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## Countries, Regions and Multinational Firms: Location Determinants in the European Union

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# Countries, Regions and Multinational Firms: Location Determinants in the European Union\*

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## Abstract

This paper analyses the location decisions of European multinational firms across European countries and regions. Emphasis is placed on whether location determinants and, in particular, the sign and strength of agglomeration and dispersion forces change when looking at different levels of geographical aggregation. Our sample includes 4,803 foreign investment projects established in 246 regions belonging to the 25 European Union countries from 1998 to 2005. Preliminary results of conditional logit estimations indicate that national and regional levels should be distinguished when considering the location choices of multinationals. It appears that agglomeration tendencies are more relevant at the regional level, while dispersion forces are dominant at the country level.

**JEL Classification:** F23, R30, R58

**Key words:** Foreign direct investment, location choice, conditional logit, European Union.

## 1 Introduction

There has been a growing interest in the location determinants and the spatial distribution of foreign establishments. Increasing processes of regional integration, such as the European Union, not only reshape and affect the location of economic activity but also foster foreign economic activity. Therefore, the spatial distribution of economic activity is, to an increasing extent, determined by the location decisions of multinational firms (MNEs). Moreover, regional integration provides a natural experiment to analyse the location determinants of MNEs. Changes in market size and transaction costs for example may affect the pattern of MNEs' location choices.

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In addition, there may also be differences in the changes of location determinants and their effects depending on the geographical scale considered. Again, one characteristic of regional integration, particularly relevant for the European context, is that countries and regions exist at the same time but they may possess very different characteristics. Therefore, the geography of MNEs may differ depending on the spatial unit of analysis. This is important since attraction of multinational activity is a policy concern not only for country but also for regional authorities. Understanding the location process of multinationals, at both levels, is crucial for adequate policy responses.

In the light of this, in this paper we investigate the location decisions of MNEs across countries and regions in the European Union. Emphasis is placed on whether location determinants, and in particular, the sign and strength of agglomeration and dispersion forces change when looking at different levels of geographical aggregation. We expect to find differences between national and regional levels because location determinants exhibit different patterns depending on the geographical scale.

We seek to explain empirically how economic integration causes some multinational activity to locate in peripheral countries, leading to a dispersion process at a supranational scale. The experience of Spain and Portugal since the mid eighties and, more recently the CEEC<sup>1</sup>, confirms this pattern. However, when the location decision is considered within a country, agglomeration tends to dominate. The core regions within the host countries attract more foreign projects than the rest of the regions. Altogether, the location of multinational activity in Europe could be an additional mechanism explaining the evidence of a decrease in the core-periphery pattern between European countries but an increase in the core-periphery pattern within European countries (Puga 1999, Combes and Overman 2003).

The location behaviour of MNEs has been analysed theoretically by different fields. International business (see, for example, Dunning 1993), trade theories (see, for example, Markusen 2002) and economic geography (see, for example, Dicken 2003) are a rough classification of the main contributions. However, there is no theory that addresses the geographical behaviour of MNEs (McCann and Mudambi 2005). Hence, our question, which is based on the geographical decision-making pattern of multinationals, is left to empirical investigation. Our analysis takes into account all the existing theoretical approaches highlighting the importance of a spatial analysis when considering how the location behaviour of the MNE is influenced at different spatial levels.

On the empirical side, we focus on the literature that specifically deals with the location determinants of MNEs. The majority of these studies are related to a single country (see Crozet, Mayer *et al.* 2003, for the case of France; Coughlin *et al.* 1991, for the case of USA; Guimaraes *et al.* 2000, for Portugal; Boudier-Bensebaa 2005, for the case of Hungary). A few exceptional cases consider simultaneously several countries and their regions within an economic integrated context (Head and Mayer 2003, Disdier and Mayer 2004, Basile *et al.* 2003). In general, however, these studies are primarily interested in testing the validity of different nested structures in which similarities among alternatives in the lower level of aggregation can be taken into account. In the present paper the idea is

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<sup>1</sup> Central and Eastern European countries: Czech Republic, Eslovenia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia.

slightly different. We are concerned about the right nested structure<sup>2</sup> but our main interest is to test if there are differences in the location determinants of MNEs scale-dependent that could be an additional explanation to the decrease in the core-periphery pattern between countries and the simultaneous increase in the core-periphery pattern within countries in the European Union. Hence, in this preliminary version, we only distinguish between countries and regions in order to test for differences corresponding to different spatial levels. That is, some location determinants may have opposite effects when looking at different spatial levels, or be more relevant at one spatial level than another, or even only be significant at one spatial level.

In this analysis we use conditional discrete logit family models of location choices to assess which agglomeration and dispersion forces change and which are dominant at different geographical units. Our dataset includes 4,803 foreign investment projects established in 246 regions (NUTS 2) belonging to the 25 European Union countries from 1998 to 2005. Preliminary results confirm that national and regional levels should be distinguished when considering multinationals' location choices because determinants behave in a different way and therefore the resulting processes vary at both levels.

To our knowledge, this paper is the first to consider all the EU countries and their respective NUTS 2 regions<sup>3</sup> in order to study the determinants of location choices of MNEs. Therefore, we will be able to study not only the spatial distribution of foreign activity across countries but also the outcomes for individual countries within the economic integrated area of the European Union. This study will contribute to the current literature firstly by emphasizing the existence of spatial dependencies on the location behaviour of multinational firms which are not considered in existing theoretical explanations. Secondly, we will be able to discriminate which location determinants change the effect of and which ones are most relevant according to the spatial unit of analysis which may be useful when designing policies to attract FDI. We also want to raise a policy concern about the role of MNEs location decisions and their consequences in affecting the European core-periphery pattern. Finally, from the multinational firm perspective we expect to shed some light on the trade-off that they face between core and peripheral regions in core and peripheral countries in order to help make the most appropriate location choice.

The rest of the paper is organised as follows. In section 2 we describe the geography of MNEs across European countries and regions. In the following section the econometric model is presented. Section 4 offers a description of the data and variables included in our empirical model. The results are discussed in section 5, and section 6 summarizes the principle conclusions.

## 2 The Geography of MNEs in the EU

In this section we describe the spatial distribution of multinational activity in the European Union. First we present a discussion about the underlying theoretical

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<sup>2</sup>In this preliminary version of the paper we do not check for the appropriate nested structure and assume that is based on regions as the lower level that belong to countries which appear to be the most straight forward structure.

<sup>3</sup>Previous studies with two spatial levels have included NUTS 1 as the lower level. However, we believe that NUTS 2 are the appropriate one since agglomeration effects are better captured at small geographical units of observation.

framework on which we base our analysis. We then describe the geography of multinational activity in the EU at both national and regional levels of spatial aggregation.

## 2.1 The underlying theory

The goal of this paper is to explain the spatial location behaviour of MNEs at different levels of geographical aggregation. Therefore, our empirical specification requires a theory describing the geographical pattern of multinationals' location choices. Theoretical analysis in this field can be roughly classified into the following areas: international business literature, international trade theories, economic geography and location theories.

From an international business perspective, the OLI framework (Dunning 1977) is considered as the theoretical foundation of FDI. Location is viewed as an advantage the firm needs to have to become a multinational. However it is built on a non-formal setting. To overcome this, the OLI framework is consistently incorporated into general equilibrium trade models leading to the so called knowledge capital approach of multinational firm (see Markusen 2002 for a review of these models). In this setting, location depends on country and firm characteristics. In general, both approaches present some weaknesses from our point of view. They draw theoretical predictions that can be mainly related to country level studies of multinationals location choices and they lack an explanation for existing agglomeration tendencies of foreign activity. Moreover, according to Markusen (2002) they remain aspatial.

In contrast to the above literature, economic geographers have generally been interested in the geography of MNEs at subnational levels. Much of this literature adopts traditional geography elements and applies them to the multinational firm. For example, Dicken (2003) uses the product-cycle model of Vernon (1966) to analyse the location of MNEs. Marshall's agglomeration ideas (1920) have also been incorporated to take into account the existing agglomeration tendencies of FDI. However, no formal framework is built to test theoretical predictions empirically.

With the advent of NEG (see Fujita, Krugman et al. 1999 for a review of these models), traditional location theories<sup>4</sup> and, more precisely, economies due to proximity, are incorporated into a formal model. Moreover, the core-periphery model (Krugman 1991) includes Marshall's ideas into large industrial areas and studies how economic integration affects the location of economic activity. Nevertheless MNEs are ignored in these models. Recently, new theoretical developments (see, for example, Ekholm and Forslid 2001<sup>5</sup>) incorporate the knowledge capital approach into a NEG setting. They conclude that tendencies towards agglomeration are reduced when introducing multi-plant firms. However, there is again a lack of a spatial structure distinguishing between country and regional levels. This is in line with the idea by Neary (2001) who notes that NEG setting seems to be scale independent.

Altogether, it appears that no single theory involved in the location process of MNEs provides a coherent and adequate theoretical framework to study si-

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<sup>4</sup>A review of location theories of production activities can be found in Beckman and Thisse (1986).

<sup>5</sup>Other studies that incorporate multinational firms into a NEG setting are Gao (1999) and Raybaudi-Massilia (2000).

multaneously the location behaviour of MNEs at both levels of geographical aggregation. This is supported by a recent study by McCann and Mudambi (2005) in which, from a literature review similar to ours, they conclude that there is a lack of a geographical theory of the location decision making of MNEs. Therefore, we incorporate the diverse elements from all the existing approaches through a reduced form specification based on profit maximization principles, leaving the question of our interest left to empirical investigation.

In light of this discussion, we now look at the national and regional spatial distribution of multinational activity to gain insight about the location processes at work<sup>6</sup>.

## 2.2 The geography of MNEs at the country level

Figure 1. Here shows the average number of manufacturing foreign investment per year (from 1997 to 2005) established in EU-25 countries as a share of the national GDP<sup>7</sup>. The distribution of foreign investments at the country level indicates that peripheral countries attract more investments than the ones they should attract according to their GDP. This supports the idea of NEG models that introduce multiplant firms in which tendencies towards agglomeration are weakened at a supranational scale.

We note from the map that CEEC are perceived by European MNEs as attractive locations to establish their affiliates. They have optimized the opportunities of these countries characterised by privatization processes and incorporation to an integrated market while, at the same time, benefiting from their location advantages such as lower labour costs. This idea is reflected in the transition economies literature (see, for example, Sohinger 2005) which emphasises the role of FDI in determining developmental patterns in these countries.

Other peripheral countries also successfully attract foreign investments. This is the case of Portugal and Spain. However, Iberian countries, and particularly Spain, seem to have lost some of their attractiveness because of the lower labour costs of CEE countries (IMF 2004) or because of the larger market potential of CEE countries (Turrión and Velázquez 2004). They are still important locations for international investment although the number of foreign projects they received was higher in the earlier phases of their European integration.

Ireland and Greece are the last peripheral countries to be discussed. Ireland has been quoted as a successful case in attracting FDI while Greece is mentioned as the contrary case. This is also shown by Figure 1. On one hand, a combination of diverse factors are raised as the reasons for the Irish success ("Celtic Tiger"). Not only has European integration played a role but also a favourable corporation tax regime, low wages and high educational level of the labour force, cultural linkages with the United States and United Kingdom, an ideal institutional framework, etc., are some of the other features contributing to its success (Barry 2003). On the other hand, European integration does not seem to have greatly affected the attraction of foreign activity into Greece nor has the development of incentive policies appeared to be enough to offset the unfavourable Greek conditions in order to attract FDI. This is reflected in the

<sup>6</sup>In this descriptive analysis we use a dataset of foreign investment projects of European multinational firms described in Section 4 in more detail.

<sup>7</sup>By dividing the yearly average number of foreign investments located in each country by the GDP of the country the size-effect is removed.

"inward FDI index" (UNCTAD 2001) which indicates that Greece attracts less FDI than would be expected.

In relation to the rest of the EU countries, France and the UK attract the highest number of foreign investments across Europe (see Table 1). However, when we control for market size their relative attractiveness is reduced. Italy and Germany do not appear to be popular as locations for multinational firms. Both the total number of investments (see Table 1) and the average number of locations per year controlled by market size (see Figure 1) indicate that they are not considered to be attractive locations for foreign projects. Table 1 provides a more detailed information about the total distribution of foreign projects of our sample by year and by country.

Overall we have shown that there is evidence to think about the presence of a process of delocalization in the European market through the location of manufacturing affiliates of European multinational firms.

### **2.3 The geography of MNEs at the regional level**

Given the pattern in the spatial distribution of multinational activity at a national level, the next question is if the same process is happening within countries. The map in Figure 2 illustrates the distribution of manufacturing multinational activity at the regional level (NUTS 2). Here, the regional share of the average number of foreign investment per year from 1997 to 2005 is mapped with respect to the total number established in the country. We observed that, in general, the core regions within each country attract the most foreign investment projects. Hence, it appears that tendencies towards agglomeration are fostered within countries favouring a core-periphery pattern within countries in contrast to what is observed at the supranational scale.

In CEE countries the general pattern is that the capital regions and the regions situated near the border with Western Europe receive the highest shares of manufacturing foreign investments. These regions are also considered the core regions of each country. A similar pattern takes place in the Iberian countries. Madrid and Cataluna in Spain and Lisbon and Norte (Porto) in Portugal are the regions which attract the most foreign investments. Italy also represents another example of a clear core-periphery pattern, with the region of Lombardia accumulating the majority of the investments. In the UK and France a more disparate pattern emerges. Some regions situated in Scotland and Wales (UK) and Lorraine and Rhone-Alpes in France have a similar share of foreign investments to the core regions of London and Paris respectively. However, we need to bear in mind that if we were to consider service activities, then London and Paris would clearly be the most preferred locations within these two countries.

Overall it can be said that a core-periphery pattern is reinforced within European countries when considering the location of foreign investments. In order to empirically assess the opposing patterns encountered at the country and regional levels and determine the behaviour of the location determinants causing them, we turn to conditional discrete choice models.

### 3 Econometric Model

In this paper, we estimate a model of location choices of individual European multinational firms over a set of 25 European countries and their regions (NUTS2) during the period 1997-2005. There is a general agreement to use the *conditional logit model* (CLM) proposed by McFadden (1984) to model location decisions since they are discrete choices made among several alternatives.

Suppose that, at time  $t$ , a decision maker labelled  $n$  faces a set of  $J$  alternatives where  $J = (1, \dots, j, \dots, l)$  which is, in our setting, the set of possible location countries or regions. At  $t$ , each firm  $i$  obtains a profit  $\pi_{jt}$  from location  $j$  such that:

$$\pi_{jt} = V_{jt} + \varepsilon_{jt}, \quad (1)$$

where  $V_{jt} = \beta X_{jt}$ , that is, a function of observable characteristics ( $X_{jt}$ ) of each location choice  $j$  and a vector of coefficients  $\beta$  to be estimated and  $\varepsilon_{jt}$  the unobservable advantage of location  $j$ . At time  $t$ , firm  $i$  will locate in region  $j$  if this location offers a higher profit than all the other alternatives. Therefore, the probability of choosing location  $j$  is:

$$P_{jt} \equiv \Pr ob(\pi_{jt} > \pi_{kt}) = \Pr ob(\varepsilon_{kt} < \varepsilon_{jt} + \beta(X_{jt} - X_{kt})), \forall k \neq j. \quad (2)$$

Under the assumption of independent and identically distributed error terms  $\varepsilon$ , with type I extreme-value distribution, the probability of choosing location  $j$  at  $t$  becomes:

$$P_{jt} = \frac{e^{\beta X_{jt}}}{\sum_{j=1}^l e^{\beta X_{jt}}}. \quad (3)$$

It can be demonstrated that the log-likelihood function with these choice probabilities is globally concave in parameters  $\beta$  and thus can be estimated readily. In addition, CLM is characterised by the assumption of Independence of Irrelevant Alternatives (IIA) and consequently the ratio of the logit probabilities for any two alternatives  $j$  and  $k$  does not depend on any alternatives other than  $j$  and  $k$ .

In future versions of the paper, we plan to estimate nested logit models<sup>8</sup>. This will allow us firstly to relax the IIA assumption and consider the fact that regions within a country are likely to be more similar to each other than to regions in other countries. In addition, nested estimations will provide us with a more accurate interpretation in order to distinguish multinationals' location patterns between countries and within the countries. However, nested estimations require an adequate choice of nested structure according to the location decision-making process carried out by MNEs. We assume a geographical sequence in this decision process but different nested structures must to be tested

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<sup>8</sup>Also we plan to extend the model by accounting for firm heterogeneity in the location decision process by estimating a mixed logit model. In addition, we will estimate a model considering both autocorrelation among alternatives and firm heterogeneity. This will be carried out by estimating a mixed nested logit model.



in order to find the most representative one. In the present version of the paper we consider location choices between countries and between regions separately.

The simplicity of CLM allows us a first insight into the behaviour of location determinants at different spatial levels since we can compare CLM estimations from a model considering location choices between European countries with CLM estimations from a model considering location choices between European regions.

## 4 Specification of the model and data description

Following the existing literature about the location behaviour of the multinational firm and profit maximization principles, a theoretical profit equation is translated to a CLM profit equation using a linear specification of the profit function. From 3:

$$\pi_{jt} = V_{jt} + \varepsilon_{jt} = \beta X_{jt} + \varepsilon_{jt}, \quad (4)$$

where  $X_{jt}$  is a vector of country or regional characteristics and  $\beta$  is a vector of coefficients to be estimated. The dependent variable takes a value of 1 if a given affiliate  $n$  was created at time  $t$  in region  $j$  and zero otherwise. All the explanatory variables are lagged one period with respect to the year when the location decision of each observation was implemented. In other words, if we assume that a rational firm locating an affiliate in year  $t$  and in location  $j$  makes the decision based on the characteristics of  $j$  in  $t - 1$ , then:

$$\pi_{jt} = V_{jt-1} + \varepsilon_{jt} = \beta X_{jt-1} + \varepsilon_{jt}, \quad (5)$$

In the next subsections we explain in detail the dataset used for our dependent variable and the choice of explanatory variables.

### 4.1 Dependent variable

The construction and analysis of our dependent variable is based on a dataset that includes more than 17,000 foreign investment projects from all over the world established in European countries from 1997 up today. The information was compiled from the European Investment Monitor<sup>9</sup>. Each company project is recorded individually and contains information about the year when the project announcement took place, the parent company and parent country, industrial sector, function of the investment and host country, host region and host city. For some observations the size of the investment as indicated by number of jobs created is also recorded.

This database only considers projects that are real creations, extensions or co-locations of already existing real projects, that is, greenfield investments<sup>10</sup>. It excludes mergers, acquisitions, licence agreements and joint ventures. Hence, it allows us to focus only on the location determinants which relate to a specific type of entry mode. This is important because there is evidence that location

<sup>9</sup>European Investment Monitor is a dataset produced by Ernst & Young.

<sup>10</sup>It also includes joint ventures in cases that involved an extension or a new plant creation.

determinants and spatial distribution may vary according to the mode of entry of the investment (Basile 2004, Huallacháin and Reid 1997).

From this dataset we select foreign investment projects that fulfil the following requirements. Firstly, we restrict our analysis to those projects that are located in the 25 European Union countries since changes may occur due to regional integration. In addition, only European Union multinationals' projects are included in our sample<sup>11</sup>. This allows us to concentrate on intra-EU FDI which has not received much attention in the existing literature (Barba-Navaretti and Venables 2004). Finally, only manufacturing affiliates are selected. Primary sector foreign investments seem to be characterised mainly by where the natural resources for those investments are located and therefore they will bias our analysis. Service foreign investment also seem to be biased towards big or capital cities.

At the end, our sample includes 4,803 manufacturing foreign investment projects established in 246 regions<sup>12</sup> belonging to the 25 European Union countries from 1998 to 2005.

## 4.2 Independent variables

The independent variables are grouped into four categories: market demand variables, labour market variables, agglomeration variables and other variables of interest. These categories correspond to the classical location determinants<sup>13</sup> that are argued to be the principal motives for multinationals' location choices in the existing literature. Both national and regional variables are included for the three first categories of variables while other variables of interest are only considered at national level. A description of all variables used in our empirical specification is shown in Table 2.

### 4.2.1 Market demand variables

Multinational firms are traditionally attracted to those markets where they can profit from great demand. Existing studies use different measures to proxy this location motive but the most frequent variable is GDP (Woodward 1992, Braunerhjelm and Svenson 1996, Head *et al.* 1999). This is a proxy for internal market potential demand. Following Harris (1954) we include the effect of external market potential demand which has also been found to be an important location determinant (Crozet *et al.* 2003, Basile *et al.* 2003). In our specific context, this latter variable is crucial since we are considering intra-European foreign investment projects located in an economically integrated area. Therefore, MNEs are likely to consider not only the internal market of the country or region where they decide to locate but also all the other markets included in the European Union.

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<sup>11</sup>The increase in inward FDI in Europe during the 1990s was mainly due to an increase in intra-EU FDI (Eurostat 2004) and hence, we do not think that choosing only intra-EU FDI will restrict a lot our analysis. In future versions we plan to include extra-EU foreign projects such as American and Japanese ones.

<sup>12</sup>French overseas regions and Madeira and Açores regions in Portugal are not included in the set of our location choices because of the lack of data to account for their location characteristics.

<sup>13</sup>In reality location determinants are a combination between firm and location characteristics. Future versions of the paper will include firm characteristics as additional location determinants.

More precisely, our external market potential variable is the sum of the GDPs of all other location alternatives weighted by their distance<sup>14</sup> to the chosen location:

$$EMP_i = \sum_{j \neq i} \left( \frac{GDP_j}{d_{ij}} \right). \quad (6)$$

Our interest is to evaluate whether these market demand variables behave differently depending on the spatial unit of analysis. In general, at large geographical scales there is a market-seeking motive of foreign direct investment coming from the OLI framework of multinational activity (Dunning 1993). In addition, under regional integration contexts, NEG modelling emphasizes the fact that firms tend to locate where demand is found, thus generating a core-periphery pattern (Krugman 1991). However, when the existence of multi-plant firms is introduced in a NEG setting, tendencies towards agglomeration weaken (Ekholm and Forslid 2001). In an integrated economic area MNEs do not necessarily locate their affiliates near the highest potential market demand. They can take advantage of decreasing transport costs and locate in low production cost areas and therefore be compensated for a loss in potential market demand.

Turning to small geographical units of analysis, in our case European Nuts 2 regions, market-seeking motives may be at work as well. Moreover, even in cases where there is no market-seeking motive, MNEs may still be attracted to locations characterised by high demand. Following NEG models, economic activity follows demand and the demand is where the workers are. Hence, regions with higher GDPs may signal the availability of a large pool of workers. However, it is reasonable to think that the market-seeking location motive is weaker, or even non existent, since the region where the foreign project is established is unlikely to be the only market served by the multinational.

Altogether, there is no clear direction about the sign and strength of the influence of internal market potential at both spatial levels. Therefore, a larger internal market potential at both country and regional level may positively or negatively influence the location of foreign investment projects. Empirical results are required to solve these opposite arguments.

External market potential is also considered in order to take into account the effect of the geographical location of the country and regional alternatives. MNEs serve not only the internal market where they decide to locate but also the rest of the European market. Hence, we expect countries with high external market potential to be attractive locations. For example, if a multinational decides to invest in an European peripheral country, under the same circumstances, the foreign project is likely to be established in the country with the highest external market potential<sup>15</sup>. At a regional level this influence appears to be more relevant. NUTS 2 regions are too small a geographical unit to be the only market served by the foreign firm established there. Therefore, external market potential is the appropriate proxy to measure any type of market potential at this geographical unit of analysis.

We expect that external market potential at both country and regional level

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<sup>14</sup>The distance is calculated with the great circle formula using the latitude and longitude of the main cities in each country and in each region.

<sup>15</sup>It is argued that one of the reasons influencing the transfer of foreign investment projects from the Iberian peninsula to the CEE countries is that the latter enjoy from greater external market potential given their geographical location in relation to Spain and Portugal.

is likely to act as an attracting force for the location of multinationals' affiliates although the effect will be greater at the regional level.

A third market potential variable is included. It can be said that GDP is not the right proxy for potential internal market since it may be biased by a scale effect. That is, geographical areas characterized by a large population are likely to have higher GDP simply because of their size. In order to correct for this GDP per capita is included in our empirical model.

#### 4.2.2 Labour market variables

Apart from the demand side determinants, location of foreign investments are also motivated by production costs reflected in labour market conditions. Labour market conditions have generally been included in the literature of multinationals' location choices by including measures of wages and unemployment. However, the empirical evidence is somewhat inconclusive. Some studies find a positive correlation between labour costs and FDI (Guimaraes *et al.* 2000, Head *et al.* 1999) while others find a negative influence (Coughlin *et al.* 1991, Bartik 1985). We attempt to measure labour conditions through wages defined as hour cost per employee and unemployment rate to look for differences in their influence at different spatial units of analysis.

Wages appear to have a double effect that may be present at both country and regional levels. On the one hand, there is the resource-seeking motive of FDI raised by Dunning (1993). If we measure production costs by wages, the theoretical prediction is that wages are negatively related to profits and hence, to locations. Furthermore, incentives to agglomerate are reduced as trade costs fall and labour cost considerations become more important than agglomeration forces under regional integration contexts (Gao 1999). However, on the other hand, labour costs may reflect the availability of skilled workers. If this is the case, higher wages signalling the availability of skilled workers will positively influence the location of foreign investment projects. Hence, higher wages can either encourage or deter the location of multinational activities at both country and regional geographical units of analysis.

Unemployment levels may also have a positive or negative influence on the location choices of MNEs. A high unemployment rate may indicate, on one hand, a lack of suitable workers<sup>16</sup> (Bartik 1985) or the existence of labour rigidities (Disdier and Mayer 2004) and hence will negatively influence the location of foreign firms. On the other hand, it is also possible to explain a positive effect of high unemployment rate in the location decisions of MNEs. A high unemployment rate may signal the existence of a large available workforce (Woodward 1992). There is no general agreement about this and the evidence is mixed. Thus, a high unemployment rate can be either a dispersion or an agglomeration force when considering location choices at country and regional levels of geographical aggregation.

Overall, all the possible results are supported by plausible theories. We expect to find some differences depending on the spatial unit of analysis in the empirical results and hence, shed some light on the inconclusive results that

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<sup>16</sup>A complementary variable that could measure this effect is educational level. Higher unemployment rates may mean not having the appropriate workforce, that is, a well-educated labour force. Therefore, MNEs prefer core locations because they are expected to have a more educated population, hence lower unemployment rates.

appear in the existing literature. We also expect the empirical results relative to labour variables to support our general hypothesis of a dispersion process at supranational scale with an agglomeration process within countries.

#### 4.2.3 Agglomeration variables

The seminal work by Alfred Marshall (1920) establishes the generally accepted explanations for manufacturing agglomeration. Agglomeration generates some form of economies due to proximity and is the result of a combination of different factors: labour market pooling, proximity of non-traded goods, and technological spillovers. Contributions such as new trade theory and new economic geography have expressed these ideas in formal general equilibrium models. Following this, manufacturing MNEs are attracted to those areas where they can enjoy the presence of existing manufacturing activity and benefit from the agglomeration economies that may be generated.

Several studies have investigated the importance of agglomeration economies as a determinant of location choice and all find a positive relationship. In particular, focusing on those studies that analyse the multinationals' location choices, several proxies have been used to measure this effect. Ideally, we should follow Head *et al.* (1995) who argue that agglomeration economies can be more accurately analysed by allowing for different measures according to the type of the agglomeration. In this preliminary study we only consider two types: foreign agglomeration and overall manufacturing agglomeration.

The foreign agglomeration variable attempts to capture foreign agglomeration economies that emerge for non observable reason. This idea is also mentioned in Head and Mayer (2003) who note that "the backward linkage of NEG mechanism might not be the only driver of clustering behaviour by MNEs". The main non observable reasons that cause multinational activity to agglomerate can be summarize in four reasons: (1) MNEs face more uncertainty than local firms in their location choice process and therefore, locations where a high number of MNEs are already established may be a signal that the location is a good one, thus reducing the associated uncertainty. (2) Establishing a plant in a foreign market is costly. Not only are there costs associated with the real implementation of the plant but also previous costs. For example, MNEs need to contract strategy services in order to select adequate locations or spend time analysing different alternatives and then decide. However, MNEs may act as free riders and avoid these costs by locating in areas where other MNEs are already established. (3) Foreign firms may want to locate where other foreign firms already exist because of demonstration effects (Decoster and Strange 1993). That is, firms follow their competitors in order to keep pace. (4) Finally, there might be a rent-seeking motive. Both MNEs and public officials in core locations may agree in some type of rent to inefficiently affect the location of foreign investment favouring agglomeration.

We measure this following Head *et al.* (1995) who define foreign agglomeration<sup>17</sup> as the sum plus one of the number of foreign projects located in the region or country the year before the location decision of a new investment and expect to find that a higher presence of foreign firms in an area (either country or region) positively influences the attraction of other foreign firms.

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<sup>17</sup>In forthcoming versions of this research we will be able to include a sectoral foreign agglomeration variable to account for industry specific foreign agglomeration economies.

Our second agglomeration measure is thought to account for the rest of the of agglomeration effects, that is, as defined by Marshall. This is proxied by the total manufacturing employment per square kilometer. We think that this variable is most related to the labour pooling type of agglomeration economies. Localization economies accounting for forward and backward linkages are difficult to measure due to the lack of comparable sectoral disaggregated data at country and regional level in the European Union. To proxy for knowledge spillovers, a more precise measure would be necessary. However, the presence of many competitors in the area may also act as a deterrent to the location of new foreign investments. In highly manufacturing populated areas not only are firms competing in the product market but also in the factor markets, making the production process more costly. Taking all these ideas into consideration, we find again a double possible effect that needs to be solved empirically. A strong presence of manufacturing industries may influence either positively or negatively the entrance of foreign investment projects at both country and regional levels .

Finally, a third control variable is added: population density. The argument that it represents is, not only a measure of agglomeration but also a measure of congestion. Following Guimaraes *et al.* (2000), population density can be used as a proxy for industrial land costs. Here we think about this variable in the sense that high industrial land costs in highly populated areas act as a dispersion force. On the other hand, population density may be indicative of an adequate networking environment or a large available pool of workers. Since MNEs also care about this, they value locations with high population density. In the light of this, population density can negatively or positively influence the location of multinationals firms at both country and regional levels.

According to the three agglomeration hypotheses, either result is possible. We expect to find in the empirical results differences in some of these agglomeration location determinants at different spatial levels. This may also reflect the fact that they can be better measured at either country or regional level.

#### 4.2.4 Other variables of interest

Other location determinants need to be considered in order to control for the many issues that multinational firms take into consideration in their location choices. Here, we control for institutional quality and level of corporate taxes. Multinational firms are attracted by countries with good governance quality and low corporate taxes. A country with a good governance signals a good environment in which to do business since policies emerge for the benefit of an adequate political, social and economic environment. At the same time, a country with low corporate taxes reduces the production costs of any economic activity and therefore is an important factor that MNEs consider when deciding where to locate. Given this and taking into consideration that these two variables are only at national level, we expect to find that the better the governance effectiveness and the lower the corporate tax rate the better conditions for a country to attract foreign direct investments.

According to the different arguments about the location determinants at both national and regional level we expect dispersive forces to be a stronger influence in the multinationals' location process when considering location alternatives at a supra national level. On the other hand, we expect agglomeration

forces to dominate when the location choices are at a regional geographical level within individual countries. Therefore, these geographical considerations in the location decision process of MNEs can be an additional mechanism through which the decrease in the core-periphery pattern between European countries but increase in the core-periphery pattern within European countries can be explained.

All explanatory variables are in logs, with the exception of the governance index which is not a continuous variable, and are lagged one period. The reasons for the latter transformation are the following: (1) multinationals' decisions choices take some time to be implemented, (2) foreign agglomeration economies will only be at work if there have been previous foreign firms in the area for some time, and finally, (3) by lagging the explanatory variables we reduce endogeneity bias.

## 5 Empirical results

Table 3 presents the estimation results concerning the determinants of location choice at country level (columns 1 and 2), at regional level (columns 3 and 4) and at regional level with country attributes (column 5). In general, the different determinants have the expected signs and their magnitudes are consistent with comparable existing work using logit models of location choice. All continuous variables are in logs so that the coefficients are approximations of the elasticity of the probability of choosing a particular location with respect to the explanatory variable for the average investor. The overall fits of the estimations are consistent with those found in comparable papers.

### 5.1 Country level results

Regarding estimation results at the country level (columns 1 and 2 in Table 3), location choice is influenced positively by market potential variables. Countries characterized by both large internal and external potential demand are considered to be attractive locations for European manufacturing multinational firms. Although location choice is positively influenced by where the demand is, this might be capturing the fact that countries such as the UK and France are leading locations for foreign projects. This does not necessarily go against our general hypothesis, since we argue that economic integration fosters some multinational activity in peripheral countries. It also appears that external market potential is more relevant than internal one. This is reasonable within our setting since European MNEs are likely to sell their products to the entire European market. Our estimated coefficient indicates that a country that experiences a 10% rise in its external market potential increases its probability of being chosen in the future by a 3,7%. In order to control for a possible size effect we include GDP per capita in the model. However this variable is insignificant.

The labour market variable results resolve the ambiguity of their effect discussed previously (see section 4). Wages have a significant and negative influence on location choice. Therefore, wages levels act as a dispersion force at the country level indicating that MNEs tend to locate their affiliates in low production cost countries. Unemployment rate has a positive sign but is not significant

which confirms the difficulty experienced by previous studies to establish a clear relationship between unemployment rate and location choices.

Turning to the effect of agglomeration variables, manufacturing density negatively influences multinationals' location choices. This supports the idea of a delocalisation process from core countries suffering from competitive pressures to peripheral countries. Although this variable is not significant, it is logical to think that the existence of this competition effect at country level rather than the explanation which relates this variable with a measure of manufacturing positive externalities. This may be due not only because of the sign obtained but also due to the fact that the proxy used is a very vague measure to capture these type of economies.

Previous locations of foreign projects have a strong, positive and significant influence. This indicates the relevance of non observable reasons in the location of multinationals. A 10% increase in previous foreign locations in a country raises the probability of being chosen by approximately 8,2%. Finally, population density is not significant. We believe this indicates that this variable, at country level, does not capture the effects it was intended to capture. Because of this, we drop this variable and the new results are shown in column 2 in Table3. The only mentionable change is that our manufacturing density variable now becomes significant. The rest of the variables have the same signs and significances.

As was expected, there is a negative and significant relationship between the level of corporate taxes and location choices. Our control variable for institutional quality, governance index, is not significant.

Overall, country level estimation provides evidence of a dispersion tendency in the European Union through the location of European multinationals' affiliates. Location determinants expected to behave in a particular direction have the expected signs: external market potential, foreign agglomeration, taxes. In relation to the trade-off between agglomeration and dispersion forces, it appears that the negative influence of wages is stronger than the positive influence of internal market potential as is shown in the value of their estimated coefficients (-0,377 versus 0,214 respectively). That is, when trade costs are reduced, such as in the European Union, incentives to agglomerate are also reduced and labour-costs considerations become more important than agglomeration forces. This is line with the conclusions of NEG models that include multiplant firms (see, for example, Gao 1999).

## 5.2 Regional level results

To investigate whether the influence of each location determinant remains the same when we change the spatial unit of analysis, our first approach is to estimate the same location decisions at the regional level (NUTS 2) and hence, introduce explanatory variables measured at regional level. Then we compare our country estimations with the regional ones.

The results at the regional level correspond to the values shown in columns 3 and 4 of Table 3. Potential market variables appear to have the same sign and significance pattern observed at the country level. That is, when multinationals consider the set of possible European regions as location alternatives, they prefer regions with a large internal and external market potential. Nevertheless it is important to notice that the strength of the relationship between internal market



potential and location choice is much weaker than at the country level. This means that European MNEs are concerned with the entire EU market and thus the relationship is weaker at the regional level given that regional units are very difficult to be only considered as the market where firms are going to sell their products. Hence, external market potential better captures potential demand effects. Moreover, GDP per capita appears to be insignificant which supports the previous idea. Column 4 presents the results excluding this variable.

The effect of labour market variables are similar to country level results. Unemployment rate continues to be insignificant and wages have a significant and negative effect on location choices. That is, a 10% increase in the wages of a region reduces the probability of being chosen in the future by 2.7%. It is important to note that this result highlights an interpretation problem. Since we have conditional logit estimations over the entire set of European regions, the negative effect of wages is reasonable. The effect found is a measure of the advantage of those European regions with lower labour costs. We are not able to capture the effect we are really interested in, namely the effect of wages within countries.

Agglomeration variables appear to have the expected signs supporting our hypothesis that agglomeration tendencies dominate when studying multinationals' location choices at the regional level. Again, foreign agglomeration due to non observable reasons has a significant positive influence on the location choices at the regional level. Manufacturing density has a positive effect, in contrast to the negative effect at the country level, but the effect is insignificant. Therefore, it is measuring the positive effect of positive economies favouring agglomeration rather than capturing competition effects. In future versions of this paper we plan to include more appropriate measures for more conclusive analysis.

Population density has become a significant variable at the regional level confirming our previous result that it is a relevant measure at small geographical units of analysis. However, we experience the same interpretation problem we observed with wages. Since we are considering the entire set of European regions without any spatial structure, population density captures the negative influence of industrial land prices in the location of foreign projects. In contrast, we are not able to capture any possible agglomeration tendencies indicated by population density when we consider location choices within countries.

Altogether, location determinants exhibit different influences when measuring them at the regional level. This is reflected in the change in the sign of manufacturing density and also in the fact that some effects appear to be measured more accurately at one specific geographical scale. For example, internal market potential is more appropriate for country geographical scales while population density is more appropriate at regional level. However, there is an interpretation problem. We are not able to distinguish possible opposite effects in the influence of location determinants, and particularly, in agglomeration and dispersion forces, when considering location choices between countries with respect to location choices within countries. This may be the reason why potential demand and labour cost variables influence location choices in the same manner at both geographical levels. This is due to the fact that we use conditional logit models without any geographical structure in the location decision making of the MNEs. In order to account for this a nested logit estimation is required. Moreover, the choice of an appropriate nested geographical structure needs to

be tested. Further research is therefore required in this line<sup>18</sup>.

In order to solve part of this problem, we estimate a conditional logit model as a second approach to give some insight into possible differences in the influence of multinationals' location determinants depending on the spatial unit of analysis.

### 5.3 Country and regional level results

We again estimate a conditional logit of location choices at the regional level but this time introduce location determinants measured at the country level. Column 5 in Table 3 presents the estimated coefficients. This alternative approach complements the previous analysis in order to test for spatial dependencies in the location determinants of MNEs. Here, the strategy is to compare the two estimated coefficients (country and regional) for each location determinant.

The first thing to note is that we have only included a country measure of GDP per capita and a regional measure of population density. This is because previous estimations indicate that these are the appropriate spatial scales for these variables. Results are similar to what has already been commented in previous estimations.

In addition, there are two variables that can only be taken into account at country level. Corporate taxes appear to have a significant negative influence on location choices while the index of governance positively and significantly influences the location of foreign projects. These results match our expectations as discussed in section 4.

According to the discussion in section 4 differences in the behaviour of foreign agglomeration variables depending on the geographical scale taken into consideration were not expected. This is confirmed by results in this last estimation and in the previous ones. Previous foreign location positively affects the location of foreign projects regardless of the geographical unit of analysis. However, results certainly show a consistent spatial divergent behaviour of the manufacturing density measure. It seems that manufacturing density negatively influences multinationals' location choices at the country level favouring a dispersion process while, at the same time, positively influences multinationals' location choices at a regional level fostering agglomeration tendencies.

Estimated coefficients of the labour market variables present clarifying results. In this last estimation, the impossibility of estimating a significant effect of the unemployment rate is confirmed. We conclude that there is no clear relationship between unemployment rate and location choices at any of the spatial levels considered. We obtain again a negative effect of wages at the country level which supports the delocation process at a supranational scale. However the effect at the regional level is insignificant. We argue that firms consider the wage level as a determinant to locate in a cheaper country but within a country it has no effect<sup>19</sup>. At the regional level wages may be signalling educational

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<sup>18</sup>A nested logit estimation was done with country and regional levels but inclusive values were not significant. Hence, these results are not included in the present paper and further research is needed to find the adequate geographical structure. This is in line with Basile *et al.* (2003) who conclude that national boundaries do not seem to affect multinationals' location decisions.

<sup>19</sup>A similar idea is raised in Figueredo *et al.* (2002). They say that firms consider the wage level as a determinant to locate in a cheaper country but within a country it has no effect.

levels instead of labour costs. Hence, in order to take into account this effect, a better proxy would be necessary in future versions.

Finally, and in relation to market variables, we obtain that external market potential behaves in the same way at the country and regional level which confirms the similar behaviour found in previous estimations. When looking at model 5, comparison of country and regional GDP leads to an opposite effect. It appears that multinationals do not worry about national internal market potentials since they operate under an economic integrated area and hence can delocate some activity to countries with lower internal demand. At the regional level, internal demand matters. However it is important to notice that the interpretation of the internal market demand variables varies respect the one when comparing models 2 and 4. Previously, we conclude that country GDP has a stronger positive effect than regional GDP due to the fact that the market served by foreign firms is rarely limited to their regional location choice. In model 5 we may want to interpret the difference with national GDP in the sense that multinationals prefer regions where the demand is high because those regions have the largest labour pool following NEG theory.

Overall, we find evidence of a divergent behaviour of location determinants depending on the spatial scale taken into account. Firstly, there are some location determinants that are only at work at one spatial scale (population density, GDP per capita, wages). This means that some location determinants should be measured only at the appropriate geographical unit of analysis. Secondly, some determinants have opposite effects when measured at different level of aggregation (manufacturing density, GDP). This is due either because the effects they proxy certainly behave in opposite directions at the two spatial levels or because the effects they proxy change depending on the unit of analysis. And finally, some effects behave in similar directions, however the strength of the relationship differs depending on whether it is considered at the country level or the regional level (market potential variables).

To summarize, our econometric estimations concerning the location choice of EU multinational firms in EU countries and regions from 1998 to 2005 indicate that some location determinants behave in a divergent way depending on whether they account for country or regional effects. The estimation results, suggest that economic integration fosters some multinational activity to locate in peripheral countries due to a dispersion process. However, tendencies towards agglomeration are reinforced at a regional level.

Caution should be used when analysing these preliminary results. Some interpretation problems are faced because with conditional logit estimations we cannot take into account any spatial structure. A more precise specification is necessary in future versions to distinguish the divergent effects of economic variables at the country and regional level. Future extensions should involve nested models to look for an appropriate geographical structure in the decision making process of MNEs. In addition, future work should include firm characteristics and account for firm heterogeneity through estimation of mixed logit models.

## 6 Conclusion

We analyse the determinants of location choices by European multinationals in the European Union. We attempt to study how foreign activity is spatially

distributed not only across countries but also in individual countries within an economic integration context. Our attention is particularly concerned with the behaviour of the location determinants at the country level versus the behaviour of the same location determinants at the regional level. The underlying profit equation incorporates agglomeration and dispersion location determinants at both levels of geographical aggregation. Using conditional logit discrete estimations we determine whether the location determinants of MNEs change when looking at different spatial units of analysis.

Preliminary results support the idea of a divergent effect of location determinants depending on the geographical unit of analysis. At the country level, dispersion determinants such as wages play a major role. This favours the delocation of economic activity to peripheral countries within the EU through the location of European multinationals affiliates. On the other hand, agglomeration determinants tend to dominate at the regional level. For example, both external market potential and foreign agglomeration for non observable reasons have a stronger positive influence at the regional level.

We find empirical evidence supporting the idea that agglomeration tendencies are weakened when multinationals' location choices are considered under regional integration contexts. In addition, we find empirical support that the opposite is likely to happen when regions are the choices of the location decision. That is, it appears a spatial dependency in our results. Therefore, it could be said that the location decision process of intra-EU foreign investment may be an additional mechanism to explain the decrease in the core-periphery pattern between EU countries and an increase of the core-periphery pattern within EU countries.

Two policy concerns appear. Firstly, since country and regional characteristics differ, the influence of multinationals' location determinants, and hence, their consequences, also vary. Policies aimed at attracting FDI require cooperation between national and regional authorities. And secondly, policies to reduce economic disparities should consider that the location of multinational firms may be an additional mechanism that influences the pattern of between and within country disparities.

However, this requires a more precise empirical specification to test for the adequate spatial structure. Preliminary results presented in this paper show a divergent spatial influence in location determinants of intra-EU foreign projects but some interpretation problems appear. Future challenges consist on a better empirical specification able to account for an appropriate spatial structure in order to provide a more concise evidence. Also, extensions in the empirical specification are planned to be done by including extra-EU foreign investment projects and by adding characteristics of the firms as location determinants.

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TABLE 1

Distribution of Foreign Direct Investment Projects (Greenfield) in the European Union												
Country	1997	1998	1999	2000	2001	2002	2003	2004	2005	Total (Country)	Percentage (%)	Yearly Average
AUSTRIA	12	40	23	21	20	14	18	15	27	190	3.40	21.11
BELGIUM	37	33	27	39	14	27	24	37	43	281	5.03	31.22
CYPRUS	0	0	0	0	0	0	0	0	0	0	0.00	0.00
CZECH REPUBLIC	30	38	31	43	47	55	35	46	60	385	6.89	42.78
GERMANY	47	46	30	22	37	22	24	37	40	305	5.46	33.89
DENMARK	8	10	3	2	1	3	9	6	11	53	0.95	5.89
ESTONIA	6	4	8	11	7	8	9	22	11	86	1.54	9.56
SPAIN	41	40	63	53	54	60	50	37	48	446	7.98	49.56
FINLAND	3	5	5	3	9	4	4	4	1	38	0.68	4.22
FRANCE	200	89	156	102	85	72	147	189	135	1175	21.03	130.56
GREECE	0	3	1	1	1	3	0	2	3	14	0.25	1.56
HUNGARY	63	64	43	34	42	50	47	76	57	476	8.52	52.89
IRELAND	26	22	9	6	7	6	9	10	5	100	1.79	11.11
ITALY	13	13	14	13	14	7	5	9	5	93	1.66	10.33
LITHUANIA	9	5	2	3	8	11	2	5	7	52	0.93	5.78
LUXEMBOURG	0	1	0	0	0	1	1	0	3	6	0.11	0.67
LATVIA	5	4	1	3	4	5	4	9	6	41	0.73	4.56
MALTA	0	0	0	0	0	0	0	0	0	0	0.00	0.00
NETHERLANDS	23	13	20	15	11	14	8	8	7	119	2.13	13.22
POLAND	70	65	40	50	22	32	26	72	103	480	8.59	53.33
PORTUGAL	5	12	5	7	14	19	22	17	16	117	2.09	13.00
SWEDEN	14	7	8	9	19	24	19	24	16	140	2.51	15.56
SLOVENIA	2	4	0	0	0	0	1	8	3	18	0.32	2.00
SLOVAK REPUBLIC	7	9	7	13	9	13	15	44	38	155	2.77	17.22
UK	162	141	84	75	45	58	91	81	79	816	14.61	90.67
<b>Total (per year)</b>	<b>783</b>	<b>668</b>	<b>580</b>	<b>525</b>	<b>470</b>	<b>508</b>	<b>570</b>	<b>758</b>	<b>724</b>	<b>5586</b>	<b>100</b>	

Source: Author's elaboration on EIM



TABLE 2		
Description of the Variables		
Variable	Definition (Source)	Sign
<i>Dependent variable (Y)</i>	Location choices among 25 countries and 246 regions (EIM).	
<i>Independent variables</i>		
<b>Country variables</b>		
GDP	Constant Gross Domestic Product: Euros 1995 (Cambridge Econometrics).	+/-
External Market Potential	Sum of the GDPs all the other alternative countries weighted by their distance to the location choice.	+
GDP per head	Constant Gross Domestic Product: Euros 1995 divided by population.	+/-
Population density	Population per square kilometer (Cambridge Econometrics).	+/-
Wage	Labour cost per hour (Cambridge Econometrics).	+/-
Unemployment rate	Percentage of unemployed over active population (Cambridge Econometrics).	+/-
Manufacturing density	Total manufacturing employment per square kilometer (Cambridge Econometrics).	+/-
Foreign Agglomeration	Count plus one of firms location in the same country (EIM).	+
Corporate Taxes	(Eurostat).	-
Governance Index	Governance effectiveness index (World Bank).	+
<b>Regional variables</b>		
GDP	Constant Gross Domestic Product: Euros 1995 (Cambridge Econometrics).	+/-
External Market Potential	Sum of the GDPs all the other alternative regions weighted by their distance to the location choice.	+
GDP per head	Constant Gross Domestic Product: Euros 1995 divided by population.	+/-
Population density	Population per square kilometer (Cambridge Econometrics).	+/-
Wage	Labour cost per hour (Cambridge Econometrics).	+/-
Unemployment rate	Percentage of unemployed over active population (Cambridge Econometrics).	+/-
Manufacturing density	Total manufacturing employment per square kilometer (Cambridge Econometrics).	+/-
Foreign Agglomeration	Count plus one of firms location in the same region (EIM).	+

TABLE 3						
Conditional Estimates, 1998-2005						
Type	Location choice Variable	Country		Nuts2		Both
		(1)	(2)	(3)	(4)	(5)
Country	GDP	0,216 <sup>(a)</sup> (0,031)	0,214 <sup>(a)</sup> (0,031)			-0,287 <sup>(a)</sup> (0,034)
	GDPpc	0.196 (0,208)	0.22 (0,197)			0.275 (0,201)
	Market Potential	0,372 <sup>(a)</sup> (0,074)	0,367 <sup>(a)</sup> (0,073)			0,228 <sup>(a)</sup> (0,078)
	Wage	-0,365 <sup>(a)</sup> (0,108)	-0,377 <sup>(a)</sup> (0,102)			-0,27 <sup>(a)</sup> (0,136)
	Unemployment rate	0.015 (0,052)	0.013 (0,051)			0.064 (0,055)
	Manufacturing density	-0.103 (0,097)	-0,135 <sup>(a)</sup> (0,039)			-0,247 <sup>(a)</sup> (0,043)
	Foreign agglomeration	0,828 <sup>(a)</sup> (0,023)	0,828 <sup>(a)</sup> (0,023)			0,386 <sup>(a)</sup> (0,027)
	Population density	-0.035 (0,098)				
	Corporate Tax	-0,194 <sup>(a)</sup> (0,058)	-0,196 <sup>(a)</sup> (0,058)			-0,19 <sup>(a)</sup> (0,061)
	Governance index	-0.008 (0,059)	-0.012 (0,058)			0,119 <sup>(b)</sup> (0,06)
Region	GDP			0,135 <sup>(a)</sup> (0,021)	0,124 <sup>(a)</sup> (0,019)	0,225 <sup>(a)</sup> (0,023)
	GDPpc			-0.069 (0,058)		
	Market Potential			0,177 <sup>(a)</sup> (0,032)	0,183 <sup>(a)</sup> (0,031)	0,256 <sup>(a)</sup> (0,041)
	Wage			-0,277 <sup>(a)</sup> (0,03)	-0,293 <sup>(a)</sup> (0,027)	-0.006 (0,09)
	Unemployment rate			-0.01 (0,022)	-0.007 (0,021)	0.037 (0,026)
	Manufacturing density			0.021 (0,016)	0.022 (0,016)	0,099 <sup>(a)</sup> (0,019)
	Foreign agglomeration			0,86 <sup>(a)</sup> (0,017)	0,862 <sup>(a)</sup> (0,017)	0,564 <sup>(a)</sup> (0,023)
	Population density			-0,113 <sup>(a)</sup> (0,017)	-0,115 <sup>(a)</sup> (0,017)	-0,148 <sup>(a)</sup> (0,018)
Pseudo R <sup>2</sup>		0.179	0.179	0.064	0.064	0.072
Number of choices		25	25	246	246	246
Number of investors		1,181,292	1,181,292	120,075	120,075	1,181,292

Notes:

(i) The dependent variable is location choice.

(ii) The symbols (a), (b) and (c) denote significance at the 1%, 5% and 10% levels respectively.

(iii) Quantities in parenthesis are the standard errors.

Figure 1: Spatial distribution of MNEs at the country level.

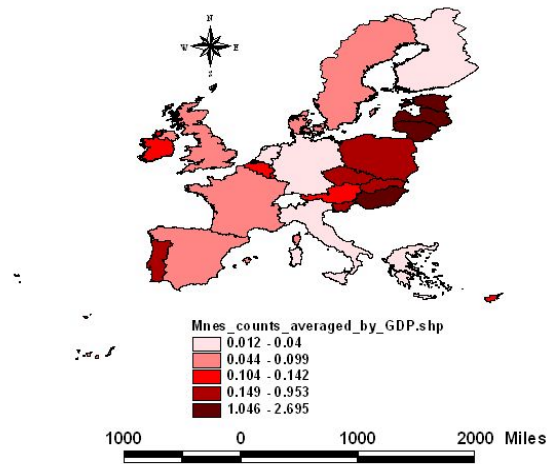


Figure 2: Spatial distribution of MNEs at the regional level.

