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ORIGINAL PAPER

Scope, scale, and locational preferences: an analysis of emerging multinationals

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Abstract

This paper aims to examine the case of emerging multinationals, using a large sample of Spanish parent-subsidiary links obtained from ORBIS Bureau van Dijk. Three characteristics of multinational firms are specifically considered: their scope, scale, and location decisions. Our results confirm that more productive firms engage in greater multinational activity in terms of their scope (the number of foreign markets in which they invest) and scale (the volume of local sales by subsidiaries in foreign markets). The structure of multinational firms' activity is also analyzed from the perspective of host country characteristics. Distance and the relative labor costs of the host country are negatively related to the scope of foreign direct investment decisions, whereas the presence of a common language, host country size, and institutional quality positively influence decisions to invest abroad. In the manufacturing sector, host country tariffs positively correlate with the scope of multinational firms' operations, whereas regulatory trade barriers in host countries negatively influence investment decisions in the services sector. These results are robust to the control of endogeneity between parent firms' productivity and both the scope and scale of subsidiaries abroad.

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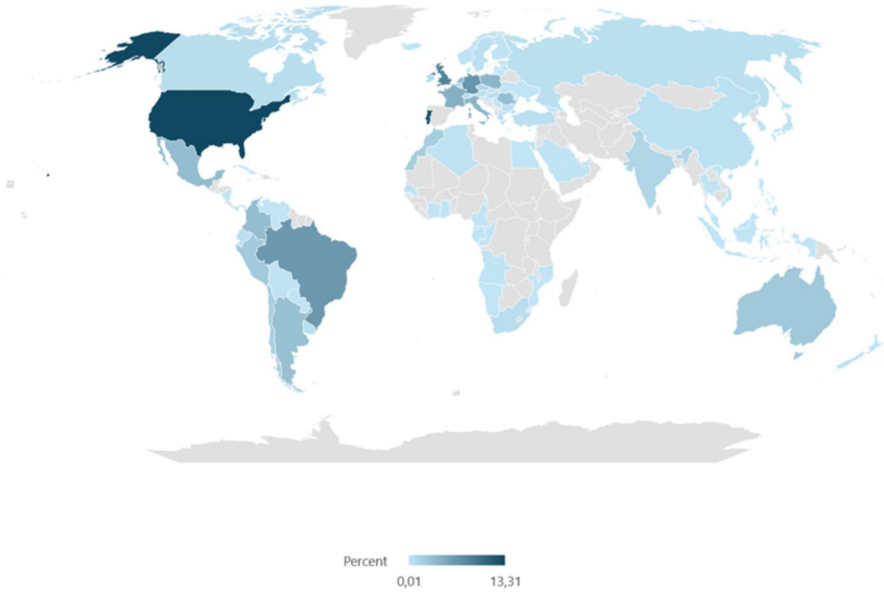
Graphical abstract



Keywords Multinational firms · Firm heterogeneity · Productivity · Location decision

JEL Classification F10 · F23 · L25 · R30

1 Introduction

Since the beginning of this century, several data sources have shown a growing and significant international presence of companies from developing and middle-income countries (UNCTAD 2006). In the last two–three decades, new global and regional players have emerged as new multinational companies in international markets. This paper aims to examine the characteristics of these firms taking as a reference the case of Spanish multinationals, which we consider to be a good illustration of these new and emerging players.

Spanish companies become significant players in the global expansion of foreign direct investment (FDI) over recent decades. This phenomenon has been aptly characterized as the "rise of Spanish multinationals" by Guillén (2005) and Guillén and García-Canal (2010). Reports from the United Nations Conference on Trade and Development (UNCTAD) confirm this trend, indicating that Spanish multinationals have consistently ranked among the top 10 countries in terms of FDI outflows at the global level in most of the years over the last two decades (UNCTAD 2023). A generation ago, there were no Spanish companies of international size. However, today,

some of them are among the largest companies in the world. According to Guillén and García-Canal (2010), Spain can be compared to countries like South Korea, Taiwan, and Singapore in that, in 1970, Spain was a middle-income country and, within three decades, a group of new Spanish multinational companies emerged in the global markets.

This paper presents a case study aimed at identifying the general characteristics of the multinational activities of Spanish firms. Two reasons make this case analysis particularly interesting. First, as indicated, Spain has been a major contributor to the recent expansion of multinational activity worldwide. Second, the expansion of Spanish multinationals has relied more on advantages related to their organizational and project execution knowledge, as well as advantages grounded in networks and relationships, rather than on possessing classical intangible technological assets (Guillén and García-Canal 2010). According to UNCTAD (2006), this is a general pattern observed in the behavior of emerging multinationals in recent times. Rather than relying on the possession of classical assets, such as the technology to produce a differentiated good or service, the advantages of new multinationals are more often based on other specific location and internalization assets. Therefore, to the extent that the case of Spanish multinationals illustrates the characteristics of these so-called new multinationals, the results presented here offer the possibility of a broader and more general interpretation that we link to what we have termed "emerging multinationals".

We use Helpman et al. (2004) model of multinational activity and heterogeneous firms to organize our empirical work. This approach combines two quite standard features in the literature on multinationals. The first is Brainard's (1997) proximity-concentration model, where firms must choose between exporting and foreign investment to access foreign markets. The second is Melitz's (2003) model, which identifies heterogeneous firms based on different levels of productivity reflecting differences in management ability, human capital, technology, and other resources that drive firm-level productivity.

We take the literature on heterogeneous multinationals as a reference for two reasons. First, this approach allows us to organize the analysis of a broad set of characteristics and attributes of our sample of multinational firms. Second, this perspective has not been used in previous studies to analyze Spanish multinational companies. Furthermore, our paper presents new empirical evidence for service firms, which have been underrepresented in previous research that has focused predominantly on the manufacturing sector. Notably, the most renowned Spanish multinationals are primarily in the services sector, including financial services, telecommunications, construction, and civil engineering, which is common for emerging multinationals from other countries. Another aspect we consider is the horizontal or vertical nature of FDI decisions, a key aspect of the literature on multinationals that has been scarcely covered.

The analysis focuses on two aspects of multinational firms (MNEs). Firstly, we measure the strength of the relationship between the probability of investing in a specific subsidiary serving foreign markets and the productivity of their parent firms (their scope). Secondly, we aim to examine the relationship between the size of multinational activity, defined by the volume of subsidiary sales in a specific market,

and their parent's productivity (their scale). In addition, the analysis considers the relationship between the overall level of multinational activity and host country characteristics. This relationship has been frequently analyzed in the empirical literature on FDI (see Head and Mayer 2014, for a review article) and allows us, in our case, to establish a general map of the location preferences of the sample of MNEs.

We examine the previous set of questions using a sample of Spanish multinational firms. To this end, we build an original sample of firms based on the ORBIS database from Bureau van Dijk. One of the novelties of this sample is that it is based on the identification of links between parent and subsidiary firms from both the manufacturing and service sectors. The baseline sample, which requires observing at least some basic information for the parent firm, contains 1,831 Spanish parent firms with foreign production through subsidiaries in 92 host countries. Based on information about parent-subsidiary ownership links obtained from ORBIS, we can identify 7,767 subsidiaries with production abroad ultimately owned by a Spanish parent firm. This number is close to the OECD figure for the total number of subsidiaries that are immediately owned by parent firms operating in Spain. According to OECD statistics, the number of Spanish subsidiaries that correspond to the concept "Inward activity of multinationals by investing country" in the year 2019 is 11,097 (see OECD. Stat). Since the number of subsidiaries in our sample is around 70% of the total number of subsidiaries abroad according to the OECD statistics, we consider that the analysis presented here almost fully reflects the characteristics and properties of the population of multinational firms.

The largest part of previous empirical literature on FDI in Spain refers to FDI inflows. Papers that concentrate on the determinants of FDI inflows in Spain at the aggregate, sectoral, and regional levels include Bajo-Rubio et al. (2010); Myro (2014); and Camarero et al. (2020), among others. The level and evolution of domestic demand, trade barriers, and relative labor costs have been identified as the main drivers of foreign FDI in Spain. A topic that has attracted particular attention concerns the existence of spillover effects, i.e., foreign multinationals channeling new foreign knowledge and technology. Álvarez and Molero (2005) and Álvarez (2014) confirm this positive effect for Spanish domestic firms operating in low-tech industries.

The interest in Spanish FDI outflows is more recent. Spain, a country that at the beginning of the 1990s lacked companies of international size, has been able to generate many truly global multinationals. Analysis that illustrates this interest in outflow FDI investment by Spanish multinationals include Guillen (2005); Gordo and Tello (2008); Guillén and García-Canal (2010); García-Canal (2013); Myro (2014); Gutiérrez-Portilla et al. (2019); Myro et al. (2024) and Ruiz (2024), among others.

Our paper presents a set of novel findings for the sample of Spanish multinational firms. First, we confirm that more productive firms exhibit greater multinational activity in terms of both their scope (the probability of investing in a foreign market) and their scale (the volume of local sales by subsidiaries in foreign markets). This result should be interpreted as self-selection: the more productive multinationals self-select for a greater scope of their international activities and a larger scale of operations abroad. To the extent that differences in productivity

across firms reflect differences in management ability, human capital, technology, and other resources, we confirm that these factors drive both the probability of investing in foreign markets and the scale of operations abroad. Both effects are statistically significant, though the magnitude of the scope elasticity is modest. These results are consistent with papers examining a similar question for countries such as Taiwan, Aw and Lee (2008), U. S. multinationals, Yeaple (2009), EU countries, Geishecker et al. (2009), France, Chen and Moore (2010) and Japan, Tanaka (2012, 2015). Concerning the magnitude of the relationship between the productivity of parent firms and the probability of operating through subsidiaries abroad, it is quantitatively very similar for Spanish multinationals and multinationals from OECD countries (see Fariñas et al. 2021a).

A second set of results concerns the analysis of emerging multinationals from the perspective of host country characteristics. We consider several host-country characteristics that have traditionally been used in the literature to explain multinationals' location choices (Head and Mayer 2014; Ghodsi 2020). Specifically, we examine the size of the host country, the presence of a common language, relative labor costs, distance, institutional quality, tariffs, and the restrictiveness of service trade. These characteristics are associated with the scope of multinational firms. The size of the host market, sharing a common language with the host country, and an index of institutional quality of the host destination are positively and significantly related to the scope of multinationals. Conversely, the relative labor costs between the host country and Spain and the distance to the host country are negatively and significantly related. Host country tariffs positively influence the scope of multinational firms in the manufacturing sector. Conversely, restrictions on services trade constrain foreign direct investment in firms within the services sector. One difference between the scope and scale equations results is that host country characteristics do not significantly affect the scale of operations of subsidiaries in services. The institutional quality of host countries is the only factor that positively influences the scale of operations abroad for firms in this sector. Finally, these results are robust to the control of endogeneity between the productivity of parent firms and their decision to invest abroad.

The paper is organized as follows. Section 2 offers the empirical framework we use to obtain the paper's results. Section 3 presents the characteristics of the dataset used in the paper along with the measurement issues and the definition of the variables. It also provides a descriptive analysis of the characteristics of Spanish multinational companies. Section 4 reports the results: first, the results concerning the estimates of scope equations; second, the estimates of the relationship between the scale of subsidiaries and the productivity of their parent firms. Two sections of the paper are devoted to robustness checks. Section 5 presents some results concerning endogeneity robustness checks, which address the issue of endogeneity in estimating the relationship between the productivity of the parent firm and its decision to open subsidiaries abroad. Section 6 checks whether the effect of parent firm productivity on the decision to invest abroad is not uniform across host market destinations. Section 7 concludes.

2 Empirical framework

This section of the paper introduces the empirical framework, which focuses on two basic aspects of multinational activity. Firstly, we consider the geographical scope of Spanish multinational firms. Secondly, we examine the scale of operations of these firms in international markets. Furthermore, the analysis also considers the relationship between host country characteristics and the structure of multinational activity. To organize these empirical questions, we rely on the literature on heterogeneous multinationals. As indicated in the introduction, this literature provides a solid foundation for our interest in examining a broad set of characteristics and attributes of Spanish multinationals. Models of multinationals with firm heterogeneity, which have become popular in recent years, identify the ownership advantage for an MNE to open a subsidiary in a foreign market by building on ideas from the OLI eclectic paradigm and knowledge capital, as well as certain country characteristics as potential location advantages for the firm (see Faeth 2008). In this section, we present these elements.

2.1 The scope of multinationals

Helpman et al. (2004) show that, given a set of reasonable assumptions about the relationship between the levels of fixed costs of producing at home, exporting and producing in a foreign country (the latter greater than the fixed cost of exporting, and this greater than the fixed cost of serving only the domestic market), the probability of investing in foreign markets is given by

$$y_{fj} = \begin{cases} 1 \; if \; \theta_f \geq \theta_j^* \\ 0 \; if \; \theta_f < \theta_j^* \end{cases} \tag{1}$$

where the indicator function y_{fj} is equal to 1 if firm f from a given country decides to open a subsidiary in a foreign market j and 0 otherwise, θ_f is the productivity of firm f and θ_j^* is the cutoff productivity level at which to enter market j from home market. Therefore, the firm's decision to open a subsidiary in host market j depends on the comparison between the firm's productivity level and the host country`s cutoff productivity. This cutoff to a specific market destination refers to those firms producing abroad from a given home market. Firms with productivity levels greater than the threshold level of productivity will invest in foreign market j.

Helpman et al. (2004), Yeaple (2009), and Chen and Moore (2010) have derived specific mathematical formulas to determine the critical level of productivity, denoted by θ_j^*. This critical level of productivity is influenced by different factors that affect the profitability of producing goods at home versus producing them abroad through a subsidiary. These factors are in turn determined by the characteristics of the destination market, technological advancements in the industry, and differences in costs between the home and host countries.

Taking as a reference the condition that links the probability of investing abroad to the critical level of productivity θ_j^*, we consider the next specification below, which follows with small modifications the framework proposed by Fariñas et al. (2021a):

$$\Pr(y_{fj} = 1) = \Phi(\alpha_0 + \gamma\theta_f + \widetilde{\delta}X_j + \delta_g + \varepsilon_{fj}) \tag{2}$$

where $\Pr(y_{fj} = 1)$ is the probability that firm f invests in host market j, θ_f was previously defined, and Φ is the normal cumulative distribution function. The specification assumes that the effect of firm productivity, θ_f, is uniform, γ, across host country destinations. Furthermore, some host country and bilateral characteristics that influence the cutoff level of firm productivity are observable. In particular, elements such as distance or other factors reflecting cultural proximity, which affect the fixed costs associated with foreign entry and are determinants of the firm's productivity cutoff level, can be introduced into the specification for this reason. Other more general bilateral characteristics such as the relative level of host-home production costs can also be included in the equation. We define the vector X_j as the set of observable host country characteristics and the vector of coefficient $\widetilde{\delta}$. Finally, specification (2) includes δ_g, a set of industry dummies and ε_{fj} is the error term.

The above expression describes the probability of investing abroad. It is linked to the productivity of parent companies and shows that more productive parent firms operate in a larger number of foreign countries. In other words, their scope of operations is broader. We have examined this prediction using data from Spanish multinational firms to measure the relationship between the change in the variability of the probability of producing through a subsidiary in a given foreign market and the change in the level of parent firms' productivity (scope elasticity). Section 4 presents the results of the estimation of specification (2) using a probit model.

2.2 The scale of operations of multinationals

For firms that have already decided to invest in foreign markets, models of heterogeneous multinationals have a second prediction, which refers to the scale of operations of these firms. Parent firms with greater productivity have affiliates with a higher volume of production abroad. As in the case of the decision to invest abroad, the scale of subsidiaries depends on host country characteristics that determine the level of profits of producing through a subsidiary in a foreign market. According to Yeaple (2009) and Chen and Moore (2010), the size of the host market and the relative costs of production at home and in the host country influence the scale of operations abroad. Other factors associated with the decision to enter foreign markets, such as the distance-transport costs and those fixed costs linked to the decision to open the subsidiary**,** do not affect their scale of operations.

Therefore, we can use an equation to examine whether more productive parent firms are more likely to own subsidiaries abroad with higher sales. The strength of heterogeneity across firms to characterize FDI decisions is measured

by the intensity of the relationship summarized in terms of the scale elasticity. We define the following empirical specification to estimate the scale elasticity:

$$s_{fj} = \alpha_0 + \beta\theta_f + \overline{\mu}Z_j + \delta_g + \vartheta_{fj} \tag{3}$$

where s_{fj} is the volume of aggregate sales (in natural logs) from all the subsidiaries under the control of a parent firm f that invests in host country j, θ_f denotes the productivity of parent firm f (in natural logs). Z_j is a vector of host country characteristics that are observable and influence the scale of operations of subsidiaries in host countries (market demand size and relative production costs). Additionally, δ_g is a set of industry dummies, and ϑ_{fj} is the error term.

The sample of firms used to estimate Eq. (3) corresponds to firms that have decided to open a subsidiary. Therefore, the total sample of parent firms deciding to open a subsidiary in a given destination, as described by condition (1), involves a much larger number of observations than the sample of firms used to estimate Eq. (3). This is because it includes parent firms that have decided not to open a subsidiary in a given host market, and consequently, foreign sales in those markets are zero. This self-selection is an outcome determined by firms' individual choices of whether or not to produce outside their home country.

To control for selection bias, we apply Heckman's two-step procedure (Heckman 1979). In the first step, a probit regression of the decision to invest in a given foreign market or not is estimated. Equation (2) offers a natural specification for the selection equation. The estimated inverse Mills ratio for each observation augments the estimation of Eq. (3) in the second step. Therefore, our approach for the estimation of the scale equation is based on Eqs. (2) and (3); both permit the application of a Heckman's two-step procedure.

A final consideration concerning identification issues completes our empirical approach. In the context of sample-selection models, if the non-linearity in the probit equation is slight, then the identification is rather weak (Cameron and Trevidi 2005). It is recommended in applied work to look for exclusion restrictions: in our case, variables that are significant in the selection equation but do not directly affect the outcome variable, the scale of the subsidiary. As indicated above, the theory of heterogeneous multinationals indicates that transport costs and fixed costs of entry in foreign markets determine the decision to open a subsidiary (selection) but not the scale of operations of subsidiaries. This offers a favorable context in which to look for exclusion restrictions. In previous literature applying a similar approach, Tanaka (2015) uses, for FDI decisions, the number of days required to start a business in a host market as an excluded variable, and Helpman et al. (2008) use, for trade flows, regulatory barriers to entry in foreign markets. The vector of variables Z_j in the scale Eq. (3) is different from the vector of variables X_j in the scope Eq. (2). This difference in notation intentionally reflects the existence of a set of variables that imply exclusion restrictions.

3 Data

The dataset is taken from the Bureau van Dijk ORBIS database, which provides information about the balance sheets and income statements of close to 400 million firms worldwide. This financial information is completed with data on the ownership structure of companies from both the perspective of shareholders in the capital structure of the (parent) company and shares of this company in the capital of other companies (subsidiaries).

Table 1 describes the number of parent firms and subsidiaries in our sample. The sample identifies 1,831 parent Spanish multinational firms that ultimately own 7,767 subsidiaries in 92 countries. Table 1 also provides the number of companies for the manufacturing and service sectors, which we analyze separately. In the total sample, firms from the energy, construction, and primary sectors are included in addition to manufacturing and services. Our database is a cross-section of firms identifying parent-subsidiary links for the year 2019.

The number of subsidiaries in our sample is quite close to the OECD figure for the total number of subsidiaries immediately owned by parent firms operating in Spain. According to OECD statistics, the number of Spanish subsidiaries corresponding to "Inward activity of multinationals by investing country" in 2019 was 11,097 (see OECD. Stat). As we have indicated in the introduction, given this number is quite close to the number of subsidiaries in our sample, we consider our analysis to be representative of the characteristics and properties of the population of Spanish multinationals.

The link between the parent and the subsidiary firm is defined using the criterion of "ultimate control" (OECD 2005), which considers both direct and indirect participation in the subsidiary's capital. The application of this criterion corresponds to the notion of the "Global Ultimate Owner" as defined by ORBIS and implies that the parent firm owns more than 50% of the capital of the subsidiary at every step (direct and indirect) of participation. By using this condition, we make sure that the subsidiary is effectively under the control of a parent firm from Spain.

Another condition we impose on the information extracted from ORBIS is that the parent firms have unconsolidated information. This requirement has the advantage of minimizing the volume of financial flows between parent firms and subsidiaries as the financial statement of the subsidiary is not consolidated with the information from parent firms. This is convenient for the problem of reverse causality when estimating the relationship between the productivity of the parent firm and its decision to open a subsidiary abroad. Still, it has the obvious disadvantage of reducing the number of firms in the sample.

Table 1 Number of Spanish parent firms and their subsidiaries. (Requiring that the variable Sales of parent firm is available)

	Parent firms	Subsidiaries
Total economy	1831	7767
Manufacturing	346	1107
Services	1258	4337

Apart from using unconsolidated accounting information, some basic consistency checks have also been applied to data to detect financial sub-items that do not add up to total items and outliers for the level of the firm's productivity within the same industry.

The large number of host countries together with the small number of countries in which each multinational invests abroad (almost one-third of the firms in the sample have subsidiaries in one or two countries out of the total of 92 countries) makes it difficult to estimate Eq. (2). For this reason, the definition of host destination markets used in this paper refers to the Classification of Geographic Regions, which the United Nations identifies. This classification distinguishes 22 geographic regions at the world level. According to the last *Standard Country or Area Codes for Statistical Use* (United Nations 1999), "these geographic regions are based on continental regions, which are further subdivided into sub-regions and intermediary regions drawn to obtain greater homogeneity in sizes of population, demographic circumstances and accuracy of demographic statistics."[1]

The rest of this section is devoted to the definition of variables included in Eqs. (2) and (3). Regarding the variables from ORBIS used at the firm level, the list includes output, material costs, value-added, fixed assets, and employment. Equations (2) and (3) have been estimated by taking the measure of a firm's total factor productivity (TFP) as the basic definition of parent firm productivity. TFP is estimated with accounting information of the parent companies obtained from ORBIS. Since firm-level TFP refers to t-1, the firm-level accounting information used to estimate production functions at the four-digit industry-level corresponds to the period 2018–2010. The methodology employed to compute TFP is the semiparametric estimator proposed by Levinsohn and Petrin (2003). Based on this approach, production functions were estimated for each four-digit industry, and estimated coefficients were used to calculate TFP at the firm level. The variables required for estimating TFP are based on information obtained from ORBIS, including value added (output measured by operating revenue turnover, minus material costs), fixed assets, employment and material costs. For the estimation of Eq. (3), the output of the subsidiary firm in market j is measured by the value of "operating revenue turnover" (SALES). Table 2 summarizes the description of these variables and their data sources.

The basic variables used to measure bilateral home-host characteristics (variables included in vectors X_j and Z_j) come from three different sources. Host basic economic indicators, such as the size of market destination (MKTSIZE) and host country tariffs (TARIFF), come from the World Bank. The Services Trade Restrictiveness Index (STRI), which measures regulations on services trade in host countries, is sourced from the OECD and the World Bank (see Geloso Grosso et al. 2015). A variable that measures the institutional quality of host countries (INSTQUAL) is derived from the Worldwide Governance Indicators of the World Bank

[1] These 22 geographic regions are Northern Africa, Eastern Africa, Southern Africa, Western Africa, the Caribbean, Central America, South America, Northern America, Central Asia, Eastern Asia, Southeastern Asia, Southern Asia, Western Asia, Eastern Europe, Northern Europe, Southern Europe, Western Europe, Australia and New Zealand, Melanesia, Micronesia, and Polynesia.

Table 2 Description of variables and data sources

Variable	Description	Source
COMLANG	Proportion of host countries that belong to a geographical region *j* that shares languages (mother tongue, lingua franca or second languages) spoken by between 9 and 20% of the population with Spain	CEPII
DIST	Log of average distance between Spain and all host countries that belong to a geographical region *j*	CEPII
INSTQUAL	Index of institutional quality computed as the simple average of four variables that refer to the regulatory quality of host countries, government effectiveness, the quality of rule of law (contract enforcement, property rights, etc.) and control of corruption	World Bank
MKTSIZE	Log of GDP of the countries included in each geographic region *j*	World Bank
RLABC	Relative hourly labor costs measured as the ratio of average hourly labor cost in each geographical region to hourly labor cost in Spain	Penn World Table
SALES	Log of total affiliate output (measured by operating revenue turnover) of parent firm f in market j	ORBIS
STRI	The OECD Services Trade Restrictiveness Index is calculated weighting regulatory barriers across sectors and countries in five policy areas (restrictions on foreign entry, restrictions on the movement of people, other discriminatory measures, barriers to competition and regulatory transparency). It is available in 50 countries. For the rest of countries has been completed with the World Bank Service Trade Restrictions Index	OECD and World Bank
TARIFF	Log of the average tariff rate of host countries included in each geographical region *j* from Spain	World Bank
TFP	Log of the semiparametric estimator proposed by Levinsohn and Petrin (2003). Specifically, $lnTFP = lnQ - \widehat{\beta}_K lnK - \widehat{\beta}_L lnL$, where, for a given firm, Q denotes added value, K denotes fixed assets and L is employment. The coefficients $\widehat{\beta}_K$ and $\widehat{\beta}_L$ are obtained from the estimation of the production function using the material costs of the firm as a proxy for unobserved productivity shocks. Production functions were estimated for each four-digit industry using a period of nine years (2010–2018)	ORBIS

(see Kaufmann, Kraay, and Mastruzzi 2010). The distance between home and host countries (DIST) and the presence of a common language (COMLANG) are taken from the GeoDist database from CEPII (Mayer and Zignago 2011). Finally, relative production costs between home and host countries (RLABC) come from the Penn World Tables (see Feenstra et al. 2015). Table 2 provides more details about the definition of these variables and Table 3 presents basic descriptive statistics for the sample used in the estimation.

Finally, the results concerning the scope of Spanish MNCs, which are presented in Sect. 4.1, include an extension of the main analysis where we classify the parent-subsidiary linkages as horizontal or vertical. Specification 2 will be estimated separately for the samples of horizontal and vertical links.

The framework we take as reference is based on the proximity-concentration approach (Brainard 1997) combined with Melitz's (2003) model. This framework refers to parent firms that engage in horizontal FDI, but the positive relationship between firm productivity and FDI decisions is quite general and applies to models that allow for both horizontal and vertical FDI strategies, as in Grossman et al. (2006). By focusing on the distinction between horizontal and vertical FDI we test the positive relationship between productivity and multinational activity across groups of firms with different FDI strategies.

To identify horizontal-vertical FDI, we follow the approach used by Alfaro and Charlton (2009). Herger and McCorriston (2016) examine horizontal-vertical cross-border mergers and acquisitions with a similar approach.

ORBIS provides information on the sectoral classification codes of parent and subsidiary firms, which helps in identifying the horizontal and vertical linkages between the two firms. As MNCs often operate in several industries, we consider the permutation of primary and secondary activities of parent and subsidiary firms defined at the four-digit level to establish the horizontal-vertical nature of the parent-subsidiary linkage. If the codes at the four-digit level are the same for both firms, we call it a horizontal link. On the other hand, if the parent and subsidiary firms have

Table 3 Descriptive statistics

	Total economy		Manufacturing		Services	
	mean	Sd	mean	Sd	mean	Sd
Common language (host region, %)	0.191	0.278	0.190	0,290	0.192	0.274
Distance (Km)	3920	3259	4112	3422	3731	3112
GDP (ln)	20.51	0.73	20.59	0.75	20.50	0.70
Probability of investing abroad	0.084	0.277	0.089	0.285	0.080	0.272
Relative hourly labor cost (ratio geographical region/ Spain)	0.673	0.368	0.708	0.391	0.669	0.360
Sales (ln)	7.56	2.73	8.05	2.38	7.36	2.74
Services Trade Restrictiveness Index (0–1)	0.22	0.05	–	–	0.22	0.05
Tariff rate (host region, %)	4.19	3.56	4.21	3.76	–	–
Total Factor Productivity	5.1	3.7	5.2	1.2	4.9	4.4

some degree of vertical relatedness across their activities, the link between them is defined as vertical. To measure the existence of vertical relatedness, we use the coefficients from the Leontief inverse matrix, which provide information about the upstream and downstream relationships across industries.

This methodology helps us classify the set of parent-subsidiary links into the following two categories:

- **Horizontal**: Parent and subsidiary firms share at least one pair of the same four-digit industry code, but these pairs are never vertical.
- **Vertical**: Parent and subsidiary firms operate in different industries, and at least one pair of the four-digit industry codes exceeds the threshold value for the vertical relatedness coefficient (value of 5%), and the rest of the parent-subsidiary pairs are never horizontally related.

Fariñas, Martín-Marcos, and Velázquez (2024) provides a more detailed explanation of the procedure to classify parent-subsidiary linkages as horizontal or vertical.

3.1 Characteristics of Spanish MNCs: descriptive analysis.

This section offers a descriptive analysis of the sample of Spanish multinationals in order to identify their main characteristics. Athough Spanish companies are not leading players in technology-intensive manufacturing industries, they do have a presence in specialized niche markets such as automotive components (Gestamp, Ficosa), clothing (Inditex), or beverages (Freixenet). Spanish multinationals are most renowned in service sectors, including financial services (Santander, BBVA), telecommunications (Telefónica), and air transport services (Amadeus IT group), which rank among the biggest in the world. The Energy and Construction sectors complete the list of activities with the presence of Spanish multinationals in electricity (Iberdrola), petroleum products (REPSOL), and construction and civil engineering (ACS, Acciona, Ferrovial, FCC).

Table 4 shows the sectorial distribution of Spanish subsidiaries in the sample of firms used in this paper. The data show that service activities are the first, accounting for around 68% of the total number of subsidiaries. The top five service activities defined at two digits of the NACE-Rev 2 classification are as follows: Wholesale trade except motor vehicles and motorcycles (NACE code, 46), Real estate activities (68), Financial service activities (64), Office administrative and other business support activities (82), Legal and accounting activities (69). Manufacturing accounts for 19.2% of the total number of subsidiaries, and the top three manufacturing activities are as follows: Manufacturing sector of fabricated metal products (25), Manufacture of machinery and equipment (28) and Manufacture of food products (10). The construction buildings sector (41) also ranks among the top positions. This sectoral distribution closely mirrors the composition of Spanish domestic production. From 2015 to 2023, services accounted for 69.4% of total value added in the Spanish economy, while manufacturing contributed 14.8%.

Table 4 Distribution of subsidiaries of Spanish multinationals by activity sectors

Major sector of parent firm	Total	Horizontal	Vertical
1. Primary sector	3.1	0.8	4.5
2. Manufacturing	19.2	6.1	40.9
3. Energy	1.4	10.1	6.5
4. Construction	8.1	19.6	5.9
5. Distribution	16.4	12.5	2.3
6. Transportation	2.5	2.0	0.7
7. Hotels	1.5	11.2	4.8
8. Telecomunications	6.1	9.1	2.1
9. Finance	17.4	10.9	25.3
10. Business services	15.8	14.9	5.2
11. Other services	8.6	2.8	1.8
Total	100	100	100

One aspect that has hardly been addressed in the literature on Spanish multinationals, and on which the sample of companies in this study offers new insights, refers to the importance of the horizontal or vertical nature of FDI. Table 4 describes the distribution by sector of both FDI strategies in Spanish multinationals. Firms that engage in vertical FDI, locating different stages of production in other countries, are concentrated in the manufacturing sector with 41% of the total number of vertical links in the sample. The horizontal strategy, with subsidiaries duplicating roughly the same activities of the parent firm, is very much concentrated with 84% of the cases in the Construction and Services sectors.

Service sectors subject to regulation in the past that have undergone liberalization reforms recently should be highlighted as activities with a strong presence of foreign subsidiaries owned by Spanish multinationals. García-Canal and Guillén (2008) have argued that Spanish firms in these sectors allowed them to acquire experience and political knowledge that they transferred to their international expansion. Spanish multinationals in banking, electricity, water, and telecommunications, first in Latin America and then Europe, based their international expansion on advantages grounded in previous local experience.

FDI location choices are important in characterizing how new Spanish multinationals have oriented themselves. Spanish firms located their subsidiaries mainly in Latin America and Caribbean at the turn of the century. Linguistic proximity and cultural closeness to the region explain part of this behavior. In the case of construction, civil engineering, and financial service firms, the search for emerging markets to expand their growth opportunities also influenced the choice of Latin America as a destination for Spanish FDI. After positioning in Latin America, Spanish multinationals focused on Europe, which became the main destination for their outward FDI activities since 2000.

Graph 1 shows the distribution of subsidiaries of Spanish parent companies. Geographic proximity and cultural closeness seem to be important factors that explain the location choice of subsidiaries owned by Spanish multinationals. If

we take as a reference the geographic regions identified by the United Nations (UN), around one-third of the subsidiaries are concentrated in Western and Southern Europe, where geographic and cultural proximity seems to be an important explanatory factor. The second most important destination is South America, which accounts for around 20% of the total. The third position corresponds to North America, which is close to 15%. Eastern and Northern Europe have lower percentages. Finally, the limited presence of subsidiaries in Asia, 3% of the total, is noteworthy. The geographic distribution of Spanish FDI partially mirrors that of foreign trade. Between 2020 and 2023, approximately 70% of Spanish trade was with Europe, with North and Central America as the second most important destination. During this period, only 6.4% of Spanish exports were directed to South America. Ruiz (2024) compares the patterns of Spain's international direct investment across geographic areas with those of imports and exports of goods. He concludes that while FDI is complementary to trade within the EU, no such complementarity exists with other regions, particularly the United States and Latin American countries. Specifically, in these regions, high levels of FDI are observed alongside relatively low volumes of trade, in terms of specialization.

Table 5 summarizes the pattern of multinational activity by host countries classified according to their income level, defined by the United Nations classification. The location of subsidiaries is distributed as follows: 71% in high income countries, 25% in upper-medium income countries and the remaining 4% in low and low-medium income countries. This distribution is similar in manufacturing and services, with a slight increase in the weight of low-medium income countries in manufacturing and also for services in upper-medium income countries.

The distribution of vertical and horizontal links indicates that horizontal FDI strategies are, in relative terms, more frequent than vertical strategies (the difference is 8.4 percentage points) with upper-middle income countries. Conversely, vertical strategies are more frequent than horizontal strategies with high-income countries (7.2 pp). Therefore, with respect to the total sample of links, there is a reallocation of relative weights within vertical and horizontal links: in favor of rich countries for vertical links and in favor of upper-middle-income countries for horizontal links. In any case, the reassignment does not change the fact that the rich countries remain the main focus for both horizontal and vertical strategies.

Table 5 Patterns of multinational activity by host countries classified according to their income levels (percentages)

	Total	Manufacturing	Services	Horizontal	Vertical
Low	0.1	0.0	0.1	0.1	0.0
Low-Medium	3.8	5.7	3.8	2.3	3.6
Upper-Medium	25.3	22.9	27.8	29.1	20.7
High	70.8	71.5	68.3	68.5	75.7
Total	100.0	100.0	100.0	100.0	100.0

4 Results

This section presents two sets of results. The first one is about the estimation of the scope of Spanish multinationals, and the second is about their scale of operations abroad. We follow the empirical framework defined previously in Sect. 2.

4.1 The scope of multinationals

This section presents the estimates concerning the scope of multinational firms, following the framework defined in Sect. 2.1. Table 6 reports the coefficients estimated from specification (2). The first column corresponds to the total economy, which includes a sample of firms from manufacturing, services, the primary sector, construction, and energy. The second and third columns correspond to the samples of manufacturing and service firms, respectively.

The coefficient of TFP is positive and significant at the 1% level, as expected, i.e., there is a positive relationship between the productivity level of the parent firm and

Table 6 The scope of Spanish multinationals: main results

	Total Economy	Manufacturing	Services
Parent TFP	0.0517***	0.0973***	0.0473***
	(0.0058)	(0.0203)	(0.0066)
RLABC	−2.3152***	−1.8058***	−2.5047***
	(0.1156)	(0.2233)	(0.1555)
MKTSIZE	0.4726***	0.4520***	0.5132***
	(0.0254)	(0.0504)	(0.0335)
DIST	−0.9813***	−0.9236***	−1.0754***
	(0.0291)	(0.0744)	(0.0359)
TARIFF	0.0146	0.1698*	
	(0.0352)	(0.0971)	
STRI	−0.5922**		−0.7712***
	(0.2652)		(0.2682)
COMLANG	1.0828***	1.1786***	1.1020***
	(0.0453)	(0.1051)	(0.0560)
INSQUALT	0.0879***	0.0923***	0.0848***
	(0.0074)	(0.0155)	(0.0099)
Industry dummies	Yes	Yes	Yes
Pseudo R-squared	0.2425	0.2196	0.2578
Wald test	2557	546	1651
(P-value)	(0.000)	(0.000)	(0.000)
Log pseudolikelihood	−5971	−1441	−3727
N. of observations	27,341	6137	17,955

Robust standard errors are reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively

the scope of their production abroad. To quantify this effect, the estimated average marginal effect is 0.0061. As productivity is measured in logs, the marginal effect indicates that a 1% increase in firm productivity increases the probability of opening a subsidiary in each foreign market by 0.000061. Since, as we have shown in Table 3, the average probability of observing a parent multinational in a foreign market is 8.4%, a 10% increase in parent firms' productivity raises this probability by 0.7% (0.00061/0.084). Therefore, the effect is statistically significant, but the magnitude of the scope elasticity is small. More productive firms have a higher probability of establishing a subsidiary abroad, although the magnitude of this effect is modest.

Regarding the effect of host country characteristics, we find that countries with higher relative labor costs (RLABC) have a lower probability of receiving Spanish FDI investment. Conversely, firms are more likely to locate their subsidiaries in countries with attractive characteristics. This result is confirmed for variables such as market size (MKSIZE), the presence of a common language (COMLANG) and institutional quality (INSQUALT. All these variables have a positive and significant effect on the probability that a Spanish multinational will locate a subsidiary in markets with these attractive characteristics.

The variable distance (DIST) has a significantly negative impact on the probability to observe a FDI decision. According to the concentration-proximity approach, distance might favor FDI decisions by increasing the transport costs of exporting. However, it also increases the cost of monitoring business activities abroad. The coefficient attached to distance indicates that the latter effect predominates, consistent with many other empirical studies on FDI (e.g., Ramondo et al. 2015).

The inclusion of tariffs and a services trade restrictiveness index for host countries allows for the assessment of the "*tariff jumping"* and "*regulation haven"* hypotheses. When tariffs increase trade costs and import prices in the host country, firms may opt to substitute exports with foreign direct investment, driven by the "t*ariff jumping"* motive, which primarily applies to horizontal FDI. However, for vertical FDI, higher costs of intermediate goods in the host country may diminish the incentives to invest. On the other hand, strict regulations related to quality requirements, labor, environmental, or fiscal standards may discourage firms from investing in those countries, prompting them to seek more lenient locations. This decision, which negatively impacts FDI, is referred to as the "*regulation haven"* motive, as over-regulation deters investment (see Ghodsi (2020) for a more detailed explanation).

As can be seen in the first column of Table 6, the average tariff of the host country (TARIFF), is not statistically significant. Therefore, the *"tariff jumping"* motive for FDI is not observed in the data for the overall economy. However, the Services Trade Restrictiveness Index (STRI) negatively impacts the probability of investing abroad. These results support the "*regulatory haven*" hypothesis, which suggests that over-regulation in the host country can discourage FDI.

Columns 2 and 3 of Table 6 show results for MNCs in manufacturing and services. Concerning the relationship between firm productivity and the probability of owning a subsidiary in each host destination, we consistently find that the elasticity is higher for manufacturing than for services. For manufacturing firms, the elasticity is double that for services. The estimated average marginal effect obtained for

multinational firms that operate in the manufacturing sector, 0.0125, is also higher than the average marginal effect obtained for service, 0.0053. Since the average probability of observing a Spanish subsidiary abroad in the manufacturing and the service sectors are 8,9% and 8,0% respectively, see Table 3, an increase of 10% in the level of TFP increases the probability by 1,4% (0,00125/0.089) in manufacturing and 0,66% in services (0,00053/0.08). The effect of heterogeneity, i.e. productivity differences between firms, on the probability of investing in foreign affiliates is much larger for manufacturing firms. Another factor that may contribute to the greater elasticity observed in manufacturing is related to the proximity-concentration trade-off, a key component of models of heterogeneous multinationals. The nature of this trade-off likely differs for manufacturing and services, leading to systematic differences in scope elasticities across these sectors.

Regarding the coefficients associated with country characteristics for both manufacturing and services, Table 6 shows a remarkable similarity between the two. Among the host country characteristics with a negative effect are relative labor costs (RLABC) and distance (DIST), both significant at the 1% level. Both variables have the same sign in manufacturing and services. Among those characteristics with a positive and significant effect are market size (MKTSIZE), common language (COMLANG) and institutional quality (INSQUALT), all of which significant at the 1% level in both manufacturing and services.

In this case, the "*tariff jumping"* and *"regulatory haven"* hypotheses were tested separately. Tariffs (TARIFF) exhibit a positive and significant effect on FDI decisions in the manufacturing sector, confirming the "*tariff jumping"* motive in this context. Conversely, regulatory barriers to trade in services (STRI) have a negative and significant impact on the likelihood of FDI, supporting the "*regulatory haven"* hypothesis in the services sector.

The results are partially consistent with Ghodsi (2020), who examined both hypotheses in Central, Eastern, and South-Eastern Europe between 1996 and 2016, analyzing the impact of technical trade barriers imposed by both home and host countries on FDI stocks. His findings support the "*tariff jumping"* hypothesis. However, when trade barriers imposed by the home country are excluded from the analysis, the coefficient for regulatory barriers in host countries becomes negative and significant, supporting the *"regulatory haven"* hypothesis.

A body of literature examines the determinants of the probability of operating in different markets through subsidiaries with local production abroad. This list, though not exhaustive, includes: Aw and Lee (2008) for Taiwanese firms; Yeaple (2009) for U.S. multinationals; Geishecker et al. (2009) for multinationals from a group of EU countries; Chen and Moore (2010) for French companies; Damijan, Kostevc, and Rojec (2016) for EU member states from Central and Eastern Europe; Nishiyama and Tamaguchi (2013) and Tanaka (2012, 2015) for Japanese firms; Shao and Shang (2016) for Chinese firms. Our results are consistent with these papers regarding the basic prediction of the model of heterogeneous multinational firms: a parent firm's productivity always increases the probability of opening a subsidiary abroad.

The comparison between the scope of Spanish multinationals and those from the rest of the world can be made more specific. Fariñas et al. (2021a) use a sample of almost 200,000 parent-subsidiary ownership links from ORBIS to examine the

geographical scope of multinational firms from a group of 35 home countries that represent more than 70% of total outward FDI investment globally. The specification is very similar to that presented in this paper. Two conclusions can be drawn from comparing the results obtained from both papers. First, the relationship between the productivity of parent firms and the probability of operating through subsidiaries abroad is quantitatively very similar for Spanish multinationals and for multinationals from OECD countries. The scope elasticity is very similar for Spanish multinationals and for multinationals from OECD countries. Second, the influence of host country characteristics on the probability of making FDI decisions is also very similar for both groups of firms.

In the remainder of this section, we present evidence regarding the horizontal or vertical nature of the linkage between the parent and subsidiary firms, as defined in Sect. 3. To conduct this analysis, we estimate specification (2) separately for the samples of horizontal and vertical links. Our objective is to identify differences and similarities in the results obtained when distinguishing between various types of FDI. This issue has not been extensively considered in the empirical literature based on models of heterogeneous multinationals, and we aim to extend this analysis to the sample of Spanish multinationals.

Table 7 presents the results. The exclusion of links that are neither horizontal nor vertical nor both simultaneously, makes the number of observations used in the estimates in Table 7 different from the observations in Table 6. The results shown in Table 7 are very similar for both samples of firms. Firstly, the productivity of the parent company positively influences the decision to establish a subsidiary abroad, both for horizontal and vertical links. The magnitude of the scope elasticity is somewhat greater in horizontal links. Secondly, the characteristics of the host markets exhibit a very similar pattern of results for both horizontal and vertical links. Specifically, relative labor costs and distance have a negative and significant impact, while market size, common language, and institutional quality have a positive and significant impact.

The literature on multinationals suggests that firms engage in horizontal FDI, duplicating roughly the same activities in foreign markets to avoid trade costs (Markusen 1984; Brainard 1997), and engage in vertical FDI, locating different stages of production in different countries to take advantage of differences in factor costs across countries (Helpman 1984). However, Table 7 indicates that host country characteristics, capturing relative labor cost differences and trade cost differences across host markets (such as distance, and a shared language), have a similar influence on the FDI decision regardless of the horizontal or vertical nature of the parent-subsidiary link.

Interestingly, two host country characteristics show differences between horizontal and vertical FDI. As expected, tariffs have a positive and significant effect on horizontal FDI, supporting the "*tariff jumping*" motive. However, tariffs appear to have no impact on vertical FDI. In contrast, the Services Trade Restrictiveness Index (STRI) negatively and significantly affects the likelihood of vertical FDI, while its coefficient is negative but non-significant for horizontal FDI.

Finally, Fariñas, Martín-Marcos, and Velázquez (2024) use a sample of more than 300,000 parent-subsidiary ownership links from ORBIS to examine the geographical

Table 7 The scope of Spanish multinationals: horizontal vs. vertical FDI

	Horizontal	Vertical
Parent TFP	0.0385***	0.0257*
	(0.0105)	(0.0139)
RLABC	−2.3873***	−1.9177***
	(0.2375)	(0.2277)
MKTSIZE	0.5649***	0.4341***
	(0.0635)	(0.0528)
DIST	−1.1021***	−0.9547***
	(0.0671)	(0.0618)
TARIFF	0.1396*	−0.0801
	(0.0756)	(0.1002)
STRI	−0.8601	−2.0112**
	(0.5282)	(0.7989)
COMLANG	1.4624***	1.0934***
	(0.0931)	(0.0944)
INSQUALT	0.0829***	0.0726***
	(0.0166)	(0.0155)
Industry dummies	Yes	Yes
Pseudo R-squared	0.2723	0.2496
Wald test	756	676
(*P*-value)	(0.000)	(0.000)
Log pseudolikelihood	−1.440	−1.369
N. of observations	7,505	6,802

Robust standard errors are reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively

scope of multinational firms from OECD countries, taking into account the horizontal and vertical nature of those links. The patterns of results observed for the scope of Spanish multinationals and for multinationals from OECD countries are very similar regarding the horizontal or vertical nature of their FDI decisions.

4.2 The scale of operations of multinationals

This section presents results based on the Heckman selection model in a two-step procedure (Heckman 1979), as described by Eqs. (2) and (3) in Sect. 2. Table 8 presents the main results for the aggregate sample of firms (Total economy in column (1). The upper part of the table shows the results for the scale equation (Eq. 3), and the lower part shows the results for the selection equation (Eq. 2).

Starting with the results of the selection equation, the coefficient of TFP is positive and significant at the 1% level, indicating a positive relationship between the productivity of the parent firms and the scope of their production abroad, confirming the expected sign. There is a small change in the magnitude of the coefficient compared to the equivalent coefficient in Table 6. Both coefficients, which should be equal, are not because the number of observations used in the estimation of Table 8

Table 8 The scale of Spanish multinationals: main results. Heckman two-step procedure

	Total economy	Manufacturing	Services
Dependent variable: SALES			
Parent TFP	0.1638***	0.3978***	0.1339***
	(0.0265)	(0.1071)	(0.0290)
RLABC	−1.4772**	−1.7725*	−0.8085
	(0.6188)	(1.0256)	(0.8293)
MKTSIZE	−0.0839	0.1506	0.0355
	(0.1543)	(0.2510)	(0.2105)
INSTQUAL	0.1753***	0.1875***	0.1069*
	(0.0420)	(0.0685)	(0.0578)
Industry dummies	Yes	Yes	Yes
Inverse Mills ratio	0.6126***	0.4940*	0.4407**
	(0.1426)	(0.2620)	(0.1774)
Rho	0.2420	0.2227	0.1724
Sigma	2.5311	2.2182	2.5563
Selection equation			
Parent TFP	0.0583***	0.1127***	0.0521***
	(0.0063)	(0.0246)	(0.0070)
RLABC	−2.6176***	−2.1656***	−2.8211***
	(0.1441)	(0.2678)	(0.1950)
MKTSIZE	0.5360***	0.4344***	0.6250***
	(0.0288)	(0.0502)	(0.0414)
DIST	−1.0790***	−1.0054***	−1.2140***
	(0.0296)	(0.0685)	(0.0395)
TARIFF	−0.0101	0.2033**	
	(0.0412)	(0.1056)	
STRI	−1.1134***		−1.2713***
	(0.3647)		(0.4147)
COMLANG	1.0011***	1.0238***	1.0903***
	(0.0624)	(0.1224)	(0.0827)
INSTQUAL	0.0834***	0.1121***	0.0732***
	(0.0092)	(0.0193)	(0.0125)
Industry dummies	Yes	Yes	Yes
N. of observations	25,174	5658	16,691
N. of uncensored observations	1567	392	1001
Wald test	281	71	136
(P-value)	(0.000)	(0.000)	(0.000)

Robust standard errors are reported in parentheses. ***, ** and * indicate significance at the 1, 5 and 10 percent levels**,** respectively

is slightly lower than that in Table 6. This discrepancy arises because the estimation in Table 8 imposes an additional information requirement, the value of the subsidiary's sales—reducing the sample size of links available in Table 8 relative to those in Table 6.

Regarding the set of variables capturing host country characteristics, as expected the same basic results shown in the scope equation are reproduced in the selection equation. Host markets with higher relative labor costs (RLABC) have a lower probability of receiving Spanish FDI investments. Also, distance (DIST) reduces the probability. Conversely, host country characteristics that attract FDI investments include market size (MKTSIZE), a shared language (COMLANG), and institutional quality (INSTQUAL). Tariffs (TARIFF) have a positive and significant effect in the manufacturing sector, supporting the "*tariff jumping"* motive for FDI and the Services Trade Restrictiveness Index (STRI) has a negative and significant effect in the services sector, validating the "*regulation haven*" motive of FDI. Therefore, the results are robust to the small reduction in the number of links in the sample.

Our focus is on the estimation of the scale equation. Concerning the exclusion restrictions, in the vector of host characteristics Z_j for Eq. (3), we exclude the variable distance (DIST) as models of heterogeneous multinationals confirm this prediction (Chen and Moore 2010). Interestingly, this variable is significant in the selection equation but not in the scale equation. Furthermore, we also exclude variables that can be proxies for entry costs as suggested by theory: COMLANG, TARIFF and STRI. According to theory, market size (MKTSIZE) and relative costs between home and host markets (RLABC) should be included in both the selection and scale equations. Finally, we include institutional quality (INSTQUAL) in both equations.

The results presented in the upper part of Table 8 apply to the scale equation. These results confirm that parent firms with greater productivity will have more affiliate sales. At the aggregate level, considering all sectors, the magnitude of the scale elasticity is 0.1638, meaning that a 1% increase in productivity level increases the scale of operations of the subsidiary by 0.16%. The inverse Mills ratio is positive, implying that there is a positive bias and that the scale elasticity is higher when selection is controlled. Some host market characteristics affect the scale of operations in a direction that is not identical to how they affect the decision to open a subsidiary. A larger host market size (MKTSIZE) does not imply a larger subsidiary's scale of operations. The scale of operations abroad of Spanish multinationals is not statistically associated with the size of the destination market. Regarding the variable RLABC, higher relative labor costs in the host market lead to a smaller subsidiary's scale of operations. Spanish multinationals tend to be larger in low-labor-cost countries. Additionally, a larger scale occurs in destinations with higher institutional quality, approximated by INSTQUAL.

An additional question for which we provide empirical evidence refers to the comparison between manufacturing and services. Table 8 shows the results for the scale of Spanish multinational firms, similar to the information presented for the total economy. The results are similar for manufacturing and services. The scale elasticity is higher in manufacturing than in services. The pattern of signs for host market characteristics is similar in both manufacturing and services. However, these variables are not significant in the services sector, except for institutional quality, which positively affects the scale of subsidiaries. In the

manufacturing sector, as in the overall economy, the size of the destination market (MKSIZE) does not influence the scale of operations abroad for Spanish multinationals. However, lower relative labor costs (RLABC) in the host market are associated with a larger scale of subsidiary operations in this sector.

5 Robustness checks: endogeneity of firm productivity

This section presents a robustness check to complete the analysis of Sect. 4. This analysis refers to the issue of endogeneity in the estimation of the relationship between the productivity of the parent firm and its decision to open subsidiaries in international markets.

As we mentioned in Sect. 2, the concern about reverse causality from past FDI decisions to firm productivity is a relevant question. This has led us to include lagged firm productivity in the specifications and estimates presented in Sect. 4. In addition, we impose the condition of using only unconsolidated accounting information from parent firms to minimize financial flows from the subsidiary to the parent firm. Both elements help mitigate the problem of reverse causality in our estimates. However, the issue is more general in the sense that firm productivity is endogenous because it is correlated with the error term in all specifications. This will happen with any unobserved characteristic included in the error term and potentially correlated with the level of firm productivity.

In this section, we present some results that address the potential endogeneity of parent firm productivity. We apply a similar approach in Fariñas et al. (2021a and 2021b), which follows an application by Chen and Moore (2010) to French multinational firms based on a control function method developed by Petrin and Train (2006, 2010).

The approach is defined in two steps. In the first step, we included a new term in specification (2), ν_f, that is an unobserved firm characteristic:

$$\Pr(y_{fj} = 1) = \Phi(\alpha_0 + \gamma\theta_f + \widetilde{\delta}X_j + \delta_g + \nu_f + \varepsilon_{fj}) \tag{4}$$

This term, ν_f, is correlated with parent firm productivity, θ_f, and also affects the decision of firm f to open a subsidiary in market j (y_{fj}). As this term is not observed, it is part of the residual. An estimate of ν_f can be derived from the following expression:

$$\widehat{\nu}_f = \theta_f - E\left(\theta_f | W_f\right) \tag{5}$$

where W_f is the vector of instruments used to estimate firm productivity. For the set of instruments, we use the average productivity of non-multinational firms from the same four-digit industry level, and the same size class. The motivation for this decision comes from the literature on technological spillovers (see Chen and More 2010). With this purpose, we consider the information from a large sample of non-multinational companies covered in ORBIS with enough accounting information to calculate their TFP productivity.

Table 9 Endogeneity analysis: scope of multinationals

	Total economy	Manufacturing	Services
Parent TFP	0.0491*** (0.0065)	0.0954*** (0.0224)	0.0457*** (0.0073)
$\hat{v}_f$	Yes	Yes	Yes
Pseudo R-squared	0.2469	0.2225	0.2598
Wald test (P-value)	2411 (0.00)	505 (0.00)	1583 (0.00)
Log pseudolikelihood	−5482	−1279	−3534
N. of observations	25,403	5567	17,138

Robust standard errors are reported in parentheses. ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.$\hat{v}_f$ is estimated in a first stage and then included in this second stage to proxy for unobserved firm heterogeneity correlated with firm productivity. The independent variables are, in addition to productivity and $\hat{v}_f$, the same as those in Table 6

Table 10 Endogeneity analysis: sales of multinationals

	Total economy	Manufacturing	Services
Dependent variable: SALES			
Parent TFP	0.1442*** (0.0267)	0.3576*** (0.1139)	0.1225*** (0.0292)
Inverse Millsratio	0.4947*** (0.1457)	0.4515* (0.2717)	0.3797** (0.1795)
Rho	0.1983	0.2082	0.1493
Sigma	2.4955	2.1692	2.5427
Selection equation			
Parent TFP	0.0543*** (0.0069)	0.1149*** (0.0268)	0.0497*** (0.0076)
$\hat{v}_f$	Yes	Yes	Yes
N. of observations	23,402	5139	15,996
N. of uncensored obs	1450	349	956
Wald test	279	78	122
(P-value)	(0.00)	(0.00)	(0.00)

Robust standard errors are reported in parentheses. ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.$\hat{v}_f$ is estimated in a first stage and then included in this second stage to proxy for unobserved firm heterogeneity correlated with firm productivity in selection equation. The independent variables in the selection equation are, in addition to productivity and $\hat{v}_f$, the same as those in Table 8

In the second step, the estimates of $\hat{v}_f$ are included in our baseline specifications to again estimate the relationship between the decision variable y_{fj} and the productivity of the parent firm θ_f. This augmented specification is identical for the rest of the variables.

Tables 9 and 10 show the results obtained in step two. Table 9 corresponds to the scope equations estimated according to specification (2). After controlling for endogeneity, we confirm positive and significant scope elasticities for the total economy, manufacturing and services. Table 10 corresponds to scale equations considering specification (3). Instruments are included only in the selection equation, since we consider that the endogeneity is relevant for the decision to invest abroad. After controlling for endogeneity scale elasticities are positive and statistically significant for the complete sample of firms, manufacturing and services.

6 Robustness checks: heterogeneous scope elasticities across host markets

Section 4 presents the results of the scope equation using expression (2) as the baseline specification. This specification assumes that the effect of firm productivity, θ_f, is uniform across host destinations, i.e., the same γ across host market destinations. However, expression (1) from models of heterogeneous multinationals suggests that country characteristics influence the critical level of productivity θ_j^*, and this may be reflected in the parameter capturing the influence of firm productivity on the decision to invest abroad. Under the assumption that these effects are not homogeneous across host markets, the expression can be written as follows:

$$\Pr(y_{fj} = 1) = \Phi(\alpha_0 + \gamma_j \theta_f + \widetilde{\delta} X_j + \delta_g + \varepsilon_{fj}) \tag{6}$$

Our objective is not to explore the heterogeneity of γ_j, but to test whether the results in Sect. 4 are robust to an alternative specification such as (6). In a previous paper, Fariñas et al. (2021a, b), we estimated the γ_j for different OECD countries and confirmed the heterogeneity of the elasticities by host market destinations.

As can be seen in Table 11, for the total economy, the average value of the estimated γ_j is very similar to the coefficient we obtained for γ in Table 6. There is no difference in the magnitude and significance of the scope elasticity when the alternative specification is used. Columns 2 and 3 of Table 11 show the results for Spanish MNEs in manufacturing and services. This alternative specification provides an estimate of elasticities that is somewhat higher, albeit small, compared to those obtained when homogeneity is imposed on the specification. Overall, the comments made in Sect. 4 remain robust when considering γ_j in the specification.

Perhaps more importantly, the sign of the coefficients associated with host characteristics are maintained when allowing for different elasticities by destination market. The influence of variables proxied by geographic distance, market size, common language, differences in relative labor costs, institutional quality, Services Trade Restrictiveness Index and tariffs of host market destinations remain robust across different specifications.

Table 11 Robustness check: heterogeneous scope elasticities

	Total economy	Manufacturing	Services
Parent TFP (average coefficient)	0.0529***	0.1311***	0.0516***
	(0.0078)	(0.0185)	(0.0100)
RLABC	−2.5757***	−1.8571***	−2.6988***
	(0.2578)	(0.7996)	(0.2956)
MKTSIZE	0.5616***	0.5653***	0.5849***
	(0.0494)	(0.1153)	(0.0606)
DIST	−1.0274***	−0.9776***	−1.0741***
	(0.0461)	(0.1992)	(0.0559)
TARIFF	0.0234	0.0637	
	(0.0393)	(0.3292)	
STRI	−0.5056		−0.9866**
	(0.2652)		(0.4499)
COMLANG	1.1651***	1.3054***	1.1554***
	(0.0758)	(0.3834)	(0.0843)
INSQUALT	0.0834***	0.0672	0.0793***
	(0.0155)	(0.0464)	(0.0194)
Industry dummies	Yes	Yes	Yes
Pseudo R-squared	0.2631	0.2476	0.2736
Wald test	3040	769	2207
(P-value)	(0.000)	(0.000)	(0.000)
Log pseudolikelihood	−5808	−1389	−3647
N. of observations	27,341	6137	17,955

Robust standard errors are reported in parentheses. ***, **, and * indicate significance at the 1, 5, and 10 percent levels, respectively

7 Conclusions

The purpose of this paper is to present a case study aimed at identifying the general characteristics of emerging multinational firms. Our empirical work is organized based on models of heterogeneous multinationals. The analysis is based on a sample of Spanish firms with information on parent-subsidiary ownership links obtained from ORBIS. From this source, we identify 7,767 subsidiaries with production abroad, in both manufacturing and services, that are ultimately owned by a Spanish parent firm.

The sample used allows us to identify a relevant set of characteristics of Spanish multinationals that we consider to be a good illustration of the emerging multinationals. Firstly, concerning location choices, one-third of the subsidiaries are concentrated in Western and Southern Europe, where geographic and cultural proximity appears to be an important explanatory factor. The second most important location is South America, which accounts for 20% of total destinations, where cultural and linguistic closeness is more pronounced than in Europe. The presence of subsidiaries in Asia is very limited, accounting for only 3% of the total.

A second descriptive consideration refers to the sectoral distribution of multinationals. Spanish subsidiaries in the service sector account for 68% of the total number of subsidiaries which is common for emerging multinationals from other countries. The second position in the ranking corresponds to manufacturing, with almost 20% of the total. Additionally, a short list of large firms in the energy and construction sectors are among the most renowned Spanish multinationals in global markets.

In terms of the composition of activities, service sectors that were previously regulated and have recently undergone significant liberalization reforms are particularly important in describing the location choices of foreign subsidiaries owned by Spanish multinationals. In banking, electricity, water, and telecommunications, first in Latin America and then in Europe, Spanish multinationals based their international expansion on advantages grounded in their previous local experience in regulated sectors.

The paper offers a set of novel results concerning the scope and scale of emerging multinational firms. First, we confirm that more productive firms have greater multinational activity in terms of both scope (the probability of investing in a foreign market) and scale (the volume of local sales by subsidiaries in foreign markets). This result should be interpreted in terms of self-selection: more productive multinationals self-select into a higher scope for their international activity and a higher scale of operations abroad. To the extent that differences in productivity across firms reflect differences in management ability, human capital, technology, and other resources, we confirm that these factors drive the probability of investing in foreign markets and the scale of operations abroad. Both effects are statistically significant, though the magnitude of the scope elasticity is modest.

Second, the activity of emerging multinationals is also analyzed from the perspective of host country characteristics. These characteristics are associated with the scope of multinational business activity. The size of the host market, a shared language between Spain and the host country, and an index of institutional quality of the host destination are positively and significantly related to the scope of multinational firms. Conversely, the relative labor costs between the host country and Spain, as well as the distance to the host country, are negatively and statistically significantly related. These results are generally consistent with theoretical expectations. Host country tariffs are positively associated with the scope of multinational firms in the manufacturing sector or those engaging in horizontal FDI. In contrast, regulatory barriers to trade in host countries are negatively associated with the scope of multinational firms in the services sector or those pursuing vertical FDI.

One difference between the results for the scope and the scale equations in the service sector is that the effects of host country characteristics, except for institutional quality, have no significant effect on the scale of subsidiary operations are not significant. The characteristics of host countries affect the decision to invest in foreign markets but have little influence on the scale of operations abroad, which is more affected by the firm's own characteristics. In addition, the results presented in Sect. 5 of the paper indicate that the findings are robust to endogeneity between the firm's productivity and its FDI decisions.

Our findings have important policy implications. The first relates to host market characteristics that may be changed by trade or investment policies, thus determining

the presence of multinational firms and the scale of their subsidiaries. This is particularly relevant for policies that address the institutional characteristics of the host country, such as its regulatory framework, contract enforcement mechanisms, property rights and other elements captured by the INSTQUAL variable. These factors have a strong and positive impact on both the scope and scale of firms entering foreign markets.

A second policy implication to consider is the strong positive relationship between the productivity levels of multinational firms and their ability to penetrate foreign markets. Consequently, policies aimed at enhancing the productivity of local firms are likely to expand their scope, specifically by increasing the number of foreign markets targeted through direct investment. Furthermore, as productivity spillovers from multinational enterprises to domestic firms represent a key feature of FDI, host-country policies designed to encourage the expansion of foreign subsidiary operations could have far-reaching effects, particularly by fostering productivity spillovers that benefit domestic firms.

A final comment concerns the comparison of our results with previous literature. In a series of papers, Fariñas et al. (2021a), (2021b), and (2024) have analyzed a large sample of multinational firms from OECD countries using a methodology analogous to that employed in this study. The results obtained are notably similar to those derived for the sample of Spanish multinationals: first, the scope and scale elasticities exhibit comparable magnitudes, and second, the influence of host country characteristics on FDI decisions is remarkably consistent between both samples.

As highlighted in the introduction, the case of Spanish multinationals effectively illustrates the characteristics of the so-called new and emerging multinationals. From this perspective, it cannot be asserted that the determinants of Spanish multinational decisions, in this study, differ significantly from those identified from samples of multinationals of more developed countries. Heterogeneity in the productivity of parent firms, as well as the attributes of the host countries where their subsidiaries are located, do not show significant differences between the two groups of companies. Contrary to UNCTAD (2006), which suggests that emerging multinationals tend to rely more on specific localization and internalization advantages than on more traditional technological advantages, our analysis of Spanish multinationals does not reveal significant differences compared to multinationals from a wide range of developed countries. This finding deserves attention in its own right and encourages further research into other determinants of the advantages of Spanish multinationals and, by extension, of the so-called new multinationals.

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Declarations

Conflict of interest The authors declare that there are no financial or non-financial interests that are directly or indirectly related to this work submitted for publication. And the authors have no competing interests to declare that are relevant to the content of this article.

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