Firm Heterogeneity and the Structure of European Multinational Activity: an Empirical Analysis[1]

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(very preliminary)

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Abstract:
This paper explores the importance of firm heterogeneity to explain the structure of European multinational activity. Our analysis is based on a large data set taken from AMADEUS which covers 33 European countries. The results presented suggest that he number and the size of affiliates which are owned by European multinational firms are positively associated to the size and the productivity of their parent firms. Furthermore, country characteristics usually included in gravity equations are related to the number of domestic entrants and to the sales of affiliates in the countries where they operate according to the expected signs.

JEL Codes: F20, F23
Keywords: Multinationals, productivity, country characteristics.

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1. Introduction

This paper explores the importance of firm heterogeneity to explain the structure of European multinational activity. Our analysis is based on a large data set taken from AMADEUS which covers 33 European countries.

There is a large body of theory which explains the sorting of heterogeneous firms into modes of foreign market entry (see Helpman, 2010, for a survey of this literature). There is also a large set of empirical work showing that multinationals are systematically differnts from exporting and non-exporting firms (Girma, Kneller and Pisu (2005) and Tomiura, 2005) or showing that the scope (the number of affiliates the multinational owns in foreign countries) and their scale (the size of these affiliates) is associated to the characteristics of the parent firm (Yeaple, 2009).

To organize our empirical work we take as main reference the model of Yeaple (2009). We examine three questions. The first one concerns the relationship between the productivity of parent firms and their multinational activity. In particular we examine if the number of affiliates owned in foreign countries by European multinational firms and the size of these affiliates are related to the productivity of parent firms. The second question concerns the relationship, at an aggregate level, between country characteristics and the structure of European multinational activities. We consider three elements of this activity: the average size of affiliate firms, the number of affiliate firms and the average productivity of parent firms. For the three variables we examine how they are related to country characteristics which are typically included in gravity equations. Third, we examine the foreign investment behavior of individual firms of five European countries: Germany, Spain, France, United Kingdom and Italy. A preliminary analysis of this question is included in section 3.

The data used in this paper is taken from the AMADEUS data set. We have constructed a data base of sample of manufacturing affiliate firms that are majority owned by European-

parent companies whose main sector is a manufacturing industry. The sample of firms contains 12,612 parent multinational firms controlled by residents of 33 different European countries, and 33,158 affiliates owned by the previous parent firms that operate in 60 countries.

The results presented suggest that for European multinational firms the number (scope) and the size (scale) of their affiliate firms are positively influenced by the size and the productivity of their parent firms. These results are similar to those obtained for US multinationals by Yeaple (2009). Country characteristics usually included in gravity equations are related to the number of domestic entrants and to the sales of affiliates in the countries where they operate according to the expected signs. Furthermore, country characteristics which predict a larger number of affiliate entrants in a given country also predict a lower average productivity of their parent firms. This latter result is not robust to the use of different measures of parent firm productivity.

The remainder of the paper is organized as follows. Section 2 derives the testable predictions, drawing on various economic models. Section 3 describes the data, the econometric approach and the definition of variables employed. Section 4 presents the estimation results. Section 5 concludes.

2. Background

(to be completed)

3. Data and econometric approach

The data used in this paper is taken from the AMADEUS (Analyse Major Databases from European Sources) data base. AMADEUS is a corporate data base which provides information on financial accounts and the ownership structure of firms from both the

perspective of shareholders and the point of view of affiliated companies. AMADEUS compiles the information from company accounts filed under legal obligation in European countries and provides information of more than 14 million companies from 43 different European countries.

From AMADEUS we construct a dataset which is a sample of manufacturing affiliate firms that are majority owned by a European-parent company whose main sector is a manufacturing industry (Engel, Proecher and Schmidt, 2010 uses the same data set for examining foreign entry of French firms).

We use the notion of "control" to determine whether a firm is a parent-multinational as well as the set of affiliates firms which are linked to each parent company. The OECD (2005) recommends classifying an enterprise within a country on the basis of the presence or absence of effective foreign control to determine whether an investment is a FDI. According to this criterion there is foreign control if a majority of ordinary shares (more than 50 percent of the capital) is held by a single foreign investor. Following this notion, our sample of firms considers a parent-multinational firm as a firm which owns at least one affiliate in a foreign country. Similarly, an affiliate firm is defined as an incorporated enterprise in which a non-resident investor owns more than 50 percent of the capital.

Our sample contains two types of firms: parent manufacturing multinational firms, which have at least one affiliate operating abroad in a manufacturing sector, and their affiliate firms. The set of firms included in the sample are controlled by residents of 33 different countries: Austria, Belgium, Bulgaria, Switzerland, Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, United Kingdom, Greece, Croatia, Hungary, Ireland, Iceland, Italy, Liechtenstein, Lithuania, Luxemburg, Latvia, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovenia, Slovakia and Ukraine.

For the purpose of the empirical exercises that are presented in the next section, we define two samples of firms which can be summarized as follows:

Number of:	**Sample 1**	**Sample 2**
Home countries (origin of the FDI)	33	31
Host countries	60	33
Parent firms	12,619	4,216
Affiliate firms	33,158	6,230

Sample 1 contains 12,619 parent firms from 33 European countries. These firms own 33,158 affiliate companies which are located in 60 different countries[2]. Some of these affiliate companies are located in non-European countries that are not covered by AMADEUS.

Sample 2 restricts the set of enterprises to parent and affiliate firms located in European countries covered by AMADEUS. In this sample we observe some basic characteristics of affiliate firms such as their NACE code and output (value of sales). Sample 2 contains 4,216 parent firms from 31 European countries. These firms own 6,230 affiliate companies in 33 European countries.

For every parent firm, both in samples 1 and 2, we observe the country in which the firms is located, the sector in which the firm operates, its sales to consumers in the country where is located, the capital stock (value of fixed assets), the value of intermediate inputs (material costs) and labor (the number of employees). We implement the Levinhson and Petrin (2003) routine to our data set for industries defined at the two-digit level to estimate TFP of the parent firm.

For every affiliate firm in sample 2 we observe the country where the firm is located, the NACE code in which the firm operates and its level of output (sales).

[2] We have excluded from the sample host countries which do not have at least 50 affiliate firms.l

4. Results

In this section we report three different types of results. The first set of results is related to one of the basic firm level predictions of Yeaple (2009) model: more productive firms have a larger multinational activity. We examine this prediction taking as reference the foreign investment behavior of individual European manufacturing firms. The second set of results examines, at an aggregate level, the relationship between country characteristics and the structure of European multinational activity. We consider three elements of this activity: the average size of subsidiary firms, the number of subsidiary firms and the average productivity of parent firms. In the third part of this section we present a preliminary analysis of the foreign investment behavior of individual firms of five European countries: Germany, Spain, France, United Kingdom and Italy.

Table 1 provides estimations of the propensity of European firms to invest in any given foreign country as a function of parent firm's size, measured both in terms of the logarithm of sales and employment. The dependent variable is a dummy variable equal to one if the individual firm owns an affiliate in a given country and zero otherwise. We estimate a linear probability model which allows us to control for host country, home country and industry fixed effects.

Both variables, sales and employment, are positive and significant, indicating that larger firms are more likely to own an affiliate in any given country. The results are very similar if host and home country fixed effects as well as industry fixed effects are controlled. The second column of Table 1 shows the results if both host and home country fixed effects are included and the third column shows the result if industry fixed effects are included. Similarly, columns fifth and sixth report the result obtained if the number of employees is used as a proxy of firm size.

The results presented in Table 2 correspond to the specification using the logarithm of parent firms TFP as the dependent variable. This measure of productivity is positive and statistically significant, indicating that more efficient firms are more likely to own an affiliate in a given foreign country. The results are very similar if host country, home country and industry fixed effects are included in the estimation.

As a robustness check we include the estimations reported in Tables 3 and 4. As indicated in section 3, we consider two samples of firms: a large one (sample 1) and a small one (sample 2). In Tables 3 and 4 we perform the estimations with sample 2, while the estimations of Tables 1 and 2 were performed with sample 1. In sample 2 the information we are able to observe is similar for the parent firm and the affiliate firm. This happens if both the parent and the affiliate firm are located in European countries which are covered by AMADEUS. Therefore, the main advantage of using the small sample of firms is that it permits to measure the characteristics of the parent and the affiliate firm at the same level of information. The estimations obtained with sample 2 are very similar to those presented in Tables 1 and 2.

Table 5 shows the results of regressing the logarithm of foreign affiliate's sales on the logarithm of its parent firm's TFP, controlling for industry and country fixed effects. In the case of country effects, we control for both the country of origin of the foreign investment and the country of destination. The variable measuring TFP has a coefficient which is statistically significant, indicating that the size of affiliate firms is increasing in their parent's TFP. This result is very similar if country and industry effects are included in the estimation.

Overall, the results presented suggest that for European multinational firms the number (scope) and the size (scale) of their affiliate firms are positively influenced by the size and the productivity of their parent firms. These results are similar to those obtained for US multinationals by Yeaple (2009).

Next we report a second set of results which are obtained by regressing the logarithm of aggregate affiliate sales, as well as the number of affiliate firms, on a set of country characteristics which are usually included in gravity equations. The objective is to test how country characteristics affect the structure of multinational activity.

The main results are shown in Table 6. The first column reports the coefficient estimates obtained from regressing the logarithm of the aggregate sales of affiliates from firms operating in countries defined in sample 1 onto the set of gravity variables. This set includes Distance, the population and the GDP per capita of both the home and the host country where the multinational company owns an affiliate firm. Furthermore, two dummies are included as explanatory variables. The first dummy is equal to one if both the home and the host country have a common language. The second dummy is equal to one if both countries belong to the EU.

The sales of affiliates of European multinational firms in host countries are increasing in a country's population and its per capita GDP, both for the country of origin of the multinational firm and for the host country of the affiliate firm. Furthermore, local sales of affiliates are higher if both countries are members of the EU. Sharing a common language does not have any significant effect in the volume of sales. Affiliate sales are also strongly decreasing in the distance: a 10 percent increase in the distance between the home and the host country is associated with a 11.4 percent reduction of affiliate sales. Overall, the gravity variables account for 0.429 of the variation across countries as indicated by the R-squared.

Column 2 in Table 6 reports the coefficients obtained by regressing the logarithm of the number of European multinationals that own an affiliate in a given country on the set of country characteristics. The coefficient estimates have the same sign as those in column 1. The magnitude of the coefficients, in absolute value, is slightly smaller than the

coefficients in column 1. For example, a 10 percent increase in the size (population) of the host country is associated with a 4.1 percent increase in the number of European affiliates present in that country and a 6.0 percent increase in the sales of the affiliate firms in the same country. This implies, other things being equal, that more than half of the variation in affiliate sales is accounted by the variation in the extensive margin (the number of affiliate firms entering the host market). For other variable as per capita GDP of the host country, the extensive margin accounts for 80 percent of the variation of affiliate sales.

Column 3 reports the coefficients estimated from regressing the average sales of European parent firms that own an affiliate in a given country on the same set of country characteristics as in columns 1 and 2. According to the predictions of Yeaple (2010) model, the coefficients reported in column 3 should be opposite in sign to the coefficients reported in column 2 (excluding the variables capturing the characteristics of the home country of the parent firms)[3]. This prediction is consistent with the data. The coefficients associated with the variables *distance*, *population*, *per capita GDP* of the host country, EU and Common language dummies, all are opposite in sign to their corresponding estimates in column 2 . Of the five variables, distance and per capita GDP are not statistically significant.

In Yeaple's (2009) model, the value of the sales of parent firm in their home country are a sufficient statistic for the average productivity of parent firms which own an affiliate in a foreign country. For this reason we include in column 3 the average sales of parent firms as a measure of productivity. As a robustness check of this proposition we include in column 4 the results obtained using the TFP of the parent firm as the dependent variable. The coefficient estimates shown in column 4 differ in their sign from those shown in column 3. Overall, the use of parent's TFP as a measure of average productivity do not confirm the expected sign pattern that it is obtained using the sales of parents firms as a

[3] According to the structural model of multinational activity developed by Yeaple (2010) the coefficients on the variables reported in column 3 should be equal to $-(\sigma-1)/k$ multiplied by the coefficients of the same variable in column 2 (the equation for the number of affiliates). The expression $(\sigma-1)/k$ is an inverse measure of the degree of size dispersion across firms.

measure of productivity. The coefficient on the variable *distance* is decreasing and statistically significant. The coefficients associated to the variables *population* and *per-capita GDP* of the host country are both positive, but not statistically significant in the first variable. The UE a common language dummies have their expected signs.

As an additional robustness check we estimate the same specifications as those included in Table 6 but using a sample in which the unit of observation is the pair country-industry. In Table 6 the unit of observation is the pair country-country. As suggested by Yeaple (2009) the benefit of considering observations country-industry is the control of unobserved heterogeneity across industries. There is also a drawback from using country-industry pair observations: the number of industries with affiliate entries in a given country decreases substantially and there is no easy way to accommodate a large amount of observations with zero.

Table 7 shows the results obtained using the country-industry sample. The sign patter of the coefficients shown in Table 7 is almost identical to the pattern of Table 6. The main difference between both sets of coefficients is that the absolute magnitude of the coefficients in columns 1 and 2, which refer to the aggregate sales and the number of affiliate firms in a given country, is smaller. This result might be one of the consequences of controlling for sectorial heterogeneity. The coefficients shown in column 3 confirm that the average size of parent firms, as a statistic of average productivity, continue to have opposite sign to those in column 1 and 2. However, this pattern does not hold when the average productivity is measured by the TFP of the parent firm.

An additional robustness check is included in Table 8. Here the specification, as in previous regressions, is obtained from regressing different attributes of affiliate and parent multinationals firms on a set of country characteristics. However, the specification in Table 8 only includes variables of the host country where the multinational firm owns an affiliate company and at the same time we include a set of country fixed effects that correspond

to the country of the parent firm. This specification can be interpreted as equivalent to the one in Yeaple (2009).

Column 2 of Table 8 confirms that the variables included in the specification account for much of the variation in the number of affiliate firms as indicated by the R-squared of 0.720. The sign pattern of the coefficients is similar to the pattern obtained in column 3, which reports the coefficients obtained from regressing the logarithm of the average productivity of the parent firm (measured by their sales) on the set of country variables. These coefficients are opposite in sig to those of column 2. Therefore, we confirm the same pattern as in Tables 6 and 7. Similarly, we obtain a similar result for column 4: the pattern of opposite signs does not hold if average productivity is measured by the TFP of the parent firm. This is also similar to the results from Tables 6 and 7.

In the third and final part of this section we present a preliminary analysis of the foreign investment behavior of individual firms of five European countries: Germany, Spain, France, United Kingdom and Italy. At this stage we are able to present some preliminary evidence for Great Britain, Germany and Spain.

The evidence obtained for the United Kingdom is summarized in Tables 9.1 to 9.3. Next we make a few comments on the main results obtained for the United Kingdom. Table 9.1 shows that the propensity of UK firms to own an affiliate in a given foreign country is increasing in the size of the parent firm. This positive association does not hold for the TFP of the parent firm (see columns 4, 5 and 6). Table 9.2 shows that the scale (the volume of sales) of these affiliates is positively associated with the productivity of their parent firms (proxied by their sales). Finally, Table 9.3 shows some evidence on how country characteristics affect the structure of multinational activity. Column 1 shows the coefficients obtained by regressing the logarithm of the number of UK multinationals which own an affiliate in a given country on the set of host country characteristics. The pattern of signs is as expected. All coefficients are statistically significant except for the EU

dummy variable which is positive but not statistically significant. In column 2 all coefficients have the opposite sign to those in column 1. Distance, population and per-capita GDP of the host country, and the EU dummy are not significant. Finally, the pattern of signs for average productivity does not hold if productivity is measured by the TFP of the parent firm.

For Germany, Tables 10.1 to 10.3 summarized the main results. Table 10.1 shows that the number (scope) of German affiliate firms are positively associated with the size and productivity of their parent firms. Table 10.2 shows that the scale (the volume of sales) of these affiliates is positively associated with the productivity of their parent firms (proxied by their sales). Finally, Table 10.3 shows that patterns of signs of the coefficients obtained in the regression of the logarithm of the number of German multinationals which own an affiliate in a given country on the set of host country characteristics is as expected. In column 2 all coefficients have the opposite sign to those in column 1 confirming the predictions of Yeaple (2009) model. Finally, the pattern of signs for average productivity does not hold if productivity is measured by the TFP of the parent firm.

The evidence obtained for Spain is summarized in Tables 11.1 to 11.3. Concerning the relationship between the scope of multinational activity and the characteristics of the parent firm, the results obtained for Spain are very similar to those obtained for the UK. Table 11.1 shows that the propensity of Spanish firms to own an affiliate in a given foreign country is increasing in the size of their parent firm. This positive association does not hold for the TFP of the parent firm (see columns 4, 5 and 6). Table 11.2 shows that the scale (the volume of sales) of these affiliates is positively associated with the productivity of their parent firms (proxied by their sales). Finally, Table 11.3 shows that the coefficients obtained by regressing the logarithm of the number of Spanish parent firm which own an affiliate in a given country on the set of host country characteristics have the expected sign pattern (column 1). In column 2 all coefficients have the opposite sign to those in column 1. Distance, population and the EU dummy are not significant. Finally, the pattern

of signs for average productivity does not hold if productivity is measured by the TFP of the parent firm.

5. Conclusions

(to be completed)

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Table 1
The Scope of European Multinational Firms: Propensity to Invest in a Foreign Market as a Function of Parent Firm's Size
(large sample: 12619 parent firms)

	(1)	(2)	(3)	(4)	(5)	(6)
Parent size (sales)	0.0167*** (0.0001)	0.0170*** (0.0001)	0.0178*** (0.0001)			
Parent size (employees)				0.0171*** (0.0001)	0.0182*** (0.0001)	0.0183*** (0.0001)
Home country FE	No	Yes	Yes	No	Yes	Yes
Host country FE	No	Yes	Yes	No	Yes	Yes
Industry FE	No	No	Yes	No	No	Yes
Number of observations	744531	744531	744531	744531	744531	744531
R-Squared	0.0166	0.105	0.107	0.019	0.105	0.108

Notes: The dependent variable is one if the firm own an affiliate in country i and zero otherwise

Table 2
The scope of European Multinational Firms: Propensity to invest in a foreign market as a function of parent firm's TFP
(large sample: 12619 parent firms)

	(1)	(2)	(3)
Parent firm's TFP	0.0055*** (0.0003)	0.0037*** (0.0003)	0.0032*** (0.0003)
Home country FE	No	Yes	Yes
Host country FE	No	Yes	Yes
Industry FE	No	No	Yes
Number of observations	744531	744531	744531
R-squared	0.001	0.086	0.089

Notes: The dependent variable is one if the firm own an affiliate in country i and zero otherwise

Table 3

The Scope of European Multinational Firms: Propensity to Invest in a Foreign Market as a Function of Parent Firm's Size
(small sample: 4216 parent firms)

	(1)	(2)	(3)	(4)	(5)	(6)
Parent size (sales)	0.0078*** (0.0003)	0.0078*** (0.0003)	0.0081*** (0.0003)			
Parent size (employees)				0.0081*** (0.0003)	0.0083*** (0.0003)	0.0083*** (0.0003)
Home country FE	No	Yes	Yes	No	Yes	Yes
Host country FE	No	Yes	Yes	No	Yes	Yes
Industry FE	No	No	Yes	No	No	Yes
Number of observations	139128	139128	139128	139128	139128	139128
R-Squared	0.005	0.083	0.083	0.005	0.084	0.084

Notes: The dependent variable is one if the firm own an affiliate in country i and zero otherwise

Table 4
The Scope of European Multinational Firms: Propensity to Invest in a Foreign Market as a Function of Parent Firm's TFP
(large sample: 4216 parent firms)

	(1)	(2)	(3)
Parent firm's TFP	0.016** (0.0006)	0.0005 (0.0007)	0.0011 (0.0007)
Home country FE	No	Yes	Yes
Host country FE	No	Yes	Yes
Industry FE	N0	No	Yes
Number of observations	139128	139128	139128
R-squared	0.001	0.086	0.089

Notes: The dependent variable is one if the firm own an affiliate in country i and zero otherwise

Table 5
The Scale of European Multinational Firms: The Size of Subsidiary Firms as a function of their parent firm's characteristics
(small sample: 4216 parent firms)

	(1)	(2)	(3)	(4)	(5)	(6)
Parent size (sales)	0.5465*** (0.0100)	0.5073*** (0.0109)	0.4636*** (0.0118)			
Parent TFP				0.0797*** (0.0300)	-0.0443 (0.0304)	0.0965*** (0.0325)
Home country FE	No	Yes	Yes	No	Yes	Yes
Host country FE	No	Yes	Yes	No	Yes	Yes
Industry FE	No	No	Yes	No	No	Yes
Number of observations	6230	6230	6230	6230	6230	6230
R-Squared	0.323	0.376	0.396	0.001	0.165	0.244

Notes: The dependent variable is the size of subsidiary firms from a given parent firm in country i

Table 6
The Structure of Aggregate European Multinational Activity and Country Characteristics

	(1) Aggregate sales of subsidiary firms	(2) Number of subsidiary firms	(3) Productivity (average sales of parent firms)	(4) Productivity (average TFP of parent firms)
Distance	-1.140***	-0.366***	0.032	-0.112**
Population host country	0.602***	0.414***	-0.073**	0.016
GDP per capita host country	0.537***	0.422***	-0.049	0.075**
Population home country	0.758***	0.742***	0.668***	0.347***
GDP per capita Home country	1.641***	1.194***	1.425***	1.039***
Dummy EU	0.832***	0.422***	-0.506***	-0.455***
Common language	-0.335	0.170*	-0.417**	-0.584*
Number of observations	426	995	995	995
R-Squared	0.430	0.523	0.406	0.336

Table 7
The Structure of Aggregate European Multinational Activity and country characteristics, Disaggregated by Two-Digit Industry

	(1) Aggregate sales of subsidiary firms	(2) Number of subsidiary firms	(3) Productivity (average sales of parent firms)	(4) Productivity (average TFP of parent firms)
Distance	-0.488***	-0.199***	0.139***	-0.078***
Population host country	0.340***	0.253***	-0.091***	0.020***
GDP per capita host country	0.530***	0.237***	0.009	0.059***
Population home country	0.389***	0.302***	0.471***	-0.140***
GDP per capita Home country	0.791	0.443***	1.239***	1.0322***
Dummy EU	0.505***	0.252***	-0.203***	-0.275***
Common language	-0.189	0.219***	-0.305***	-0.215***
Number of observations	2283	7242	7242	7242
R-Squared	0.243	0.374	0.332	0.366

Table 8
The Aggregate Structure of European Multinational Activity and country characteristics, including home country fixed effects

	(1) Aggregate sales of subsidiary firms	(2) Number of subsidiary firms	(3) Productivity (average sales of parent firms)	(4) Productivity (average TFP of parent firms)
Distance		-0.388***	0.142***	0.036
Population host country		0.458***	-0.061**	0.047***
GDP per capita host country		0.456***	-0.077**	0.059***
Dummy EU		0.358***	-0.077	0.078
Common language		0.581***	-0.125	0.067
Number of observations		995	995	995
R-Squared		0.720	0.651	0.785

Table 9.1
United Kingdom
The Scope of Multinational Firms: Propensity to Invest in a Foreign Market as a Function of Parent Firm's Size and Productivity.

	(1)	(2)	(3)	(4)	(5)	(6)
Parent size (sales)	0.0097***	0.0097***	0.010***			
Parent productivity (TFP)				-0.002	0.002	0.001
Host country FE	No	Yes	Yes	No	Yes	Yes
Industry FE	No	No	Yes	No	No	Yes
Number of observations	50982	50982	50982	50982	50982	50982
R-Squared	0.012	0.115	0.118	-	0.105	0.109

Notes: The dependent variable is one if the firm own an affiliate in country i and zero otherwise

Table 9.2
United Kingdom
The Scale of Multinational Firms: The Size of Subsidiary Firms as a function of their parent firm's size

	(1)	(2)	(3)
Parent size (sales)	0.464***	0.457***	0.381***
Host country FE	No	Yes	Yes
Industry FE	No	No	Yes
Number of observations	368	368	368
R-Squared	0.336	0.458	0.420

Notes: The dependent variable is the size of subsidiary firms from a given parent firm in country i

Table 9.3
United Kingdom
The Structure of Aggregate Multinational Activity and country characteristics, disaggregated by Two-Digit Industry

	(1) Number of subsidiary firms	(2) Productivity (average sales of parent firms)	(3) Productivity (average TFP of parent firms)
Distance	-0.280***	0.076	-0.023
Population host country	0.273***	-0.018	0.019
GDP per capita host country	0.248***	-0.006	0.074***
Dummy EU	0.131	-0.672**	-0.072***
Common language	0.606***	-0.116	-0.109*
Number of observations	545	545	545
R-Squared	0.359	0.028	0.008

Table 10.1
Germany
The Scope of Multinational Firms: Propensity to Invest in a Foreign Market as a Function of Parent Firm's Size and Productivity.

	(1)	(2)	(3)	(4)	(5)	(6)
Parent size (sales)	0.016***	0.016***	0.025***			
Parent productivity (TFP)				0.006***	0.006***	0.005***
Host country FE	No	Yes	Yes	No	Yes	Yes
Industry FE	No	No	Yes	No	No	Yes
Number of observations	73632	73632	73632	73632	73632	73632
R-Squared	0.027	0.149	0.156	0.001	0.118	0.136

Notes: The dependent variable is one if the firm own an affiliate in country i and zero otherwise

Table 10.2
Germany
The Scale of Multinational Firms: The Size of Subsidiary Firms as a function of their parent firm's size

	(1)	(2)	(3)
Parent size (sales)	0.455***	0.477***	0.487***
Host country FE	No	Yes	Yes
Industry FE	No	No	Yes
Number of observations	816	816	816
R-Squared	0.302	0.406	0.437

Notes: The dependent variable is the size of subsidiary firms from a given parent firm in country i

Table 10.3
Germany
The Structure of Aggregate Multinational Activity and country characteristics, disaggregated by Two-Digit Industry

	(1) Number of subsidiary firms	(2) Productivity (average sales of parent firms)	(3) Productivity (average TFP of parent firms)
Distance	-0.091*	0.317***	0.080**
Population host country	0.327***	-0.368***	-0.0138
GDP per capita host country	0.290***	-0.336***	0.009
Dummy EU	0.501***	-0.569**	0.0312
Common language	0.333**	-0.215	0.0698
Number of observations	637	637	637
R-Squared	0.262	0.113	0.006

Table 11.1
Spain
The Scope of Multinational Firms: Propensity to Invest in a Foreign Market as a Function of Parent Firm's Size and Productivity.

	(1)	(2)	(3)	(4)	(5)	(6)
Parent size (sales)	0.008***	0.008***	0.009***			
Parent productivity (TFP)				0.0004	0.0004	0.001
Host country FE	No	Yes	Yes	No	Yes	Yes
Industry FE	No	No	Yes	No	No	Yes
Number of observations	71176	71176	71176	71176	71176	71176
R-Squared	0.00	0.12	0.12	0.00	0.11	0.11

Notes: The dependent variable is one if the firm own an affiliate in country i and zero otherwise

Table 11.2
Spain
The Scale of Multinational Firms: The Size of Subsidiary Firms as a function of their parent firm's TFP

	(1)	(2)	(3)
Parent size (sales)	0.668***	0.641***	0.520***
Host country FE	No	Yes	Yes
Industry FE	No	No	Yes
Number of observations	356	356	356
R-Squared	0.297	0.328	0.413

Notes: The dependent variable is the size of subsidiary firms from a given parent firm in country i

Table 11.3
Spain
The Structure of Aggregate Multinational Activity and country characteristics, disaggregated by Two-Digit Industry

	(1) Number of subsidiary firms	(2) Productivity (average sales of parent firms)	(3) Productivity (average TFP of parent firms)
Distance	-0.444***	0.086	-0.009
Population host country	0.368***	-0.083	0.027
GDP per capita host country	0.287***	0.193**	0.060**
Dummy EU	0.109	0.093**	-0.003
Common language	0.946***	-0.301	-0.155**
Number of observations	503	503	503
R-Squared	0.306	0.036	0.007

Apendix

Table A1
The Structure of Aggregate European Multinational Activity and Country Characteristics

	(1) Aggregate sales of subsidiary firms	(2) Number of subsidiary firms	(3) Productivity (average sales of parent firms)	(4) Productivity (average TFP of parent firms)
Distance	-1.140***	-0.775***	-0.093	-0.182**
Population host country	0.602***	0.439***	0.039**	0.050
GDP per capita host country	0.537***	0.167***	0.061	0.129***
Population home country	0.758***	0.453***	0.693***	0.247***
GDP per capita Home country	1.641***	0.939***	1.366***	0.943***
Dummy EU	0.832***	0.683***	-0.374**	-0.430***
Common language	-0.335	-0.380*	-0.502	-0.385*
Number of observations	426	426	426	426
R-Squared	0.430	0.511	0.308	0.336

Table A2.1

France

The Scope of Multinational Firms: Propensity to Invest in a Foreign Market as a Function of Parent Firm's Size and Productivity.

	(1)	(2)	(3)	(4)	(5)	(6)
Parent size (sales)						
Parent productivity (TFP)						
Host country FE	No	Yes	Yes	No	Yes	Yes
Industry FE	No	No	Yes	No	No	Yes
Number of observations						
R-Squared						

Notes: The dependent variable is one if the firm own an affiliate in country i and zero otherwise

Table A2.2

France

The Scale of Multinational Firms: The Size of Subsidiary Firms as a function of their parent firm's TFP

	(1)	(2)	(3)
Parent TFP			
Host country FE	No	Yes	Yes
Industry FE	No	No	Yes
Number of observations			
R-Squared			

Notes: The dependent variable is the size of subsidiary firms from a given parent firm in country i

Table A2.3
France
The Structure of Aggregate Multinational Activity

	(1) Number of subsidiary firms	(2) Productivity (average sales of parent firms)	(3) Productivity (average TFP of parent firms)
Distance			
Population host country			
GDP per capita host country			
Dummy EU			
Common language			
Number of observations			
R-Squared			

Table A3.1
Italy
The Scope of Multinational Firms: Propensity to Invest in a Foreign Market as a Function of Parent Firm's Size and Productivity.

	(1)	(2)	(3)	(4)	(5)	(6)
Parent size (sales)						
Parent productivity (TFP)						
Host country FE	No	Yes	Yes	No	Yes	Yes
Industry FE	No	No	Yes	No	No	Yes
Number of observations						
R-Squared						

Notes: The dependent variable is one if the firm own an affiliate in country i and zero otherwise

Table A3.2
Italy
The Scale of Multinational Firms: The Size of Subsidiary Firms as a function of their parent firm's TFP

	(1)	(2)	(3)
Parent TFP			
Host country FE	No	Yes	Yes
Industry FE	No	No	Yes
Number of observations			
R-Squared			

Notes: The dependent variable is the size of subsidiary firms from a given parent firm in country i

Table A3.3
Italy
The Structure of Aggregate Multinational Activity

	(1) Number of subsidiary firms	(2) Productivity (average sales of parent firms)	(3) Productivity (average TFP of parent firms)
Distance			
Population host country			
GDP per capita host country			
Dummy EU			
Common language			
Number of observations			
R-Squared			