

MAPPING FOREIGN ACTIVITIES IN UK REGIONS: THE ROLE OF ENVIRONMENTAL DETERMINISM AND DYNAMISM

1. INTRODUCTION

Foreign Direct Investment (FDI) and its agents, i.e. Multinational Corporations (MNCs), are understood to play a major role in the economic development of nations through their impact on trade and their ability to generate jobs and to produce new knowledge through technological and managerial advances (UNCTC, 2003). At the same time, the contemporary MNC is a continuously evolving institution which influences and at the same time gets influenced by its external environment. The issue then is to achieve the best fit between external environment, shaped primarily by policy actions, and the strategic orientation and goals of firms (Porter, 1990; Rugman and Verbeke, 2001). Subsidiaries are not allocated necessarily *ad hoc* specific roles. They rather have a unique way of transforming and ‘endogenising’ country or regional specific advantages to firm specific advantages (Rugman and Verbeke 2001).

Mapping FDI patterns is of crucial importance to local and national policy makers whose one of primary aims is to help the development of lagging behind regions. Public authorities, having full information on economic conditions and, thus, the needs of regions, design and provide particular incentives in order to influence investors’ location decisions. Well documented is the spatial clustering of firms, generating in this way externalities that spill over to the wider economic area, giving a boost to its development (Krugman, 1991, Krugman and Venables, 1995, Venables, 1996, Markusen and Venables, 1998). The ultimate goal then narrows down to creating the initial conditions, which will attract a sufficient number of foreign investments at the first place constituting, in turn, the centripetal forces for subsequent entrants.

The present paper contributes to the existing literature by mapping FDI patterns across UK regions based on the environmental determinism and dynamism, using a new database of MNCs, which covers 6348 foreign firms. Our extensive database allows us to differentiate the determinants at the NUTS II level. Relevant

studies are scarce in the field due to data limitation. The analysis covers aspects relating to sectoral activities by region and thus is informative on a detailed basis about MNC location decisions. The rest of the paper is organised as follows: Next section provides the literature review, whilst section 3 the empirical methodology. Section 4 presents the sample and the basic statistics and section 5 our basic hypotheses. Our empirical results are presented in section 6, whilst section 7 concludes the paper offering some possible extensions.

2. LITERATURE REVIEW

In the early nineties, “New Economic Geography” (NEG) emerged emphasizing the role of external economies inspired by Marshall’s seminal analysis (1890/1916). NEG theorists argue that specific industries are expected to become geographically concentrated and specific countries seem to be advantageous in attracting foreign activities within their grounds. The spatial clustering of firms is well documented nowadays, generating in this way externalities that spill over to the wider economic area, giving a boost to its development (Krugman, 1991; Krugman and Venables, 1995; Venables, 1996, Markusen and Venables, 1998). The ultimate goal then for policy agents narrows down to creating the initial conditions, which will attract a sufficient number of investments at the first place constituting, in turn, the centripetal forces for subsequent entrants.

According to Ottaviano (2003) the innovation of NEG lies in the fact that it explains the choice of location on microeconomic parameters and thus combines the existence of scale economies, strong market power, the flexibility in the mobility of customers and suppliers and the persistence of low trade costs. All these factors can explain the agglomeration of firms in one location (Venables, 1996; Markusen and Venables, 1998; Fujita et al., 2001).

Most of the relevant empirical literature analyzes the determinants of industrial activity, with a particular emphasis on firms’ clustering, at a national level, particularly with location choices in Europe (Wheeler and Mody, 1992, Devereux and Griffith, 1998; Barrell and Pain, 1999; Mucchielli and Puech, 2003) or within US states (Carlton, 1983, Friedman *et al.*, 1992; Nachum, 2000). Head *et al.* (1995)

examine Japanese manufacturing investments in the US and provide at the same time a map of their geographical distribution among the states.

Nevertheless, there are a few exemptions that deal with thinner geographical analyses within countries. Head and Ries (1996) investigated investment decisions for 54 cities in China and a similar work belongs to Cheng and Kwan (2000) who estimated 29 Chinese regions confirming the self-reinforcing effect on foreign direct investment (FDI) on itself. He (2002) also has addressed the role of information costs and agglomeration economies in the location of FDI in Chinese regions. Guimaraes *et al.* (2000) presents a spatial distribution of FDI start-ups in Portuguese concelhos. Crozet *et al.* (2002) maps location choices by foreign investors in France focusing especially on agglomeration effects and on the impact of French and European regional policies. While the agglomeration hypothesis is strongly supported, investment incentives do not seem to have raised the attractiveness of French regions. More recent work by Driffield and Hughes (2003) examines the impact of FDI and domestic investment on regional development in the UK. Boudier-Bensebaa (2005) examines the determinants of FDI at a regional level in Hungary and concludes that labor availability, demand conditions and agglomeration economies influence positively and significantly inward FDI by Hungarian counties.

Other empirical research at this sub-national level, however focusing on R&D activities by MNCs belongs to Carrincazeaux *et al.* 2001; Frost, 2001 and Cantwell and Iammarino, 2003. Cantwell and Piscitello (2005) examine corporate research activity in European regions by foreign-owned firms and provide evidence for the role of regional technological competence as significant factor for attracting foreign-owned research, thus, confirming that intra- and inter-industry spillovers are highly region specific (Keller, 2002).

Parallel to the above and addressing location choice within thin geographical areas stand a number of papers, which deal with total industrial activity. Hansen (1987) examines the economic determinants of interurban location behavior of 360 branch and transfer plants in Sao Paulo, Brazil, providing evidence of the role played by both factor inputs and agglomeration economies. In an analogous study, Henderson and Kuncoro (1996) explore manufacturing activity in Java, Indonesia. Their results suggest that firm location decisions respond to typical market variables as well as to the existence of local historical industrial environment in order to benefit from the built-up stock of local information in regards to institutions, linkages and

technology. More recently, Filippaios and Kottaridi (2004) examine location decisions of both domestic and foreign firms in Greek regions giving support to agglomeration economies and the role of market size for the location of firms in particular milieus. Also, Viladecans-Marsal (2004) analyses various types of agglomeration (urbanization economies and localization economies) on the location of manufacturing employment in Spanish cities. Kottaridi et al. (2004) examine whether regional characteristics determine location choice of subsidiaries in distinctive UK regions. They find that subsidiaries in the UK do take into consideration cost factors as well as agglomerative factors such as size of local market, good physical infrastructure, R&D and they also provide strong support of agglomeration patterns. At the same time the existence of a potential competitor does not alienate other subsidiaries of the same sector or nationality as this element of affinity apparently contributes to the attractiveness of a region.

Acknowledging the fact that there is insufficient empirical evidence on the effect of “environmental determinism”, (Ottaviano, 2003; Neary, 2001) it would be of utmost interest to examine the role of location factors, at a narrow regional level that are tentatively of great importance for MNCs’ strategic location decisions.

3. SAMPLE DESCRIPTION

For our purposes, we investigate regional location choices of foreign affiliates within the UK territory. The analysis is based on Corporate Database Affiliations (Who owns Whom) a wide database that Lexis-Nexis prepares with all foreign subsidiaries of US firms operating all over the world as well as the foreign subsidiaries of the world’s largest MNCs . The total number of foreign subsidiaries that operate in the UK are 6348.

Concerning the regional breakdown of the UK, this was based on common classification of UK National Statistics. UK National Statistics distinguishes among twelve regions, namely, North East, North West, England, Yorkshire and the Humber, West Midlands, East Midlands, East of England, South East, London, South West, Wales, Scotland and Northern Ireland.

Data on regional characteristics were obtained from UK online national statistics, UK Invest and the Department for Business, Enterprise and Regulatory Reform.

Table 1 provides the description of all the available variables. It is worth mentioning that goes beyond the scope to investigate the impact of all variables presented in table 1. This paper is just a proportion of a bigger project investigation the competitiveness of UK regions and thus we focused primarily on variables capturing the motivations of MNCs. The variables selected cover a wide aspect of Market seeking, Efficiency seeking and Strategic asset seeking motives as well as the existence of specific governmental or other policies that could influence the MNCs' decisions to remain in a particular region.

Insert Table 1 here

Table 1 provides a description of all available variables. Combining different datasets we managed to cover a wide spectrum of variables capturing the size of the region, its labour and other costs, competitiveness with respect to exports and imports as well as the existence of region specific governmental policies.

Table 2 on the other hand sheds light on the information obtained from the Corporate Affiliations Database (LexisNexis). It represents the relative percentage of firms established and present in each of the UK regions. As expected a large majority, almost 1 every 5 firms are located in the Greater London area. East of England, South East and the South West follow with relatively though smaller proportions. To further examine the background of the firms included in our sample we provide in table 3 a break down with respect of their origin. The first column represents the non-US international firms included in the Corporate Affiliations Database. These firms represent almost two thirds of our full sample and show a clear tendency to locate in the London area. Similar are the findings for the US Private and US Public firms, i.e. MNCs with US origin with the US Public firms demonstrating a more widespread tendency to locate in other regions as well and not to cluster in the London area.

Insert Table 2 here

Insert Table 3 here

To further visualize our findings we proceed with a mapping of MNCs activities as captured by the Corporate Affiliations Database in UK regions. As we had available data on a county level, we decided to present them in the most detailed level. In order to map the activities the specialised software ArcView was used. Figure 1 provides a density map of all MNCs included in Corporate Affiliations Database and present in the UK. This map verifies our previous argument on the existence of specific clusters in the London area, the South East and South West, the East of England, whilst fewer companies tend to locate in Scotland, Wales and Northern Ireland.

Insert Figure 1 here

As the database contains also information on the age and the employment of MNCs we decided to calculate the average age and average employment in each region and represent it in a graphical way. Figure 2 represents the average employment of firms by region differentiating between micro and small, medium and large enterprises. The profile of firms in most regions with few exemptions falls within the medium (51-251 employees) with only a handful of regions especially in the South West and Wales attracting large enterprises.

Insert Figure 2 here

On the other hand when we mapped the average age of MNCs present in each region we clearly observe a larger dispersion of results. The London area clearly attracts the oldest firms, whilst the midlands cluster with the heavy manufacturing industry also attracts rather mature firms.

Insert Figure 3 here

Finally table 4 represents the profile of each region used in our analysis with respect to the regional variables collected. London, North West and South East tend to dominate UK with respect to the workforce present, whilst London and the South East are the two largest contributors to UK's Gross Value Added creation. Northern Ireland, Scotland and Wales are the three regions that attract the highest proportions

of government's assistance due to their peripheral status in UK's economy. Finally, London is by far the most expensive area with respect to workforce earnings with 130% of UK's average.

Insert Table 4 here

4. ECONOMETRIC METHODOLOGY

In this paper we adopt the econometric methodology used by Crozet et al., (2002), Head et al., (1999) Friedman et al., (1992), Filippaios and Kottaridi (2004) and Kottaridi et al. (2004). The model assumes that foreign investors, once they have already decided to build a manufacturing plant in the U.K., maximize an intertemporal profit function subject to uncertainty with respect to location selection. The profit function consists of a deterministic part typically called the attributes of the choices and a random component arising from maximization errors, other unobserved characteristics of choices or measurement errors in the exogenous variables. Hence, the profit function of an investor i , locating in region j may be written in the following form:

$$\pi_{ij} = U_{ij} + \varepsilon_{ij} \quad (3.1)$$

where $U_{ij} = (\ln X_{i1}, \ln X_{i2}, \dots, \ln X_{ik})$ with X_{im} representing a set of m observable characteristics of alternative locations i , and ε_{ij} is a random variable associated with unobserved location attributes potentially influential to investor's choice. Investor i will choose to locate in region j (and continue to operate there afterwards), rather than choosing location k , if the following expression holds:

$$\pi_{ij} > \pi_{ik}, \forall k, k \neq j \quad (3.2)$$

Since the profit function contains a stochastic part, the probability that location j is selected among alternative choices by investor i may be then defined as:

$$P_{ij} = \text{Pr ob}(\pi_{ij} > \pi_{ik}), \forall k, k \neq j \quad (3.3)$$

Under the assumption that the j disturbances are independent and identically distributed with Weibull distribution, the probability takes the following form (McFadden, 1984):

$$P_{ij} = \frac{e^{U_{ij}}}{\sum_{k=1}^n e^{U_{ik}}} \quad (3.4)$$

This is the conditional logit model or McFadden's choice model. Using equation (3.4) and assuming that U_{ij} is a linear combination of the explanatory variables, estimation of relevant coefficients is obtained using maximum likelihood. To further test the validity of our results, we performed a test for controlling the Independence of Irrelevant Alternatives (IIA) property. This property states that the ratio of probabilities of choosing two locations, P_j/P_k , is independent of the characteristics of any third location, or, in other words, the choices must be equally substitutable to investors. From the aforementioned analysis, it is evident that we model the probability of a plant's location and prolongation of operations in any given region at period t as a function of a set of explanatory variables related to the choice variable. In this case the choice reflects one of the 12 UK regions.¹

5. VARIABLES AND HYPOTHESES

The modelling in this paper uses a tripartite typology of strategic imperatives, or motivations of MNCs. Market seeking (MS) involves producing within a country or a region in this particular case to supply the market of that region. Two distinct elements condition the choice of MS operations in a region. Firstly, that the target market is a worthwhile (i.e. currently, or potentially, significantly profitable) part of the enterprise's logical competitive environment. Secondly, that there are reasons for supplying the market through local production.

Although their MS motivation has been challenged by the emergence of freer trade and other developments in transportation and logistics, MNCs have often co-opted this potential within a second strategic imperative in the form of efficiency seeking (ES). Here production of specific existing goods is again relocated to a particular region, but now with the object of sharpening the cost-efficiency of their manufacture in order to enhance (or defend) their competitiveness in those (usually higher-income) markets where they are already well established. Compared to the

¹ The specification of the McFadden technique does not allow the usage of attributes that are not associated with the dependent variable. Thus, incorporation of subsidiary characteristics would make the model unspecified.

multi-domestic context of MS subsidiaries, such export-oriented ES operations represent the emergence of more interdependent global strategies and manifest one aspect of the modern MNC as a differentiated network.

Both MS and ES represent ways in which MNEs seek to enhance the benefits they can secure from their mature competitive technologies, as embodied in successful established products. By contrast our third strategic motivation, knowledge seeking (KS), relates to the internationalisation of the ways in which these companies pursue the medium- and long-term regeneration of their competitive scope. This reflects a second development (alongside freer trade) that has conditioned the strategic evolution of globally-competing enterprises, i.e. the greatly increased dispersion of the sources from which they can acquire key inputs into their creative/learning processes (market heterogeneity and technological heterogeneity). Of the variety of ways in which MNEs exercise the KS motivation (in effect involve themselves within the national system of innovation of their host countries) localised product development is the one most likely to be reflected in the MNCs analysed here.

A well-founded hypothesis in the relevant literature is the market potential as captured by the respective region's market size. Although more relevant within national boundaries, regional income has an important role to play especially if goods produced are costly to transport. It provides a good measure of the respective local demand. Local GDP per capita (*gdpc_euro*) is used here in order to capture the effect of regional market on location choices. This variable clearly mirrors the market seeking motivations of MNCs described above as MNCs respond to local needs and care about directly catering local/regional markets.

Taking advantage of endowment availability is a major concern of investors and an established corollary in traditional localization theories. Firms require a set of primary inputs in order to operate, with labour being the most important one. Wage considerations would, thus, impulse on investors' choices within the framework of profit maximization. The average earnings (*earn_na*) are used as a proxy for the labour cost and capture the efficiency seeking motivation and its respective need for upgraded and elaborated inputs in production emerging from increased competition induced by globalization forces. One aspect complementing this efficiency seeking behaviour is the existence of exports towards EU (*expeu*) and non EU countries (*expouteu*). The existence of exports demonstrates the availability of well developed

transportation and other networks that facilitate local production and exporting at a later stage the products or services.

Related to these are expenditures on Research and Development (R&D) by businesses operating in the same region. R&D expenses (*r_d_bus*) provide an indication both of the existence of a technological base and the potential for positive externalities arising from the interaction through upstream and downstream networks. R&D is expected to exhibit a positive sign unless a centripetal force would enact due to fear of competition.

Local infrastructural costs are undoubtedly a key factor affecting the decision to establish a plant. House prices (*houspr*) are one of the most common used indicators for proxying infrastructural costs.

Existence of available regional workforce is captured by the unemployment rate of the region (*ur*). This would demonstrate the existence of under explored factors of production and thus the existence of cheap available labour force.

Assistance and motives provided by the UK government through subsidies or other preferential modes of assistance are then examined to assess their effect on production location. The amount of government expenditure on regional preferential assistance to industry (*gov_ass*) is the measure used.

6. RESULTS AND DISCUSSION

We proceeded in our analysis in two steps. Our first step was to test the overall impact of the external environment as discussed in the previous section on the MNCs decision to locate and keep their presence in each region. Different combinations of the existence of alternative measures of the MNCs motivations were used and the results are presented in table 5. It is worth mentioning that this is a first approach to MNCs motivations when deciding whether or not to keep their presence in a region and thus the model captures primarily the MS, ES and KS motives (models one, two and three). Model four includes the government's assistance. Our second step was to exclude the agricultural sector and differentiate between services and manufacturing. Our key aim was to capture any existing motivational differences between manufacturing and services MNCs.

The overall explanatory power of the model is high with the Chi square always being statistically significant and the Pseudo R square high for this type of

estimation. The Log-Likelihood as well as the Akaike Information Criterion reveals that model four has the highest explanatory power amongst the four, i.e. the inclusion of variables capturing the governmental assistance improves the predictability of the model.

Insert table 5 here

Gross domestic product per capita, capturing the market size is always positive and significant. The existence thus of a foreign affiliate is strongly related with the existence of a prosperous local market. Our proxy for labour costs also shows consistently the hypothesised sign, being negative and significant across the different specifications. On the other hand the export variables overall demonstrate the firms' need to primarily penetrate non EU markets. The R&D by businesses in the area is also positive and significant, whilst the other variables, i.e. unemployment and house prices demonstrate their hypothesised signs. Finally, government assistance influences negatively the existence of a MNC's subsidiary. This though on a first reading might seem contradictory, it can capture the overall status of the region as laggard and thus deter the entry by MNCs.

Table 6 takes the analysis a step further by differentiating between manufacturing and services.

Insert table 6 here

Although most results remain similar to the above, it is evident that market seeking motives apply only to the services and not to manufacturing. Contrary, unemployment influences only the manufacturing sector, whilst house prices the services with a strong negative effect. Again the government's assistance influences negatively the existence of MNCs' subsidiaries.

7. CONCLUDING REMARKS

This article mapped economic activities in United Kingdom and presented an empirical formulation of investors' decision-making. A McFadden's conditional logit model was incorporated to test for the model's predictions, based on location decisions of 6348 plants in UK's counties for 2004. Estimation results suggest that firms' choices can be modelled in terms of economic factors prevailing locally. The consensus in regards to the nowadays empirically and theoretically established notion of spatial clusters is confirmed for the case of UK, with firms of the same sector locating close to each other in order to benefit from positive externalities. Typical market variables such as market size and labour costs as well as advanced infrastructure, human capital and knowledge creation constitute an influx of necessary conditions that induces undertaking production in a particular place.

On the other hand, the picture of the influence exerted by public incentives is mixed. Government's assistance is of no interest to potential investors at the first place or acts as a deterrent. This is of particular interest to national and European authorities concerned with regional integration, as the provision of aid is not a reinforcing power by itself, unless it boosts development.

Future research may explore more thoroughly regional location determinants for an expanded time span. Another interesting extension would be to investigate regional attractiveness focusing on specific sectors besides the wide classification of manufacturing versus services sectors. This would allow us for more concrete implications especially in regards to European and national policies.

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TABLES AND FIGURES

Table 1. Available Variables and Description

w_force(m.)	workforce (millions)
w_force(%uk)	workforce as % of UK total
earn(%na)	weekly earnings (Ukp.) as % of national average
earnmen	weekly earnings (Ukp.) men
earnwom	weekly earnings (Ukp.) women
gva(%uk)	regional gva as % of UK total
expeu	export trade to EU (Ukbillions)
expouteu	export trade outside EU (Ukbn)
Rdexp(m.)	R&D expenditure (Ukmillions)
houspr	house prices (av UK000s)
RD_educ	R&D performed within higher educational instituts
RD_gov	R&D perfomred within government establishments
Gov_ass	government expenditure on regional preferential assistance to industry (2001) (Ukmillion)
ur	unemployment rate 2003
empl_hightech(000)	employment in high tech sectors
R&D_bus	R&D performed within business
GVA(b.)	gross value added 2004
grgdp	real growth rate of regional GDP 2003
gdpc(euro)	gdp per capita in euro 2003
vexp(m.)	value of exports by region (Ukmillion) 2003
vimp(m)	value of imports by region (Ukmillion) 2003
earn(m)	weekly earnings (Ukpounds)

Source: UK online national statistics, UK Invest and the Department for Business, Enterprise and Regulatory Reform.

Table 2. Percentage of Firms by NUTS II Region

East Midlands	4.66%
East of England	14.13%
London	21.69%
North East	2.19%
North West	7.88%
Northern Ireland	0.88%
Scotland	5.21%
South East	16.51%
South West	9.18%
Wales	2.08%
West Midlands	8.48%
Yorkshire and the Humber	7.10%

Source: LexisNexis Corporate Affiliations Database & Authors' Calculations

Table 3. Percentage of Firms by NUTS II Region and Type of Firm

	International Firms	US Private Firms	US Public Firms	Total
East Midlands	3.37%	0.35%	0.95%	4.66%
East of England	9.37%	0.85%	3.91%	14.13%
London	17.61%	1.04%	3.04%	21.69%
North East	1.69%	0.13%	0.38%	2.19%
North West	6.00%	0.39%	1.48%	7.88%
Northern Ireland	0.68%	0.02%	0.19%	0.88%
Scotland	3.84%	0.16%	1.21%	5.21%
South East	10.84%	1.12%	4.55%	16.51%
South West	5.94%	0.58%	2.66%	9.18%
Wales	1.42%	0.05%	0.61%	2.08%
West Midlands	6.40%	0.58%	1.50%	8.48%
Yorkshire and the Humber	5.50%	0.44%	1.17%	7.10%
Total	72.65%	5.70%	21.64%	100.00%

Source: LexisNexis Corporate Affiliations Database & Authors' Calculations

Figure 1. Density of Firms in UK NUTS II Regions (1 dot = 1 firm)



Figure 2. Average Employment of Firms by UK NUTS II Region

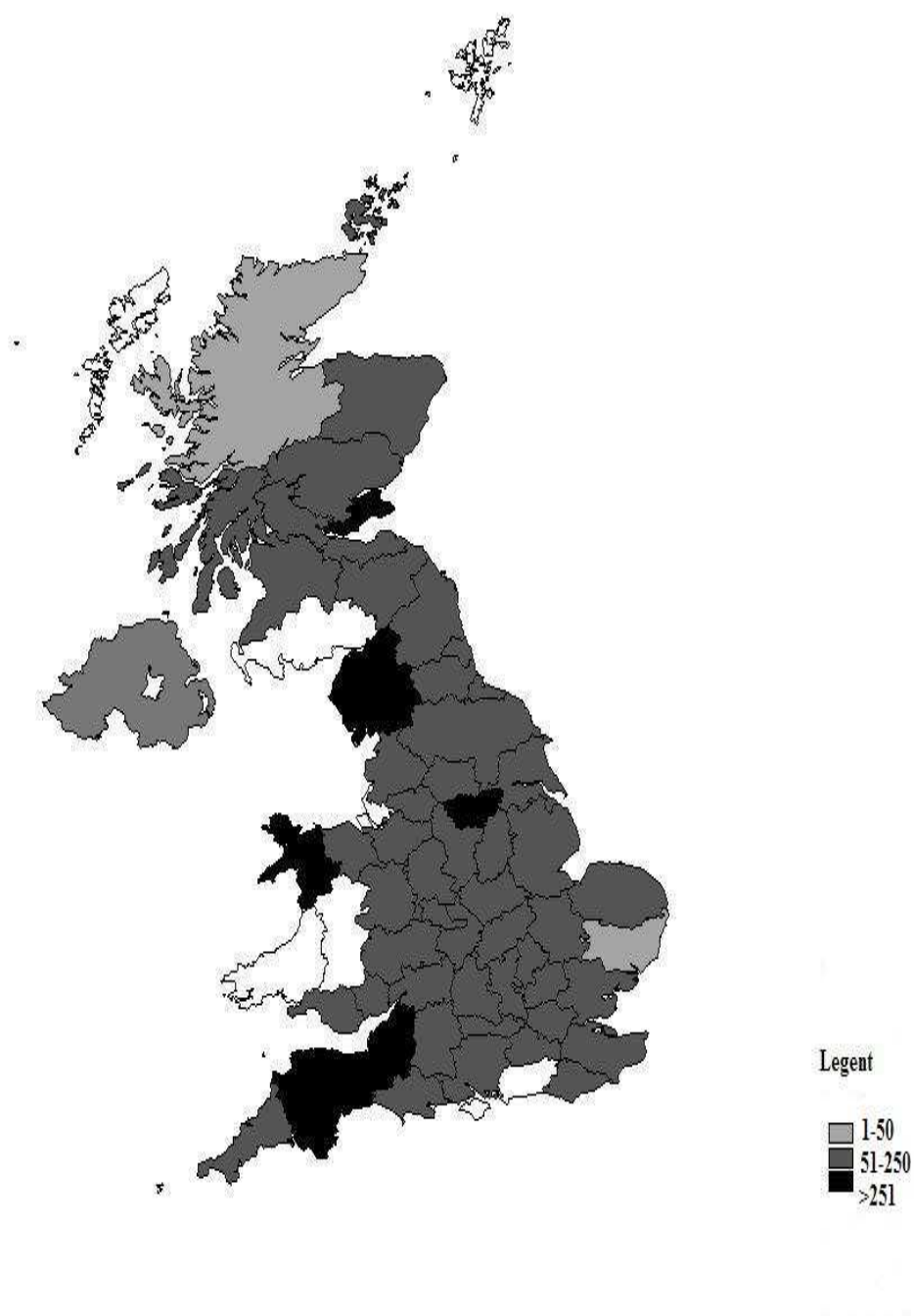


Figure 3. Average Age of Firms by UK NUTS II Region

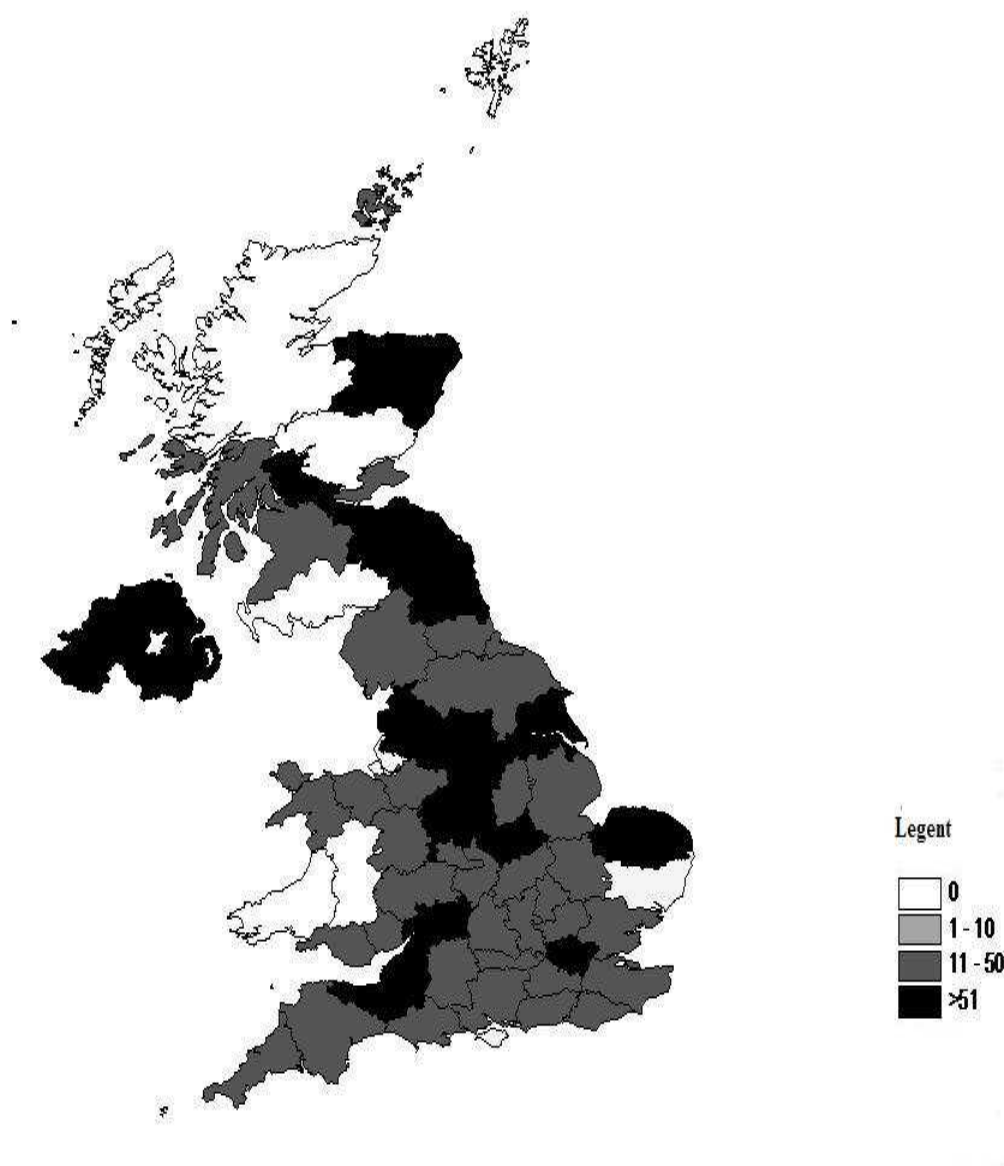


Table 4. NUTS II Regional Characteristics

	East Midlands	East of England	London	North East	North West	Northern Ireland	Scotland	South East	South West	Wales	West Midlands	Yorkshire and the Humber
w_force(m.)	2.1	2.7	3.7	1.2	3.2	0.8	2.5	4.1	2.5	1.3	2.5	2.4
w_force(%uk)	7.2	9.3	12.5	4.1	11.0	2.8	8.6	14.1	8.6	4.5	8.6	8.3
earn(m)	406.7	428.7	555.8	385.5	407.2	387.0	409.6	450.0	401.0	389.1	402.5	399.3
earn(%na)	94.3	99.5	128.9	89.4	94.4	89.7	95.0	104.4	93.0	90.4	93.3	92.6
earnmen	450.0	476.8	619.9	424.2	446.7	409.5	446.0	497.3	443.8	425.7	440.8	435.2
earnwom	334.8	356.7	491.8	330.6	350.0	355.8	361.0	383.3	340.2	334.8	345.0	339.8
gva(%uk)	6.4	9.7	16.0	3.3	9.9	2.2	7.9	15.3	7.6	3.8	7.9	7.3
expeu	9.2	11.1	9.8	5.4	10.5	2.8	6.3	17.7	6.3	5.4	8.2	6.9
expouteu	6.8	8.1	16.5	3.1	8.8	1.7	6.3	14.5	4.0	3.0	7.1	5.1
houspr	191.2	240.5	314.2	184.2	191.0	150.6	175.9	276.4	220.8	195.7	196.8	183.6
Rdexp(m.)	1174.0	4201.0	2119.0	441.0	1976.0	233.0	1367.0	4661.0	1782.0	482.0	853.0	863.0
RD_educ	223.0	412.0	1069.0	158.0	363.0	100.0	575.0	614.0	192.0	175.0	228.0	347.0
RD_gov	22.0	336.0	279.0	2.0	54.0	17.0	271.0	583.0	231.0	43.0	38.0	134.0
R&D_bus	929.0	3453.0	771.0	281.0	1559.0	116.0	521.0	3464.0	1359.0	264.0	587.0	382.0
Gov_ass	7.3	0.9	1.2	36.2	32.1	130.8	126.7	4.3	6.5	122.5	12.0	7.7
ur	5.9	4.2	7.1	6.6	5.1	5.4	5.7	3.9	3.9	4.6	5.9	5.5
empl_hightech(000)	2038.0	2710.4	3442.6	1076.6	3072.3	710.4	2396.3	4016.8	2410.1	1309.3	1104.5	2317.8
GVA(b.)	6.5	10.0	16.4	3.4	10.1	2.3	8.2	15.7	7.8	3.9	8.1	7.5
grgdp	3.2	3.3	1.9	2.7	2.4	2.2	2.7	2.4	2.4	2.8	2.2	3.1
gdpc(euro)	24414.5	25892.8	40401.5	21281.8	23723.5	21431.5	25785.1	29319.5	24962.8	21142.1	24316.1	23733.3
vexp(m.)	4.0	5.1	5.7	2.4	5.1	1.1	4.0	7.2	2.7	2.4	3.7	2.8
vimp(m)	3.1	9.9	7.3	1.4	3.9	1.0	1.4	16.4	2.1	1.2	4.8	2.9

Source: UK online national statistics, UK Invest and the Department for Business, Enterprise and Regulatory Reform and Authors' Calculations

Table 5. Conditional Logit Estimation with Robust Standatrdr Errors (Dependent Variable: Location Selection)

	one	two	three	four
gdpc_euro_	0.001*** (11.532)	0.002*** (7.033)	0.001*** (8.659)	0.001*** (6.013)
earn__na_	-0.031*** (-3.302)	-0.053*** (-4.425)	-0.204*** (-13.094)	-0.139*** (-8.261)
expeu	0.170*** (14.019)	0.015 (0.562)	-0.351*** (-9.517)	-0.360*** (-10.659)
expouteu	-0.162*** (-7.976)	0.026 (0.728)	0.386*** (8.982)	0.421*** (10.74)
ur		-0.137*** (-4.576)	0.142*** (3.984)	-0.153*** (-3.586)
houspr		0.005*** (3.095)	0.014*** (7.982)	-0.001 (-0.474)
r_d_bus			0.001*** (15.169)	0.002*** -11.216
gov_ass				-0.008*** (-15.383)
N	6348	6348	6348	6348
Chi Square	2563.82	2609.62	2848.73	3102.65
Pseudo R Square	0.082	0.0835	0.0911	0.0992
Log Likelihood	-14400.0	-14300.0	-14200.0	-14100.0
AIC	28714.24	28672.44	28435.33	28183.41

t-stats in parenthesis

* significant at 10%, ** significant at 5%, *** significant at 1%

Table 6. Conditional Logit Estimation with Robust Standatrdr Errors (Dependent Variable: Location Selection, Services and Manufacturing)

	Services	Manufacturing
gdpc_euro_	0.002*** (7.714)	0.002 (1.314)
earn__na_	-0.168*** (-6.398)	-0.151*** (-6.191)
expeu	-0.359*** (-7.407)	-0.329*** (-7.037)
expouteu	0.377*** (6.712)	0.445*** (8.346)
ur	-0.100 (-1.524)	-0.202*** (-3.665)
houspr	-0.009*** (-2.814)	0.004 (1.540)
r_d_bus	0.001*** (10.233)	0.000*** (5.001)
gov_ass	-0.009*** (-10.328)	-0.008*** (-10.369)
N	3664	2622
Chi Square	2633.48	735.81
Pseudo R Square	0.1698	0.0619
Log Likelihood	-7559.130	-6112.346
AIC	15134.260	12240.692

t-stats in parenthesis

* significant at 10%, ** significant at 5%, *** significant at 1%