121)		(2.046)
Log-likelihood	-2330.3	-2325.1	-7779.9	-7594.5
Number of obs.	38554	38554	163020	163020

Note: ***, ** and * denote significance levels at 1%, 5% and 10%. Robust standard errors are in parentheses.

APPENDIX: Data source and variable specification.

Table A.1. Summary of control variables and their sources.

Variable	Definition	Source
Market potential	Value added of the host country *j* and the value added of all surrounding countries weighted by the Euclidean distance between host and surrounding countries' major cities.	Own elaboration (the value added is obtained from the WDI database, 2012)
GDP per capita	GDP per capita in the host country *j*.	World Development Indicators (World Bank database, 2012)
Distance	Bilateral distance between the main city in home and host countries (km).	Centre d'Etudes Prospectives et d'Informations Internationales (CEPII, 2012)
Spanish agglomeration	Hoover's location index for Spanish firms in the host country *j* over the period 1990-2010.	Own elaboration based on Investment Map database (ITC, 2011)
Foreign agglomeration	Hoover's location index for foreign firms in the host country *j* over the period 1990-2010.	Own elaboration based in Investment Map database (ITC, 2011)
Inflation rate	Inflation rate in the host country *j*.	World Development Indicators (World Bank database, 2012)
Internet users	Total number of internet users in the host country *j* (per 100 people).	World Development Indicators (World Bank database, 2012)
Road density	Road density (km of road per sq. km of land area) in the host country *j*.	World Development Indicators (World Bank database, 2012)
Non-income HDI	Non-income HDI in the host country *j*.	UNDP (2011)
Risk index	1 if country has a high risk index, 0 otherwise.	Standard and Poor's (2012)

Note: All variables, except dummy variables, are estimated in log.