Comparing outsourcing patterns in domestic and FDI manufacturing plants: empirical evidence from Spain *

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Abstract. To fully understand the local linkages of FDI (Foreign Direct Investment) plants, we argue it would be useful to analyze the outsourcing patterns of such plants in comparison to domestic plants. Consequently, we examined 1,031 industrial plants, both domestic and foreign, located in Spain. The FDI plants show patterns similar to those of domestic plants with regard to the level of outsourcing, the incidence of outsourced production on the companies' total sales, and the economic content of outsourcing relationships. Further, our results show that levels of embeddedness in the local and regional economy of FDI plants are not significantly different from domestic plants. However, FDI plants are highly concentrated spatially in the largest industrial agglomerations. For such plants, Barcelona not only seems a preferred site for location but also for contracting manufacturing tasks.

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1. Introduction

Many countries aim to attract foreign direct investment (FDI), expecting that multinational enterprises will link their regions and their industrial agglomerations to global markets, and provide skills, technology and knowledge that will ultimately enhance the competitiveness of local domestic firms. However, as McCann and Mudambi (2004) note, many FDI schemes are unlikely to fulfil all, or even most, of national and regional policy-makers' expectations with regard to the development of regional industrial capabilities.

In the host-country, FDI plants may establish many different types of relationships with local competitors, clients, auxiliary industries, retailers, banks, etc.. More specifically, FDI plants may obtain inputs by producing them in-house, importing them, buying them locally or forging procurement linkages with local suppliers (Giroud and Scott-Kennel, 2009; UNCTAD, 2001). These strategies and relationships have different effects on the host-country. The literature considers that the positive effects of FDI on the host economy will depend to a large degree on the backward linkages created with local companies, with production outsourcing relations playing a prominent role (Görg and Ruane, 1998; Javorcik, 2004; McDonnald *et al.*, 2005; UNCTAD, 2001). Such business relationships may help to increase the expertise, employment and output of domestic firms (UNCTAD, 2001). In particular, policymakers often view linkages to domestic suppliers as a means of technology transfer from FDI. However, given the importance of geographical proximity in knowledge exchanges, some authors

(Kearns and Görg, 2002) maintain that such linkages should also be created at the sub-national level. In this paper we analyse data from a nationally representative survey of Spanish manufacturing firms in order to provide empirical evidence regarding the question whether affiliates are able to develop local outsourcing linkages and the specificity of such inter-company relationships.

We believe analyzing affiliates in isolation may not sufficiently explain their linkage patterns. We also need to understand the environment in which they operate, as well as the behaviour of other co-located companies. We argue that in order to fully understand affiliates' behaviour, the strategies of co-located domestic firms should be included in the analysis. As suggested by Nachum and Keeble (2001), a comparative analysis between foreign firms and domestic firms may be useful to identify the specificities of foreign firms with regard to networking. Other authors also emphasise the pertinence of such inquiry on the grounds that foreign firms should not necessarily be expected to be less embedded in regional economies than local companies (Perkmann, 2006). However, the lack of readily available data for linkage patterns of co-located domestic firms has often restricted such comparisons in previous research (Crone and Watts, 2000).

Here we investigate aspects related to two major decisions concerning the firm, and more specifically FDI plants. Firstly, we study whether companies conduct their manufacturing activities "inside" or "outside" the industrial plant. Secondly, when the company conducts at least part of its manufacturing activities "outside", we investigate where it contracts out such manufacturing tasks in order to better

understand its local linkages. We ask whether there is a specificity regarding FDI plants.

Our analysis is of an exploratory nature as we do not explicitly model firms' outsourcing decisions. In responding to these questions, we empirically compare the production subcontracting linkages created by foreign and domestic firms in the Spanish manufacturing industry. The importance of these issues goes beyond merely academic pursuits. The geography of production in Europe is changing (Sachwald, 2005; van Tulder, 2008). With the enlargement of the European Union (EU), many new member countries and candidate countries had expected to attract FDI but instead have found that FDI plants often prefer to integrate vertically (rather than outsource production) or to outsource components and parts from suppliers located in the home-country (Javorcik, 2004; Pavlínek, 2004; UNCTAD, 2001). As a result, the potential positive effects of FDI on the host-country's development may be limited. Spain, as an important recipient of FDI, can be seen as a precursor of the above mentioned countries. According to the Register of Foreign Investments, FDI amounted to 187,459 billion € at the end of 2004, of which around 75 % arrived after 1986, when Spain joined the EU (Moreno-Pinedo, 2006). According to the literature, such massive inflows of FDI were a major factor of growth at the end of the 1980s and in the early 1990s (Rodríguez-Pose, 1996). A study on foreign affiliates in four EU countries (Ireland, Portugal, Spain and the United Kingdom) shows that Spanish affiliates have a greater propensity than their counterparts to source locally (Tavares and Young, 2006). Spain also has a significant outsourcing industry. Following Italy

and Portugal, Spain hosted the largest EU-15 outsourcing industry by the end of the 1990s (European-Commission, 2008). Finally, Spanish regions have a considerable degree of autonomy and fiscal prerogatives, and develop their own spatial programmes (Suárez-Villa and Cuadrado Roura, 1993); hence, the interest in better understanding both the successful aspects and the limitations of the Spanish model with regard to FDI plants' local linkages .

There now exists a fairly developed body of literature on the linkages of multinational firms (for a recent review, see Giroud and Scott-Kennel, 2009). This paper contributes to this literature in several ways. First, to date few analyses of Southern European countries have been carried out concerning this issue. Some authors (Nachum and Keeble, 2003) have argued that research into the regional linkages of multinational enterprises (MNEs) should now focus on different industries and sites, in order to broaden and deepen our understanding of this phenomenon. Secondly, another contribution of our study is the analysis of MNEs' networking behaviour in different types of industries, covering high, medium, and low-technology sectors. Thirdly, and more importantly, this is the first time, to our knowledge, that backward linkages at the subnational level with subcontracting suppliers of, respectively, FDI plants and domestic plants are studied with a database which is representative of a national industry. Most existing studies have been based on case study evidence, individual sectors or individual regions. As noted by Eraydin and Fingleton (2006), the generalization of individual case studies may be misleading and there is a need for more quantitative analyses of companies' networking activities.

We find that FDI manufacturing plants and domestic manufacturing plants display similar outsourcing behaviour in Spain. Also, FDI plants and domestic plants are both well embedded at the regional level. However, the potential of FDI plants to stimulate regional economies in Spain is hampered by the strong geographic concentration of these plants and their linkages in the most affluent areas.

The paper is structured as follows: Section 2 provides a literature review and the lines of inquiry to be pursued in this article. Section 3 offers a panorama of the Spanish manufacturing industry and discusses the sample data and methodology. Section 4 offers the results of statistical tests comparing the outsourcing behaviour of firms and the respective levels of embeddedness of FDI plants and domestic plants. Finally, Section 5 offers our conclusions.

2. Literature Review

2.1. FDI plants, external resources and inter-firm outsourcing linkages

We define outsourcing (subcontracting) of production as *“the delivery of goods or services, which are specified by the contractor”* (Andersen, 1999, p. 626). Sako (2005) distinguished two types of outsourcing. The first type, *“corporate function unbundling”* (p.19), consists of outsourcing within the same company, while the second, *vertical disintegration of production*, consists of outsourcing relationships between independent companies. Here we focus on the second type of outsourcing.

As noted by Sako (2005 , p.20), *“in manufacturing, the ‘make or buy’ decision is about whether or not inputs that go into the firm’s final product should be produced in house or outsourced to an independent supplier”*. Our aim is to understand whether FDI plants show distinctive traits concerning such decisions. Some authors have argued that affiliates establish external linkages for different reasons than native companies (Goshal and Westney, 1993). Moreover, it is often argued that FDI plants are more likely to outsource production than their domestic counterparts because they have access to a variety of efficient suppliers, both international and local. This argument, however, is still controversial in the literature. In a sample of companies operating in the Netherlands, foreign MNEs were not found to outsource internationally more than domestic firms (Mol *et al.*, 2005). On the other hand, Girma and Görg, (2004) and Batra *et.al.*, (2003) found that in the United Kingdom and Malaysia, respectively, foreign firms were more likely to outsource than domestic firms. By contrast, the study by Nachum and Keeble (2001) of business service industries in Central London found that affiliates were less reliant on external networks than domestic firms for the provision of resources. The authors argued that high transaction costs in the host-country could limit affiliates’ ability to construct networks (outsourcing networks included) similar to those of indigenous firms; moreover, affiliates might find the resources they need within the multinational network. In the Spanish manufacturing industries, Holl (2008) found that foreign ownership did not exert a significant effect on the probability of outsourcing, once unobservable firm specific effects such as, for example, management ability or management strategy were

controlled for. Analyzing the networking relationships of 184 electronics establishments located in Madrid, Catalonia and the Basque Country (Spain), Holl and Rama (2009b) also found that FDI plants revealed outsourcing arrangements similar to those of domestic plants.

Here we analyse whether the outsourcing patterns of FDI plants and domestic plants are similar, controlling for different types of industries, covering high, medium, and low-technology sectors, as well as different types of locations.

2.2. FDI plants and the spatial patterns of inter-firm outsourcing linkages

MNEs are frequently attracted by agglomerations (Dunning, 1998; Head *et al.*, 1995; Mariotti and Piscitello, 1995; Pavlínek, 2004; White 2004, De Propriis *et al.* 2005).¹ Over the last several years an extensive literature has shown the benefits accruing to enterprises through spatial clustering (for a recent review, see, for example, Puga, 2010). Inter-firm collaboration and clustering are often associated as geographic and cultural proximity are important for both business networking and the transmission of new knowledge (Feldman and Audretsch, 1996; Fagerberg, 1995). However, co-location in specific regions may occur without linkages being produced among proximate firms (Gordon and McCann, 2000); Torre and Rallet, 2005; Yeung *et al.*, 2006). Companies, whether domestic or foreign, may prefer to source inputs chiefly outside the region (Britton, 2003) because their national and international linkages may be more important than their regional connections (Arita and McCann, 2002; Hendry *et al.*, 2000). Thus,

the localisation of foreign facilities in a region does not necessarily mean that strong linkages between subsidiaries and regional firms exist. Compared to other companies, multiplant firms, and specifically multinational enterprises, may maintain stronger intra-corporate linkages that encompass greater distances (Arita and McCann, 2002). Empirical analyses show two different patterns. Some subsidiaries pursue a vertical integration strategy, having few linkages with local firms in spite of co-location, while others prefer an embeddedness strategy (Clarke and Beaney, 1993; Hendry *et al.*, 2000; Kearns and Görg, 2002; McCann *et al.*, 2002; Morris, 1992; Pavlínek, 2004; Phelps *et al.*, 2003; Turok, 1993). The extent of MNEs' local linkages depends on a variety of factors, such as the costs and quality of local supplies, the reliability and proximity of suppliers, the quality of institutions, etc. (UNCTAD, 2001). Foreign linkages may also be more important for FDI plants than for domestic plants. As noted by a study on Japanese MNEs, foreign companies may incur substantial costs when they switch from procurement from longstanding suppliers in the home-country to suppliers in host-countries (Belderbos *et al.*, 2001).

McCann *et al.* (2002) claimed that in order to understand the networking behaviour of MNEs, we must understand the structural characteristics of the different types of industrial locations. This theory stresses the need to take into account the environment in which affiliates operate, and not simply said companies in isolation. Some authors have argued that the potential for linkage development in affiliates is influenced by the locational advantages of host-country economies (Giroud and Scott-Kennel, 2009). Others have considered,

conversely, that the weak interfirm relationships found in some localities need to be taken into account in analyses of affiliates' local embeddedness (Perkmann, 2006). Williams *et al.* (2008) advised taking into account the institutional underpinning of business networks. Analysing the embeddedness of affiliates in the United Kingdom, Phelps *et al.* (2003) mentioned more specifically the "soft" institutions which account for relationships (often informal) between economic actors. Such relationships may be different in different host economies. The strategic management literature acknowledges that cultural background, for instance, may influence the propensity of firms to network with other companies (Nachum and Keeble 2001). Drawing from specific legal and cultural environments, firms from some host-countries may be more willing and able to create linkages with other firms (Lazonick and West, 1998; Love and Roper, 2004). Linkages between companies are not created in a social vacuum (Gulati, 1995), and foreign affiliates are not an exception in this respect. Affiliates may exploit external economies provided by some regions through strategic alliances, vertical and horizontal disintegration of production, etc. (Phelps, 2000), including production outsourcing which is an important form of vertical disintegration. In our view, the networking patterns displayed by co located domestic firms in the host country may thus be studied as one of those "soft" institutions. We propose, therefore, that this externality needs to be considered to understand foreign firms' networking patterns.

Are FDI plants able to create local networks similar to those of domestic firms? Some authors maintain that affiliates are unable to build networks similar to those

of domestic firms that are active in the same geographic region and in similar industries because of their *liability of foreignness* (LOF) i.e. the additional costs of doing business abroad which are not incurred by domestic firms (Caves, 1996; Nachum and Keeble, 2003). This analysis suggests that the transaction costs of establishing external relationships may be higher for affiliates than for domestic firms. The alternative viewpoint maintains that affiliates are able to compensate for such costs in specific national or regional environments. Another theory maintains that despite their international nature, MNEs may have networking behaviour similar to domestic firms due to common externalities and similar competitive conditions in specific regions. “*Trans-local*” firms may embed some of their plants in both the economic and social relationships of local communities, leading them to adopt a new managerial culture, one closer to local practices (Bellandi, 2003).

Empirical research has not yet provided a clear answer to this question (for reviews of studies on backward linkages of MNEs, see Belderbos *et al.*, 2001; UNCTAD, 2001). As for regional sourcing in general, Britton (2003) compared domestic firms and affiliates in the Toronto electronics cluster, and showed that neither group was strongly embedded in the region. Crone and Watts (2003) compared the regional sourcing of UK and foreign owned multinational manufacturing plants in Yorkshire and the Humber and also concluded that both showed very similar regional sourcing patterns with generally low levels of embeddedness in both cases. Perkmann (2006) found similar results comparing the regional sourcing and local R&D collaboration of foreign and domestic firms in

the South Tyrol region in Northeast Italy. The study by Nachum and Keeble (2001) of business service industries in Central London found that affiliates were less regionally embedded. The LOF, the authors argued, may limit affiliates' ability to construct networks similar to those of indigenous firms. Some studies published in the 1970s and reviewed in Crone (2002) found that foreign affiliates in peripheral regions of Britain and Canada rarely developed strong local linkages, especially in comparison with domestic plants. Nachum and Keeble, (2003) studied the networking of foreign affiliates in the media cluster of Central London and found - some differences notwithstanding - considerable similarity with the behaviour of indigenous firms. They believed this reflected a similar response to the common pressures upon (and opportunities available to) both types of companies. Holl and Rama (2009b), looking at electronics firms in the three main industrial clusters in Spain, found that the share of foreign owned firms engaged in extra-regional networking and local networking was not significantly different from that found among domestic firms. However, foreign owned plants were found to subcontract more to international partners, which could have been due to the higher intra-group subcontracting observed. In the data used for the present analysis, outsourcing refers to subcontracting with independent companies. Looking specifically at production outsourcing, Holl *et al.* (2010) found that ownership was not significantly related to local subcontracting in the Spanish automotive and electronics sector.

Table 1 provides a brief review of this literature. We aim to contribute to this existing literature by providing empirical evidence on the spatial extent of

production subcontracting of FDI and domestic plants in different types of industries, covering high, medium, and low-technology sectors as well as in different types of locations. Specifically, we test whether FDI plants are able to build local production networks similar to those of domestic firms in these different contexts. As shown in Table 1 other studies which compare the local linkages of foreign and domestic firms have rarely tackled the analysis of production outsourcing.

[Insert Table 1 about here]

3. Data

3.1. The Spanish manufacturing industry

With a value added of 117.954 million € in 2004, Spain's manufacturing industry ranked fifth in the EU-27, after Germany, the United Kingdom, France and Italy (European-Commission, 2008). In Spain, the average hourly labour cost in manufacturing was 14,21 € in 2003 (in comparison to an average of 22,42 € in the euro area), a consideration which contributes to explaining the importance of FDI in this industry.

Though Spain is currently a net exporter of capital, inward foreign investment is also substantial, as stated in the introduction. The most important source-countries for FDI are France, the United States and Germany. Madrid and Catalonia are the main receiving regions (accounting for 28.4% and 25.7%, respectively, of employment in foreign companies which have invested in Spain). The strong appeal of these regions and, by contrast, the weak attraction of less

developed and industrially declining Spanish regions were already evident by the mid-1980s (Rodríguez-Pose, 1996). The manufacturing industry accounts for 42.8% of total FDI and for 38.4% of the jobs contributed by foreign investors to the host-country economy; the most important receiving industries are automotive, chemicals and food (Moreno-Pinedo, 2006).

As stated in the Introduction, the Spanish outsourcing industry is one of the most important in the EU (European-Commission, 2008). Using a panel of 93 manufacturing industries for 1993-2002, Díaz-Mora (2008) reports evidence of the rising importance of outsourcing in Spanish manufacturing industries during the period. Subcontracting is common, for instance, among Spanish electronics firms, which have a long, though chequered history of inter-firm collaboration (Benton, 1990; Estevan, 1988; European-Commission, 1992; European-Commission, 1997b; Holl and Rama, 2009a).

3.2. The national manufacturing survey

The data employed in the following analysis were obtained from a plant-level survey targeting firms in the Spanish manufacturing industry and conducted in 2003. All the companies, 1,031 in total, had 50 or more employees. In order to establish the dimension of the population of plants in terms of sector, region and size, we used the information provided by the Directorio Central de Empresas (DIRCE) of the National Institute of Statistics. To select the sample, the regional and sectoral distribution of plants indicated by DIRCE was taken into account.

Here, regions are the 17 Spanish Autonomous Communities and provinces (52 in total) are smaller territorial divisions. The regional dimension of company linkage patterns is important for policy makers. As previously stated, our survey also includes detailed information on the location of inter-linked firms at the provincial level.

Sectors were defined according to the CNAE classification (National Classification of Economic Activities), similar to the European NACE rev1. We selected companies for analysis from the Dun & Bradstreet Spain list. As stated in the introduction, given their size, sector and geographic location, the sampled firms are statistically representative of firms with over 50 employees in the Spanish manufacturing industry. For a confidence level of 95.5%, the sampling error is $\pm 2.8\%$. Our sample includes the Spanish affiliates of important multinational enterprises, such as Danone, General Electric, Pepsico, Renault, Siemens, etc., and well known Spanish companies such as Lladró, Mondragón and others. We define subsidiaries (affiliates) as companies with at least 50% of foreign capital, joint ventures as companies with less than 50% of foreign capital and domestic firms as enterprises with no foreign capital. FDI plants encompass both subsidiaries and joint ventures (in our sample, 22% of the firms are subsidiaries and only 2.2% are joint ventures).

A pre-test of the questionnaire was conducted and all the principal problems encountered (e.g. poor understanding of some questions) were addressed before the fieldwork was begun. At the company level, in most cases we interviewed Directors of Production, each personal interview lasting approximately one hour.

The sampled companies were asked whether they had outsourced some production in the last three years. Secondly, outsourcers were asked about the geographical location of their most important suppliers (subcontractors). Finally, the outsourcers were asked to rate the importance of five different reasons for contracting out manufacturing tasks. Other data collected by the survey at the establishment level list employment, capital reserves, ownership and sector. At the company level, the survey also includes information on the origin of foreign capital (European Union, United States, Japan and Other). The survey is not hampered by significant item non-response.

As stated, the sampled firms were asked in which sector they operated following the CNAE classification. This information enabled us to classify them in three groups based on the R&D intensity (average R&D/ turnover) of the industry where they operate: 1) firms operating in Low R&D intensity industries²; 2) firms operating in Medium-Low R&D intensity industries³; and 3) firms operating in Medium-High⁴ and High⁵ R&D intensity industries. In doing so, we used the OECD classification which establishes the following cut-off points for average R&D/turnover: 0.9%; 3%; and 5%, respectively. (Thus, for example, in industries classified as Low R&D intensity, the average R&D/turnover is below 0.9%.) We analyse our data controlling for the type of sector in which the plant operates. This is important because the firm's propensity to outsource may differ in traditional and high tech industries (Díaz-Mora, 2008; European-Commission, 1997a). At the same time, the spatial extent of sourcing relations also seems to be related to

R&D intensity (Eraydin and Fingleton, 2006; McDonnald *et al.*, 2005; Tomiura, 2008).

Of the sampled firms, 41.8% operate in Low R&D intensity manufacturing industries, 31.0% in Medium-low intensity industries and 27.2% in Medium-high and High intensity industries. Outsourcers, (clients or main contractors), i.e. firms which outsourced some production in the last three years, account for 64.6% of the sampled firms and non-outsourcers for 34.9%. The percentage of firms which outsource some production is quite high but is consistent with previous studies on outsourcing in various Spanish industries (Díaz-Mora, 2008; Suarez-Villa and Rama, 1996) and with EUROSTAT data (European-Commission, 2008). To put the figure into perspective note, for instance, that a study based on a large sample of French companies with more than 50 employees found that only half of them outsourced some production in the 1990s (Greenan and Mairesse, 2001). A study on Malaysia calculated that 28% of the companies (40% of foreign investors) subcontracted work out to suppliers in the mid 1990s (Batra *et al.*, 2003).

Table 2 shows the share of FDI plants and domestic plants, and some characteristics of the sample by type of ownership. FDI plants and domestic plants differ significantly in terms of size as measured by the number of employees but not in terms of capital reserves, a variable which is a result of the Spanish legal requirement for firms to set aside at least 20% of their estimated capital stock to ensure severance compensation in case of failure. Table 2 also shows that FDI plants tend to operate in high tech industries, a result consistent with previous studies on FDI in Spain and its regions (Artige and Nicolini, 2005;

BBVA, 2008; Moreno-Pinedo, 2006). Conversely, domestic firms tend to operate in low tech industries. FDI plants and domestic plants also differ regarding their main markets. While both focus primarily on the domestic market, FDI display a higher share of exports than their indigenous counterparts⁶. Finally, the location of both types of companies differs significantly, as FDI plants are heavily concentrated in Madrid and Barcelona while domestic plants are more territorially dispersed. This result supports previous studies which suggest that, within host-countries, the location of foreign investors differs from that of domestic companies (Kearns and Görg, 2002); in Italy, for instance, foreign investors tend to strongly cluster in Rome and Milan (Mariotti and Piscitello, 1995). Our results also confirm Dunning's (1998) view: FDI is especially attracted by agglomerations.

Next, we map by Spanish province the location of both domestic and FDI plants in our sample which outsource some production (Figures 1 and 2). Focusing exclusively on such companies, we observe greater geographic concentration of FDI plants than previously. While 38.2% of the sampled FDI plants are established in Barcelona, 44% of those which outsource some production are located there. In addition to the existence of other factors of attraction (Artige and Nicolini, 2005; Mariotti and Piscitello, 1995) (e.g. a port, proximity to the border, substantial R&D effort), this finding suggests that a major reason for FDI plants locating in Barcelona is the possibility offered by the presence of suppliers. We will return to this question below. Domestic outsourcers are also concentrated in Barcelona (24% of such companies) and Madrid (7.3%); however, their presence is also significant in some other industrial agglomerations, such as Valencia.

[Insert Table 2 about here]

[Insert Figures 1 and 2 about here]

4. Empirical results regarding the outsourcing patterns of domestic versus FDI plants.

4.1. Incidence and depth of outsourcing, and economic content of arrangements

The first step of the analysis is a comparison of outsourcing levels and characteristics between domestic and FDI plants (see results of t- tests in Table 3).

[Insert Table 3 about here]

To compare the companies' propensity to outsource production, we take into account three aspects: i) the incidence of outsourcing (% of firms which outsource some production), ii) its depth (the share of subcontracting with regard to sales) and iii) the content of outsourcing arrangements. For the definition of variables, see Appendix Table 1.

First, we could find no significant difference between FDI plants and domestic plants concerning the incidence of outsourcing, a result confirmed for each of the three sets of industries classified by R&D intensity as well as for plants specifically

located in Madrid or Barcelona (detailed results are available upon request). In Table 4 we present some controlled associations. Specifically, we ran a probit model where subcontracting takes the value of 1 if firm i subcontracts part of its production activities and 0 otherwise. In column 1 and 2 we pooled FDI and domestic plants and included a dummy variable for type of ownership. In column 1 we start with the control variables analysed in Table 2. As can be seen, foreign ownership is not significantly associated with the incidence of outsourcing even if we control for other plant characteristics. In column 2 we include detailed sector dummies distinguishing 28 manufacturing sectors. In addition we add a dummy for product innovation and a dummy that characterises the plant's production process taking on the value of 1 if the plant produces single products or in small batches (for definitions of these variables, see, Appendix Table 1).⁷ Again, there is no significant association between type of ownership and the incidence of subcontracting. In column 3 to 6 we present estimation results separately for FDI and domestic plants. Overall the results are similar, but two comments are necessary. On the one hand, some of the variables significant for the domestic plants are not significantly associated with outsourcing in the case of FDI plants (capital reserves, belonging to the medium technology sector, and small batch production). The lack of significance could be driven by the much smaller sample size of FDI plants in this specific category. On the other hand, looking at the geographical pattern of outsourcers, our previous results are confirmed. FDI outsourcing is strongly associated with location in the Barcelona area.

[Insert Table 4 about here]

Second, regarding the depth of outsourcing (Table 3), we find no significant difference for domestic and FDI plants, except for low R&D intensity industries and for plants located in Barcelona. In both cases, domestic firms are more likely to outsource a larger share of production than FDI plants. Though an analysis by region shows that in Madrid, companies are more reliant on external resources than the national average, within the region the depth of outsourcing is similar in FDI plants and domestic plants.

Third, we look at the outsourcing arrangement. As suggested by Markusen (1996), the client's motivations for externalizing production provide some insight into the nature of subcontracting networks. The objectives sought by the client (outsourcers) can provide some indication of the possible complementarities offered by the supplier (subcontractor). Given that employee dismissal costs have traditionally been much higher in Spain than in most other European countries, many of Madrid's electronics firms, for instance, externalized production in earlier decades mainly to meet temporary work overloads without having to hire new employees (Benton, 1990). This situation changed in the early 1980s, when newly created establishments began fulfilling the needs of medium-sized and large firms seeking specialized knowledge and production (Suarez-Villa and Rama, 1996). Results in Table 3 show that for both types of sampled companies, the most important incentive for subcontracting is to gain flexibility, not to solve temporary work overloads. However, domestic firms seem to use outsourcing arrangements

slightly more for capacity and specialisation subcontracting. An analysis of the three sets of industries classified by R&D intensity shows again that flexibility is assigned the maximum importance in each of the three industrial sets. Probably owing to differences in the industrial structure of each agglomeration, the analysis by region indicates that plants located in Barcelona are more vertically integrated than plants located in Madrid; in other words, the incidence of outsourcing is greater in Madrid for both domestic and foreign plants. Within each agglomeration, however, the motives for outsourcing of FDI plants are comparable to those of co-located domestic plants (detailed results are available upon request). Our result is in line with a study on UK establishments, which finds no differences behind outsourcing between foreign and domestic electronics plants (Girma and Görg, 2004).

An important managerial decision concerns what activities and functions should be kept within the company. Conversely, the types of outsourced tasks may also indicate whether the client is providing some opportunities for deepening supplier capabilities, for instance the development of higher value added products on the part of suppliers. In our research, the firms which had outsourced some production were asked whether their suppliers used to participate in the design of components and parts in accordance to clients' specification. 32.9% of the FDI plants and 33.1% of the domestic plants responded that their suppliers participated in such task (Appendix 1). A Chi-square test shows that differences between both are not statistically significant ($\chi^2(1) = 0.0013$, $Pr = 0.971$). Outsourcers were also asked whether their suppliers were fully responsible for

product manufacturing (Appendix 1). 66.7% of FDI plants and 67.1% of domestic plants provided a positive response. A Chi-square test shows no difference between FDI outsourcers and domestic outsourcers in this respect ($\chi^2(1) = 0.0089$, $Pr = 0.925$). Our findings provide a counterpoint to the opinion of Goshal and Westney (1993), who argue that foreign plants and domestic plants network for different reasons. To summarize, outsourcing patterns in the Spanish manufacturing industry seem to be quite similar in FDI plants and domestic plants.

Our results seem to confirm that the organization of FDI plants is quite comparable to that of domestic plants in terms of their outsourcing practices. Similar incidence and intensity of production outsourcing, and the comparable nature of the manufacturing tasks performed “outside” the firm suggest that the boundaries of FDI plants and domestic plants are quite alike. Our results differ, for example, from those of Nachum and Keeble (2001). Through analyzing business services industries located in Central London, they found that MNEs are significantly less reliant than domestic firms on external networks for the provision of resources. They study service (rather than manufacturing) firms and they include all types of linkages (e.g. market relationships) in the analysis; these differences may account for divergent results.

4.2. Comparing the spatial pattern of outsourcing linkages

Outsourcers (clients) were asked to state the main location of their subcontracting partners. Table 5 compares the level of embeddedness of domestic and FDI

plants regarding their production outsourcing.⁸ The level of embeddedness of FDI plants and domestic plants appears to be similar even at the provincial level.

[Insert Table 5 about here]

For both FDI plants and domestic plants regional subcontracting linkages are more important than inter-regional and international linkages. Embeddedness at the provincial level is substantial for both. This finding is corroborated for each of the industry subsets and also for companies located specifically in Barcelona or Madrid. In all industries and in the two largest industrial agglomerations, companies – irrespectively of ownership – tend to build outsourcing linkages mainly in their same region or, to a lesser extent, in the rest of Spain. These results support the proximity thesis. Though offshoring seems to be more important in Madrid than in Barcelona (networks are more open in Madrid), within each agglomeration, the level of embeddedness of FDI plants is similar to that of the co-located domestic plants. By the same token, for both domestic and foreign plants, offshoring is more important in high tech industries than in low and medium tech industries; however, within each industry, levels of embeddedness of FDI plants and domestic plants are comparable. Finally, foreign plants do not outsource internationally more than domestic plants, a result which is consistent with that found by Mol et al. (2005) for the Netherlands.

We have also tested controlled associations between the degree of subcontracting within the same region and ownership. In multivariate probit

estimations where the dependent variable takes on the value of 1 if the plant's main subcontractors are located within the same region and where we control for firms size, capital reserves, export orientation, sector, type of production and location we find no statistically significant relation between foreign ownership and the probability of subcontracting within the same region (Table 6). This is in line with the findings in Holl et al. (2010) for the Spanish automotive and electronics industries which show that local sourcing is mainly related to the specific organisation of the production process. Finally, other characteristics such as the nationality of the parent could also influence the capacity to build local linkages (Javorcik *et al.*, 2004) but again we find no statistically significant relation with the spatial pattern of subcontracting; this finding is in line with those of Crone (2002) and Tavares and Young (2006) for other EU countries and regions.

[Insert Table 6 about here]

Given the geographic concentration of FDI plants, it is however important to determine not only whether they subcontract within their same region but also where they subcontract production in Spain. The companies that had outsourced production were asked in which provinces their most important subcontractors were located (multiresponse question). We found that 52.3% of the FDI outsourcers and 28.6% of domestic outsourcers, irrespectively of their own location, declared that at least one of their most important supplier partners was located in Barcelona. This means that even FDI outsourcers which are not located

in Barcelona are likely, nevertheless, to contract out some important manufacturing tasks there. Differences between FDI outsourcers and domestic outsourcers were statistically significant ($\chi^2(1) = 29.010$, $Pr = 0.001$). In turn, 15% of FDI outsourcers and 11.4% of domestic outsourcers declared that at least one of their most important supplier partners were located in Madrid. Differences between both types of outsourcers were not statistically significant ($\chi^2(1) = 1.974$, $Pr = 0.105$). We also find similar responses concerning important suppliers located in other highly industrialized provinces, such as Vizcaya in the Basque Country (results available on request). By contrast, no FDI plant declared that any of its most important suppliers were located in less developed provinces, such as Badajoz, Lugo or Orense – though FDI plants could nevertheless outsource some production there. This finding supports the view that the behaviour of MNEs in specific regions and agglomerations may vary, even within the same country (Yeung, 2009). For FDI plants, Barcelona not only seems to be a preferred site of location but also for contracting manufacturing tasks.

6. Conclusions

We argue that in order to fully understand the outsourcing behaviour of MNEs in host countries and host regions, these firms should not be studied in isolation. Instead, the outsourcing patterns of MNE affiliates should be analyzed in reference to domestic firms. We propose that the networking activities of the

latter with regard to production outsourcing may be viewed as a “soft” institution (Phelps *et al.*, 2003) underpinning the local networking of FDI plants.

In doing so, we have presented an empirical analysis of 1,031 establishments, foreign and national, located in Spain. We have studied different types of outsourcing arrangements, internal and external to a region (and to a province), controlling for potential heterogeneity among sectors (according to R&D intensity) and locations, focusing specifically on companies located in Barcelona and Madrid, the largest Spanish agglomerations.

We have tested whether the outsourcing patterns of FDI and domestic plants are similar and whether FDI plants are able to build local networks of outsourcing similar to those of domestic firms.

Our results show that the propensity to outsource production seems to be quite similar in FDI and domestic plants. Participating in outsourcing networks appears to be an important strategy for FDI plants operating in Spanish manufacturing industries. The comparable incidence and intensity of production outsourcing, and the comparable nature of the manufacturing tasks performed “outside” the firm suggest that the boundaries of FDI plants and domestic plants are quite similar. As Nachum and Keeble suggested (2003), both types of firms may respond to the same constraints and opportunities by adopting similar forms of governance (i.e. hybrids between hierarchies and markets). Notably, FDI plants and domestic plants do not differ with regard to the types of outsourced tasks. Both tend to contract out relatively complex manufacturing tasks and outsourcing is not mainly

used to solve problems derived from occasional production peaks. At least for Spain, concerns (De Propris and Driffield, 2006; Morris, 1992) that FDI plants may contract out only low-value added services do not seem justified.

In FDI plants, the relative levels of regional and provincial outsourcing are similar to those of co-located domestic plants. For both FDI plants and domestic plants regional linkages are more important than inter-regional and international linkages. Our finding is corroborated for each of the subsets of industries classified by R&D intensity and also for companies located specifically in Barcelona or Madrid. We conclude that FDI plants which operate in Spanish manufacturing industries are locally embedded in terms of their production outsourcing. Both FDI plants and domestic plants value proximity; therefore, our results seem to support the proximity thesis for both types of companies.

In conclusion, our results support the view that MNEs are able to create outsourcing networks similar to those of domestic firms (Bellandi, 2001; Mol *et al.*, 2005; Nachum and Keeble, 2003). One possible explanation for FDI plants' current behaviour is that MNEs tend to become isomorphic with their environment through adopting local organizational forms and practices (DiMaggio and Powell, 1983; Goerzen, 2005). Another plausible explanation is that MNEs interpret domestic firms' enthusiasm for outsourcing as a sign of a thick market. The presence of a great number of contractors and subcontractors in the Spanish manufacturing industry might have stimulated MNEs to build networks similar to those of domestic firms. This is because partnership choices are quite flexible in such situations (De Propris, 2001). Even firms whose social capital is small, as is

allegedly the case of FDI plants (Rugman and Verbeke, 2001), may find suitable partners. Therefore, the networking activities of domestic firms may indicate market thickness, i.e., the presence of many possible partners. Further research on other national manufacturing industries is clearly needed to analyze these arguments

FDI plants externalize production and are able to build local linkages that may promote supplier development. These characteristics would predict a positive effect on regional economies. However, an additional finding of our research should be taken into consideration to evaluate the potential impact of such companies. FDI plants' impact on Spanish regions is likely to be geographically limited to some of the most affluent areas in the host-country. Being more dispersed, domestic firms which outsource production create local linkages in many regions, not only in the most developed. This circumstance may limit the possibility of successful transmission of know-how and expertise from the foreign firm to local economies. For FDI plants operating in the Spanish manufacturing industry, Barcelona not only seems to be a preferred site of location but also for contracting manufacturing tasks. This circumstance may limit FDI plants' transmission of knowledge to less developed Spanish regions both via geographic proximity (Audretsch and Feldman, 1996; Gertler, 1995) and entrepreneurial "proximity" (De Propris, 2001).

Our results also have some practical implications. A general requirement for the development of FDI plants' local linkages is the existence of other networks in the local economy. To encourage foreign plants to network with local partners, policy-

makers may find it useful to focus on complementary stimuli for domestic firms' linkages. As stated above, our results also indicate that the existence of local networks of domestic firms may point to a "market" for possible partners in an agglomeration.

Concerning policy-makers expectations, domestic plants in Spain seem more likely than FDI plants to promote linkages in less developed areas. By contrast, FDI plants, given their geographic patterns of location and subcontracting, could contribute to exacerbating regional disparities. FDI may be instrumental for promoting development and agglomerations in some regions but not in others. This circumstance suggests that, as noted by De Propris and Driffield (2006), over reliance on the role of FDI for regional development could be unwise.

Our study, however, presents some limitations. Concerning the FDI plants' suppliers, the data do not allow us to distinguish between domestic suppliers and FDI plants belonging to other groups which could work as suppliers. FDI plants may establish, as mentioned above, a multiplicity of relationships at the local level and they may have an impact on regional economies through purchases of inputs and raw materials in arm's length markets. This effect is not captured by our research which focuses only on business networks. However, given the recognized importance of such specific linkages, our study makes a contribution to the analysis of the new spatial configuration of MNEs and the role of such companies in the development of inter-firm local networks.

¹ For Spain, Pelegrín and Bolancé (2008) find that agglomeration economies are determinant location factors for affiliates which operate in high-tech industries, though not for those which operate in low-tech industries, which are more attracted by resource availability.

² Includes Wood, pulp, paper and printing; Food, beverages and tobacco; and Textiles, leather and footwear.

³ Includes Building and repairing of ships; Rubber and plastics; Coke and refined petroleum; Other non metallic mineral products; Basic metals and fabricated metal products.

⁴ Includes Electrical machinery; Motor vehicles; Chemicals (excluding pharmaceuticals); Railroad equipment; and Machinery and equipment.

⁵ Includes Aircraft and spacecraft; Pharmaceuticals; Office and computing machines; Radio, TV and communications equipment; Medical, precision and optical instruments. While the OECD classification has four categories, here the Medium-High and High R&D intensity classes were collapsed to avoid thin cells in cross-tabulations.

⁶ Differences between FDI plants and domestic plants are statistically significant among firms which operate in medium and high tech industries (significant at 1%) but not among plants which operate in low tech industries. While some FDI plants' networks are, in part, global, others are highly localized.

⁷ Note, in these estimations we have dropped the percentage of exports in total sales. This variable was never significant but there were some signs of multicollinearity, especially with the firm size variable.

⁸ In the literature on foreign affiliates, embeddedness issues are related to two main factors: host country sourcing and use of local networks (McDonald et al 2005).

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Other authors also consider local R&D activities, skills and training and repeated investment (Phelps et al, 2003; Perkmann, 2006). As stated, here we focus on production outsourcing networks.

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Table 1. Local linkages of foreign firms and domestic firms: summary of recent studies

Authors	Sample	Type of Linkages	Region/Country	Results
Nachum and Keeble (2001)	90 business services firms	<ul style="list-style-type: none"> - Sourcing - Joint-ventures - Subcontracting of a whole project - Recruitment 	Central London (UK)	Foreign firms are less reliant on external networks, more reliant on market mechanisms and less locally embedded.
Crone (2002) ⁽¹⁾	50 manufacturing firms in Yorkshire and the Humber 22 manufacturing firms in Northern Ireland	Material inputs sourcing (includes subcontracting)	Yorkshire and the Humber Northern Ireland (British Islands)	No significant differences in local sourcing between UK owned and foreign owned MNEs.
Nachum and Keeble (2003)	23 foreign firms and 26 domestic firms operating in media industries	Supply of various inputs (capital, distribution services) Customers Collaboration with other firms Sources of learning	Central London (UK)	Foreign firms develop local linkages similar to those of domestic firms only when they cannot obtain assets and resources internally.
Perkmann (2006)	75 manufacturing firms with more than 19 employees	<ul style="list-style-type: none"> - Sourcing - Sales - R&D interfirm collaboration 	South Tyrol (Italy)	The level of local linkages is weak for both domestic firms and foreign firms.
Holl and Rama (2009)	184 electronics plants	<ul style="list-style-type: none"> - Sourcing - Sales - All types of cooperation (e.g. R&D cooperation) - Production outsourcing 	Three electronics Spanish clusters (Basque Country, Catalonia and Madrid)	In foreign plants, the relative levels of regional sourcing, sales and cooperation are lower than those of domestic plants but levels of regional production outsourcing are similar.

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Holl et al (2010)	162 manufacturing firms with more than 50 employees (automobile and electronics)	Production outsourcing	Spain (17 regions)	Ownership is not a determinant of local production outsourcing (size, technology and other variables are controlled for)
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Note: (1) Local linkages of foreign MNEs and UK owned MNEs.

Table 2. Characteristics of the sample: domestic versus FDI plants

	Domestic plants	FDI plants	t-test of means difference	sig.
<i>Size</i>				
Mean number of employees	129	230	-5.414	***
Mean capital reserves (thousand euros)	6850	10803	-1.189	
<i>Type of sectors</i> ⁽¹⁾				
% of high-technology firms	21.0	45.8	-7.897	***
% of medium-technology firms	31.5	30.1	0.428	
% of low-technology firms	47.5	24.1	6.638	***
<i>Destination of sales (in % of total sales)</i>				
Same region	33.0	24.3	3.64	***
Other Spanish regions	40.8	33.5	3.35	***
International	26.2	42.2	-7.45	***
<i>Geographical location (% of firms)</i>				
Madrid	6.2	14.9	-4.334	***
Catalonia	22.9	40.6	-5.523	***
<i>of which in Barcelona</i>	22.0	38.2	-5.120	***
Basque Country	10.5	7.6	1.315	*
Valencia	15.4	5.6	4.013	***
Other regions	45.0	31.3	3.835	***
<hr/>				
Number of establishments	773	249		
% of total number of establishments	75.6	24.4		
<hr/>				
Note: *** significant at the 1% level; ** significant at the 5% level; *significant at the 10% level				
(1) Definitions in footnotes 2 to 5				

Table 3. Production outsourcing in domestic versus FDI plants

	Domestic plants	FDI plants	t-test of means difference	sig.
% of firms that subcontract	65.4	64.9	0.152	
Importance of subcontracting (% of firms)				
Importance < 25% of production	80.4	86.0	-1.573	
Importance 25-50% of production	12.8	8.9	1.303	
Importance > 50% of production	6.8	5.1	0.760	
Motive for subcontracting (mean rating 1-5):				
Peak load	3.01	2.7	1.974	**
Production cost reduction	2.68	2.89	-1.474	
Lack of specialised employees	1.92	1.70	1.796	*
Lack of specialised machinery	2.42	2.39	0.199	
To gain in flexibility	3.32	3.19	0.942	
Note: *** significant at the 1% level; ** significant at the 5% level; *significant at the 10% level				

Table 4. Probit estimation of subcontracting in domestic and FDI plants

	All plants		Domestic plants		FDI plants	
Number of employees	0.0003 (0.0003)	0.0005** (0.0003)	-0.0002 (0.0004)	0.0008* (0.0003)	0.001 (0.001)	0.0004 (0.0006)
Capital reserves (thousand euros)	-0.005** (0.003)	-0.004** (0.002)	-0.005** (0.003)	-0.004* (0.002)	-0.006 (0.005)	-0.005 (0.004)
% of exports in total sales	-0.0001 (0.002)		0.0005 (0.002)		-0.001 (0.003)	
Dummy for medium-technology firms	0.272** (0.114)		0.247** (0.126)		0.330 (0.293)	
Dummy for high-technology firms	0.464*** (0.131)		0.442*** (0.156)		0.564** (0.273)	
Dummy for product innovation		0.353*** (0.106)		0.239** (0.122)		0.878*** (0.254)
Small batch production		0.260** (0.110)		0.229* (0.126)		0.200 (0.257)
FDI dummy	-0.155 (0.121)	-0.068 (0.134)				
<i>Geographical location:</i>						
Madrid	0.258 (0.185)	0.174 (0.200)	0.382 (0.242)	0.285 (0.263)	0.160 (0.315)	0.088 (0.373)
Catalonia	0.471*** (0.123)	0.460*** (0.139)	0.323** (0.144)	0.313* (0.168)	0.797*** (0.248)	0.969*** (0.294)
Basque Country	0.724*** (0.196)	0.655*** (0.206)	0.810*** (0.229)	0.734*** (0.245)	0.477 (0.392)	0.786* (0.445)
Valencia	0.492*** (0.151)	0.491*** (0.166)	0.450*** (0.160)	0.483*** (0.176)	0.534 (0.479)	0.444 (0.564)
Sector dummies:	no	yes	no	yes	no	yes
No. of observations	758	746	581	555	177	157

This is a postprint of the following article: Holl, A., Pardo, R., & Rama, R. (2012). Comparing outsourcing patterns in domestic and FDI manufacturing plants: empirical evidence from Spain. *European Planning Studies*, 20(8), 1335-1357.

Log likelihood	-457.875	-410.511	-353.412	-312.708	-100.758	-85.034
Pseudo R2	0.058	0.146	0.055	0.134	0.100	0.186

Note: *** significant at the 1% level; ** significant at the 5% level; *significant at the 10% level

Table 5. Spatial extent of subcontracting linkages: domestic versus FDI plants (% of plants)

	Domestic plants	FDI plants	t-test of means difference	Sig.
Location of main subcontracting suppliers				
<i>Full sample</i>				
Same province	84.3	84.5	-0.063	
Same region	88.8	87.4	0.46	
Other Spanish regions	19.6	21.4	-0.48	
International	7.62	8.18	-0.23	
<i>High-technology firms</i>				
Same region	89.5	87.5	0.442	
Other Spanish regions	19.4	23.8	-0.749	
International	7.3	10.0	-0.689	
<i>Medium-technology firms</i>				
Same region	91.4	84.8	1.305	
Other Spanish regions	20.4	15.2	0.780	
International	5.6	8.7	0.774	
<i>Low-technology firms</i>				
Same region	86.4	90.9	-0.717	
Other Spanish regions	19.2	24.2	-0.666	
International	9.4	3.0	1.215	
<i>Establishments in Catalonia¹</i>				
Same province	90.4	90.8	-0.091	
Same region	94.5	94.2	0.221	
Other Spanish regions	12.6	15.6	-0.636	
International	7.6	7.2	0.079	
<i>Establishments in Barcelona</i>				
Same province	91.7	91.5	0.045	
<i>Establishments in Madrid</i>				
Same region	86.1	68.2	1.646	
Other Spanish regions	25.0	27.3	-0.189	
International	11.1	18.2	-0.748	

Note: *** significant at the 1% level; ** significant at the 5% level; *significant at the 10% level

¹Catalonia consists of four provinces. 96% of our sampled domestic plants and 94 % of the sampled FDI establishments in this region are located in the Barcelona province.

Table 6. Probit estimation for local subcontracting

	All plants
Number of employees	- 0.0004 (0.0003)
Capital reserves (thousand euros)	0.008 (0.009)
FDI dummy	0.080 (0.227)
% of exports in total sales	-0.003 (0.003)
Sector dummies ⁽¹⁾	Yes
Region dummies ⁽²⁾	Yes
No. of observations	460
Log likelihood	-151.094
Pseudo R2	0.133
Note: *** significant at the 1% level; ** significant at the 5% level; *significant at the 10% level	
(1) 28 manufacturing sectors	
(2) 17 regions	

Appendix 1. Description of qualitative variables

Variables	Question	Measurement
Incidence of outsourcing (subcontracting)	Have you outsourced some production in the last three years?	1=Yes 0 =No
Importance of subcontracting	Last year, what was the share of subcontracted production to the total production of your industrial plant?	1-24% 25-49% >50%
Outsourcing arrangement	Rate the following motives for subcontracting production: peak load, production cost reduction, lack of specialised employees, lack of specialised machinery, to gain flexibility	1-5 Likert scale ^(a)
Full responsibility	Does your subcontracting supplier assume full responsibility for manufacturing of parts and components?	1 =Yes 0 = No
Design of components and parts	Does your subcontracting supplier participate in the design of components and parts?	1 = Yes 0 = No
Location of principal subcontracting suppliers	Where are your principal subcontracting suppliers located? If located in Spain, indicate provinces	1=Same region 2=Other Spanish regions 3=International
Product innovation	Have new products or technologically improved products been introduced into the market in the last two years?	1= Yes 0 =No
Small batch production ^(b)	What is the type of production?	1= Small batch production 0 = Otherwise
Type of ownership	What is the origin of capital?	1 = 100% Spanish 0 =Otherwise

Notes:

^(a) 1 is "Not important" and 5 is "Very important".

^(b) Also includes manufacturing of single products by project.

Figure 2. Location of FDI outsourcers in our sample