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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 being paid to the sectoral composition of foreign direct investments (FDI). The estimation of a set of logit models allows us to consider different substitutability patterns among alternatives. The study focuses on a broad firm-level sample of 4,177 Spanish affiliates established in 52 countries over the period 1990 to 2010. The results suggest that Spanish FDI in 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 reveal that Spanish investment in developing and transition countries exhibit a pronounced agglomeration effect, although the intensity of these externalities depends on both the sort of activity and the nationality of competitors. Furthermore, our results show differences between manufactures and services in other local factors, such as human capital, macroeconomic instability, and financial risk, thereby confirming the idea that investors in each sector have different motivations for locating foreign affiliates in developing countries. The quality of infrastructures and institutions also appear to influence the location of FDI in these economies.

Keywords: Location choice; Nested and Mixed Logit models; Developing and transition countries; Multinational firms.

JEL classification: F21; F23; R39

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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 being paid to the sectoral composition of foreign direct investments (FDI). The estimation of a set of logit models allows us to consider different substitutability patterns among alternatives. The study focuses on a broad firm-level sample of 4,177 Spanish affiliates established in 52 countries over the period 1990 to 2010. The results suggest that Spanish FDI in 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 reveal that Spanish investment in developing and transition countries exhibit a pronounced agglomeration effect, although the intensity of these externalities depends on both the sort of activity and the nationality of competitors. Furthermore, our results show differences between manufactures and services in other local factors, such as human capital, macroeconomic instability, and financial risk, thereby confirming the idea that investors in each sector have different motivations for locating foreign affiliates in developing countries. The quality of infrastructures and institutions also appear to influence the location of FDI in these economies.

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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 closer integration in their international value-added activities.¹ Linked to this activity of MNEs, worldwide foreign direct investment (FDI) has risen considerably, thereby 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.² 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.³

At the same time, there has been a significant change in the sectoral composition of these flows, with a sharp increase in FDI in services 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 Dunning (1998).

² Specifically, annual FDI increased six-fold from US\$ 241 million in 1990 to US\$ 1,451 million in 2010. In 2011, despite the global economic crisis, FDI inflows still rose by 16%. See UNCTAD (2012).

³ 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.⁴ However, as Bloniguen and Wang (2005) mentioned, the factors that govern FDI inside these economies may be 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, and whether these determinants change 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 upon 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. The last 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 that period. Moreover, most of these investments were focused in the services sector.

⁴ As is the case of Basile et al. (2008) for MNEs in Europe, Crozet et al. (2004) for France, Guimares et al. (2000) for Portugal, and Head and Mayer (2004) for Japanese MNEs in Europe.

Particularly, the share of Spanish foreign affiliates in services represented 79% of total Spanish investments in the sample period.⁵

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 firm level. The few studies that do analyze the divergences in the location criteria between FDI in services and manufacturing activities concentrate on developed economies.⁶ 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 as being 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, thus avoiding the restrictive assumptions of the previous methods.

From the standpoint of what the most important determinants in the location decisions of MNEs are, it is easy to see that the different empirical studies have included a wide variety of variables. This is, of course, largely due to differences in analysis objectives, but also to underlying theoretical foundations. In fact, the theoretical framework which usually underlies empirical research on location patterns of MNE investment relies on different pieces and elements from diverse, but often overlapping, theories.⁷ Indeed, the theoretical foundation of the location decisions of MNEs is still quite fragmented, traditionally coming from different fields of international business,⁸ industrial organization or international economics,⁹ and more recently from “new” economic geography.¹⁰ Following recent literature, in the empirical analysis special attention is paid to the relevance of agglomeration effects, and the size and quality of host and surrounding markets in attracting FDI flows, jointly with other local factors that may

⁵ Additionally, unlike the industrial sector with a great sectoral dispersion of affiliates, in the service sector, the Spanish FDI concentrates on just a few activities. In fact, finance, business activities, and the wholesale and retail trade accounted for over two thirds of total FDI in services during the period under analysis.

⁶ 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.

⁷ A recent survey of different theoretical models of FDI can be found in Faeth (2009).

⁸ For a review of the traditional business research on this matter, see Dunning (1998).

⁹ See, for instance, Krugman (1983, 1991), Helpman (1984), Horstman and Markusen (1987), Brainard (1997), Markusen et al. (1996) or Zhang and Markusen (1999).

¹⁰ 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).

affect the location decision of MNEs, such as the endowment of infrastructures, the skills and cost of workforce or the distance between home and host countries.¹¹ As a novelty in the study of the location decision of FDI in developing countries, the role played by macroeconomic instability and the institutional and financial frameworks is also contemplated.

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 and macroeconomic climate on the location choice of foreign affiliates is not homogenous across sectors either. Domestic skills and economic stability appear to be clearly significant for the location of services investments but not for manufacturing activities. These results are consistent with the idea that investors in each sector have different motivations for locating foreign affiliates in developing countries. Thirdly, the outcomes obtained indicate a negative influence of higher labor costs and institutional uncertainty 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, we present a brief review of the variables considered in the empirical analysis, linking them with both the theoretical and the empirical literature on the subject. Section 3 describes the database used and discusses the econometric methodology employed. Section 4 presents the estimation results and the final section concludes.

¹¹ 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).

2. - LOCATION DETERMINANTS: THE UNDERLYING LITERATURE

A recent survey conducted by the UNCTAD on managers from 2,272 MNEs (among the largest in the world)¹² 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 presence of suppliers, partners, and competitors (agglomeration 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.

These perceptions are largely consistent with the factors that academic research, both theoretical and empirical, has highlighted as the most important in explaining the location decision of MNEs and the direction of FDI flows. 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 location decision of market-seeking investment made by horizontal MNEs relies on the trade-off between maximizing proximity to customers and concentrating production to achieve scale economies. The size and quality of the host market emerges as one of the main determinants of the location decisions of MNEs and has been widely tested in the empirical literature. Accordingly, most works support a positive association between the market size of the host economy and foreign investment inflows (Bevan and Estrin, 2004; Py and Hatem, 2010; Kang and Jiang, 2012). Moreover, Head and Mayer (2004) have recently enriched the notion of market access by introducing the importance of market potential in multinationals' location choice. This concept, coming from the economic geography literature, extends the role played by the host market size of proximity-concentration hypothesis to the size and accessibility of surrounding markets. According to these authors, while the ability to access a foreign market at little cost

¹² UNCTAD (2009, p. 44).

motivates firms to locate production in that country, the ability to enter other markets from that country also matters.¹³

Also from recent developments in economic geography about the forces that promote concentration or dispersion of economic activity, agglomeration economies have become commonplace in the literature on the determinants of location decisions of MNEs and FDI.¹⁴ The attractiveness of a country is a function not only of market access but also of the existence of information spillovers arising from firm and economic activity 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. 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. The agglomeration economies may further rest on the nationality of the competitors, as stated by Crozet et al. (2004). Finally, the increase in the number of firms operating in a market may also 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 an empirical question than a theoretical one.

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.

Alternatively, for vertically integrated MNEs, which fragment the production process into stages, seeking improvements in productive efficiency (efficiency-seeking

¹³ 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 Pusterla and Resmini (2007), among others.

¹⁴ Evidence on agglomeration economies is found, for example, in the works of Head and Mayer (2004) for US and Japanese firms investing in Europe, respectively; Disdier and Mayer (2004) for French firms locating in Western and Eastern Europe; Hilber and Voice (2010) for Romania; and Pusterla and Resmini (2007) for the CEE region.

investment) or the availability of certain resources or strategic assets, the probability of taking the decision to invest abroad increases with the possibility of avoiding supply constraints or obtaining cost advantages in production. The importance of labor cost in the attraction of FDI has also been confirmed by the empirical 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. Additionally, 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 of foreign investments (Noorbakhsh et al., 2001). For many authors, 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 relevance of the availability and quality of infrastructures in the location decision of foreign firms (Cheng and Kwan, 2000; Globerman and Shapiro, 2002). According to Alguacil et al. (2011), this factor might affect both the capacity of developing countries to attract FDI and their ability to benefit from inward FDI flows. For 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 and institutional 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. Similarly, less corruption and an efficient institutional system that lead to reduced investment-related transaction costs may help to attract FDI (Kinoshita and Campos, 2003; Hyun, 2006). Some studies have also emphasized the importance of 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 in which to locate their subsidiaries.

3.- 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 that located in developing and transition countries between 1990 and 2010.¹⁵ This sample, which includes all FDI undertaken by Spanish firms in these economies during the reporting period, was compiled from the Investment Map database.¹⁶ 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, this describes the location choice of each foreign affiliate over 52 possible developing and transition country locations, a value of one being given when foreign affiliates i located in country j during the period 1990 to 2010, and zero for all countries other than j .

Following previous literature, our estimate model included control variables related to the size and quality of the host market, labor market characteristics, geographical proximity, availability of infrastructures, and agglomeration forces. Additionally, we contemplated the role of macroeconomic and institutional 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

¹⁵ The sample countries are: Angola, Antigua and Barbuda, Algeria, Argentina, Bahamas, Bahrain, Bolivia, Brazil, Bulgaria, Cape Verde, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Dominican Republic, Ecuador, Egypt, El Salvador, Guatemala, Honduras, Hungary, Indonesia, India, Iran, Latvia, Malta, Mexico, Moldavia, Morocco, Mozambique, Nicaragua, Panama, Paraguay, Peru, Poland, Rumania, Russian Fed., Serbia and Montenegro, Singapore, Slovakia, South Africa, South Korea, Thailand, Taiwan, Tunisia, Turkey, Ukraine, Uruguay and Venezuela.

¹⁶ International Trade Center (UNCTAD and WTO), 2011.

other nearby important location markets. Like most of the empirical literature on location choice,¹⁷ this variable is calculated as:

$$MKP_j = GDP_j + \sum_{j \neq k} \left(\frac{GDP_k}{dist_{jk}} \right)$$

where country j is the host country and country k is a neighboring country (that is, a country that shares a common border with the host country), whose influence depends on distance ($dist$).

In some empirical works, the market demand and the quality of the target market are 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 also 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 it from being included in our analysis.¹⁸ 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 the two effects, in this work we have included the non-income Human Development Index (HDI) published by UNDP (2011) as a measure of the availability of skilled labor.¹⁹

Concerning the role played by agglomeration economies in the attraction of FDI, we follow Pusterla and Resmini (2007) and employ Hoover's location index as a relative measure of agglomeration. According to these authors, 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. Particularly, in order to capture the different impacts of the concentration of Spanish-owned and other foreign-owned firms on the attraction of FDI, we computed

¹⁷ See, for instance, the works of Crozet et al. (2004) and Spies (2010).

¹⁸ The correlation matrix of the variables used in this work is available on request.

¹⁹ The non-income HDI is a composite index that combines indicators of educational attainment and life expectancy, and hence a greater value of this index is associated with a higher value of human development. See <http://hdr.undp.org/en/statistics/hdi/> for a detailed description of data.

these indexes separately for Spanish and non-Spanish affiliates. In particular, they are defined as:

$$H_h^j(w) = \frac{N_h^j(w) / \sum_h N_h^j(w)}{\sum_h N_h^j(w) / \sum_h \sum_j N_h^j(w)}$$

where $N_h^j(w)$ is the total number of foreign affiliates in sector h 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 h that is higher than other countries, while these indexes are equal to zero when foreign affiliates in sector h are completely dispersed across countries.

In addition, we control for the geographical distance between (the capital cities of) the home and host countries. 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 that are likely to have more cultural similarities, as is the case of Latin American economies, means that this last situation is not necessarily true.

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

The inflation rate and the control of corruption index from the governance indicators proposed by Kaufmann et al. (2010) were also included to examine the impact of macroeconomic instability and the quality of institutions on the location choice, respectively. High inflation is assumed to raise uncertainty, worsen the business climate, and consequently discourage the entrance of foreign capital. Similarly, an

unstable institutional framework entails a less favorable business environment and it is hence associated with lower investment.

Finally, in order to control for the influence of the domestic financial environment and the overall political climate on the entry of FDI, a country-risk variable was also used in some empirical stages. In particular, the role that a risky economic and financial environment may play in attracting 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.

Methodology

As mentioned earlier, we employ a set of logit models to estimate the determinants of the location choice of foreign subsidiaries by matrix companies. We consider that in this selection there may be different sensitivities to the different determinants according to the type of investor, i.e., manufacturing MNEs (m) or service MNEs (s). Consistent with the Random Utility Maximization framework, these models assume that each investor i ($i \in \Omega_h$, where $h = m, s$)²⁰ 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 $l = 1, \dots, L$). 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} (thus, $\pi_{ij} = V_{ij} + \varepsilon_{ij} = \beta_h' X_{ij} + \varepsilon_{ij}$). Given that ε_{ij} is unknown, the final choice is predicted in terms of probability. More specifically, the probability of firm i choosing location j can be described as:

$$P_{ij} = P(\pi_{ij} > \pi_{il}) \quad \forall l \neq j \quad (l = 1, \dots, L)$$

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).

²⁰ 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., manufacturing MNEs (m) or service MNEs (s).

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. 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. 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.

The restrictive IIA assumption is partially relaxed in the nested logit (NL) model. 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.²¹ Therefore, by estimating the NL model, we are trying to obtain unbiased parameters and 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 profits for investor i in location j in nest k depend on both a set of characteristics that are specific to location j , X , and some attributes describing nest k , W (that is, $\pi_{ij} = \beta_h' X_{ij} + \delta_h' W_{ik} + \varepsilon_{ij}$). The degree of independence in unobserved utility among the alternatives in nest k is measured by the parameter of the inconclusive value (IV), λ_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. But if all the λ parameters are

²¹ But this does not necessarily entail a sequential decision.

between 0 and 1, alternatives within the same nest are perceived by firms as closer substitutes to one another.²²

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, we estimate a mixed logit (MXL) model. This methodology will make it possible both to recognize any correlation of random parameters of attributes that are common across alternatives, and to check the robustness of our previous results (as this is a more efficient estimation method).²³

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 can be denoted as $\pi_{ij} = \beta_h'X_{ij} + \alpha_h'Y_{ij} + u_{ij}$, where Y_{ij} is a vector of observed variables of each location choice and α is a vector of randomly distributed parameters with density $g(\cdot)$ over all firms. In this model, the variances of the error components capture the magnitude of the correlations across alternatives.

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. In the NL model, Y_{ij} is defined 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.

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 can be used 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 greater

²² Values of λ outside the unit interval suggest a problem of misspecification with the model. This could be related with the nesting structure, the specification of the systematic component, or both.

²³ According to McFadden and Train (2000), the MXL model is the most efficient way to capture correlation among alternatives.

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 both for the whole sample (Columns 1 to 3) and for two sectoral subsamples: manufacturing (Columns 4 and 5) and services firms (Columns 6 and 7). In the baseline model, the probability of an MNE locating in one particular country depends on market potential, per capita income, distance, and the agglomeration effects. Additionally, to control for the role of other local conditions in the location choice, we present the estimates of an amplified specification. In these augmented models (Columns 2, 3, 5 and 7), we add a proxy of the macroeconomic instability and the institutional framework (inflation rate and a control of corruption index, respectively), as well as measures of the quality of infrastructures²⁴ and human capital.

INSERT TABLE 1 HERE

Similar to previous empirical studies, our outcomes clearly indicate that market potential is a key determinant of the MNEs' location choice.²⁵ 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 a greater access to other potential markets that are initially closed to them. The estimates further reveal that distance is positively related to the location patterns of Spanish MNEs. 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).

²⁴ 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.

²⁵ 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 .

Location choice also seems to be positively influenced by the level of income, as shown by the coefficient on per capita GDP for the whole sample, 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. However, the division of the sample between manufactures and services shows an interesting result, namely, 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, per capita income 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. Indeed, 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.

Consistent with our expectations, we also 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). Yet, the estimates from the sectoral analysis reveal a different behavior for the agglomeration effects across sectors. For Spanish firms investing in manufactures, the spillovers arising from a higher concentration are greater in the case of non-Spanish-owned affiliates. However, when investing in services, the coefficients on the agglomeration variables are higher for the Spanish-owned affiliates, which suggests that for service investors the presence of other Spanish firms in a given country is viewed as a robust signal of the profitability of a certain location more than in the case of foreign-owned affiliates.

Finally, the estimations confirm the importance of taking into consideration other local conditions like the role played by the macroeconomic and institutional framework, and the quality of infrastructures as factors of relevance in firms' location decision. Our findings corroborate the harmful influence of macroeconomic instability. The inflation

rate is negative in all regressions and strongly significant for the whole sample and for service FDI. As expected, the control of corruption shows a positive and significant coefficient in our estimations, indicating that an efficient institutional system may help to attract FDI. Similarly, regardless of the measurement, the coefficients on the infrastructure variables are all positive and strongly significant. These results support our initial idea that the availability of infrastructures leads to higher productivity, thus encouraging the location of MNEs.

Next, with the aim of testing and partially relaxing the IIA assumption and considering the possibility of there being certain degrees of similarity among some of the alternatives, both the NL and MXL models are estimated (see Table 2). In the nested model, the final locations are grouped or nested according to a risk-country nesting structure, so that the choice of an alternative is conditional on the choice of nest.²⁶ In the mixed model, a combination of factors that make countries more similar in terms of location choice is considered.

INSERT TABLE 2 HERE

Columns 1 and 2 present the results of the NL estimations for the manufacturing and service sector, respectively. In this model, the countries have been grouped into two nests: high-risk countries and low-risk countries. As can be seen at the bottom of Table 2, 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 equivalents. Yet, an adequate nesting structure also requires that the inconclusive value parameter lie within the unit interval for all the nests, thus suggesting that locations within a nest are not completely independent. According to the IV parameters, 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

²⁶ We have also tried with other nesting structures taking into account income level similarities or geographical or cultural linkages (as the case of EU and the rest of the world, or LA and the rest of the world, or EU, LA, Africa and Asia, and others) but the equal substitution hypothesis among groups was not rejected in any case (results are available on request).

that in the attraction of services, FDI competition seems to be higher within locations with a similar business and financial environment, but this does not necessarily happen in the attraction of foreign manufacturing subsidiaries. Concerning the determinants of location choice, the estimated effects present similar signs as in the previous case. That is, Spanish MNEs preferably locate in countries with higher market potential, agglomeration economies, skilled labor, level of infrastructures, and macroeconomic and institutional 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 (Columns 3 and 4). 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.

The standard deviations of the new error terms in the MXL models suggest that if a country becomes less attractive (due to changes in any of its characteristics), MNEs investing in the services sector seem more likely to locate in countries sharing similar market potential, distance, foreign firms agglomeration, 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. These results would corroborate 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 institutions, and skilled workers, 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 multinational firms 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 for 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 (to the detriment of the more traditional resource-seeking FDI).

The estimates confirm the relevance of the variables identified by the economic and business literature that justify both a horizontal and vertical expansion of firms. The affiliates of 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 and to the economic climate 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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APPENDIX

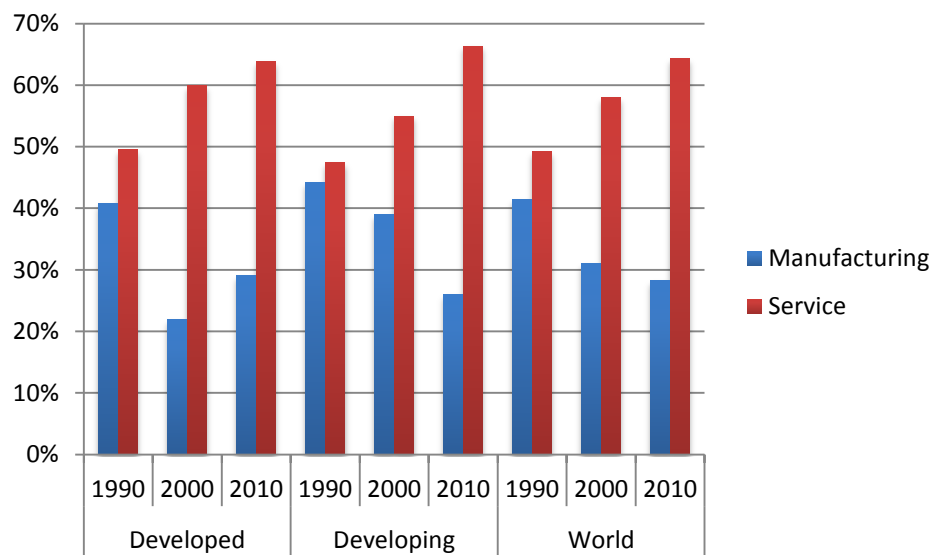
Table A.1. Summary of the independent variables and their sources.

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

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

FIGURE AND TABLES

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 2011 (UNCTAD).

Table 1. Conditional Logit

	TOTAL			MANUFACTURING		SERVICE	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Market potential	1.039*** (0.019)	1.018*** (0.019)	1.016*** (0.022)	1.202*** (0.044)	1.255*** (0.098)	1.358*** (0.039)	1.259*** (0.035)
GDP per capita	0.373*** (0.037)	0.191*** (0.055)	0.087 (0.061)	-0.006 (0.080)	-0.491* (0.256)	0.275*** (0.040)	-0.444*** (0.071)
Distance	-0.038 (0.034)	0.086** (0.038)	0.068* (0.040)	0.005 (0.058)	0.087 (0.112)	0.260*** (0.053)	0.460*** (0.053)
H. Index Spain	1.299*** (0.033)	1.316*** (0.037)	1.266*** (0.036)	1.476*** (0.071)	1.640*** (0.124)	4.972*** (0.180)	4.040*** (0.124)
H. Index Foreign	3.803*** (0.598)	2.063*** (0.653)	2.810*** (0.662)	10.446*** (0.539)	12.169*** (1.014)	2.043*** (0.417)	0.750** (0.377)
Inflation rate		-0.287*** (0.043)	-0.421*** (0.044)		-0.120 (0.172)		-0.615*** (0.064)
Control of corruption		0.131** (0.055)	0.048 (0.058)		0.354* (0.201)		0.117** (0.058)
Road density		0.194*** (0.021)			0.212*** (0.039)		
Internet users			0.547*** (0.067)				0.447*** (0.087)
Non-Income HDI		-.0183 (0.354)	0.367 (0.431)		1.802 (1.369)		4.783*** (0.622)
Log-likelihood	-10197.0	-10107.5	-10095.4	-2378.4	-2344.0	-8219.1	-8025.3
Number of obs.	217204	217204	217204	38554	38554	163060	163020

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

Table 2. Nested Logit and Mixed Logit

	NL		MXL	
	MANUFACTURING (1)	SERVICE (2)	MANUFACTURING (3)	SERVICE (4)
Market potential	1.455*** (0.183)	0.751*** (0.038)	2.071*** (0.280)	2.524*** (0,079)
GDP per capita	-0.637*** (0.220)	-0.326*** (0.039)	-0.806*** (0.241)	-0.970*** (0.080)
Distance	-0.021 (0.107)	0.175*** (0.025)	-0.156 (0.099)	0.174 (0.137)
H. Index Spain	1.792*** (0.241)	2.093*** (0.122)	1.863*** (0.256)	6.297*** (0.137)
H. Index Foreign	13.373*** (1.778)	0.398*** (0.100)	16.641*** (2.607)	0.655*** (0.221)
Inflation rate	-0.109 (0.171)	-0.441*** (0.040)	1.001 (0.184)	-0.269*** (0.089)
Control of corruption	0.605*** (0.220)	0.377*** (0.042)	0.984*** (0.297)	1.055*** (0.088)
Road density	0.216*** (0.050)		0.225*** (0.042)	
Internet users		0.300*** (0.035)		0.722*** (0.079)
Non-Income HDI	2.544** (1.154)	1.774*** (0.259)	3.934*** (1.310)	5.962*** (0.633)
Risk			0.574 (2.259)	0.752 (0.774)
	IV parameters		SD	
Low Risk	1.373*** (0.267)	0.555*** (0.036)		
High Risk	1.043*** (0.114)	0.473*** (0.021)		
Market potential			0.977*** (0.235)	1.440*** (0.067)
Distance			0.009 (0.066)	0.801*** (0.218)
H. Index Foreign			1.978 (2.540)	0.507*** (0.153)
Non-Income HDI			0.200 (0.374)	2.107** (1.015)
Risk			2.317 (2.687)	5.443*** (1.283)
LR Test	13.90***	503.74***		
Log-likelihood	-2337.0	-7777.4	-2320.8	-7350.5
Number of obs.	38554	163020	38554	163020

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

In each MXL regression the standard deviation includes all the 11 variables also used as location determinants. However, in order to save space, we do not report standard deviations that are not significant in any of the subsamples used. Standard deviations for all the variables are available from the authors upon request.