The local linkages of industrial MNEs: Embeddedness and the boundaries of the firm

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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 networking patterns of such plants in reference to domestic plants. Consequently, we examined 1,031 industrial plants, both domestic and foreign, located in Spain. Hypotheses are tested for the full sample and for three subsets of companies classified by R&D intensity; they are also tested for firms more specifically located in Madrid or Barcelona. The FDI plants show patterns of cooperation similar to those of domestic plants with regard to several aspects of production outsourcing, thus indicating similar boundaries of the firm. The firms also show similarities regarding other forms of business collaboration. Finally, our results further show that levels of embeddedness in the local and regional economy of FDI plants are not significantly different from domestic plants; though FDI plants are spatially highly concentrated in the largest industrial agglomerations.

Key words: Business networks, cooperation, local linkages, production outsourcing, multinational enterprises, regional industries, agglomerations.

1. Introduction

Many countries aim to attract Foreign Direct Investment (FDI), expecting that multinational enterprises will link their regions and their industrial agglomeration 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 (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 (Görg and Ruane 1998; 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 thus also be created at the sub-national level.

These views are consistent with current economic theory. Over the last two decades firms have become increasingly perceived as part of networks of inter-linked businesses. Interest in networks as organisational forms which affect company performance (Dyer and Singh, 1998, Lechner and Dowling, 2003, Witt, 2004) and local economic competitiveness (Sornn-Friese and Sørensen, 2005) has increased. At the same time, many economic studies have increasingly recognised the role played by space, although the spatial pattern of inter-firm linkages remains poorly understood. Numerous studies assume that spatial proximity between firms stimulates inter-firm linkages, but this relationship is rarely tested. Studies testing such relationships for specific types of firms, namely MNEs, are still rarer.
As stated above the expectations regarding the potential of MNEs for the creation of

local linkages and, consequently, the stimulation of local economic development are often unrealistic. It is therefore crucial to understand better whether affiliates are able to develop local linkages and, eventually, 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 in order to fully understand affiliates' behaviour the strategies of co-located domestic firms should be included in the analysis. 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 boundaries of the firm, and more specifically FDI plants. Firstly, we study whether companies conduct their manufacturing activities "inside" or "outside" the industrial plant; and whether they perform R&D and other tasks "alone" or with "other firms". Secondly, when the company conducts "outside" at least part of its manufacturing activities, we investigate where it contracts out such manufacturing tasks in order to understand better its local linkages. We ask whether there is a specificity of FDI plants.

In responding to these questions, we empirically compare the linkages created, respectively, by foreign and domestic firms in the Spanish manufacturing industry. To date few analyses of Southern European countries have been performed concerning this issue. Some authors (Nachum and Keeble 2003) argued that research into the regional linkages of MNEs should now focus on different industries and sites, in order to broaden and deepen our understanding of this phenomenon. Another contribution of our study is the analysis of MNEs' networking behaviour in different types of industries, covering high, medium, and low-technology sectors. Finally, and more importantly, this is the first time, to our knowledge, that some of the most important local linkages of, respectively, FDI plants and domestic plants are studied with a database which is representative of a national industry.

We find that FDI manufacturing plants and domestic manufacturing plants display similar networking behaviour in Spain. Also, FDI plants and domestic plants are both well embedded at the regional level. However, the potential of FDI plants for the

stimulation of regional economies in Spain is hampered by strong geographic concentration of FDI plants and their linkages in the most affluent areas.

The paper is structured as follows: Section 2 discusses the literature on the spatial patterns of inter-firm linkages. The section defines both the theoretical background guiding our research as well as the lines of inquiry to be pursued in this article. Section 3 offers a panorama of the Spanish manufacturing industry. Section 4 discusses the sample data and methodology. Section 5 offers the results of statistical tests comparing the boundaries of the firm and the respective levels of embeddedness of FDI plants and domestic plants. Finally, Section 6 offers our conclusions.

2. Spatial patterns of inter-firm linkages

There is no general theory of the spatial pattern of inter-firm linkages, nor do we attempt to formulate one here. The framework for our research is essentially drawn from International Business (IB) theory, network theory and agglomeration theory. Given that the literature on the local linkages of FDI plants is still relatively scarce and has to date provided few stylised facts, we shall explore various research questions whose pertinence has been substantiated by previous studies.

2.1. Business alliances and location

Strategic alliances are inter-firm linkages which involve exchange, sharing or co-development (Gulati, 1995). We analyses alliances which do not involve equity investment (e.g. outsourcing of production, joint-R&D or joint-marketing). We term such arrangements “business cooperation” or “business collaboration” (hereafter, cooperation or collaboration) and define outsourcing (subcontracting) as “the delivery of goods or services, which are specified by the contractor” (Andersen 1999, p. 626). Sako (2005) distinguishes 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. The term “business networks” (hereafter, networks) refers (Bianchi and Bellini,1991), to interrelated sets of companies based on an external division of labour not by a hierarchical command system. Networking implies the presence, among firms, of

social and economic linkages that ensure an easier transmission of information (Casson 1997) and, probably, a reduction of duplicative R&D (DeBresson and Amesse 1991).

On the other hand, firms tend to cluster to take advantage of localised within-industry spillovers (Fagerberg 1995; Feldman and Audretsch 1996; Gertler 1995; Lundvall 1988; Paul and Siegel 1999), simple natural advantages (Ellison and Glaesser 1999), pools of skilled labour, or institutional-thick locales (Malmberg 1996). Over the last several years an extensive literature has shown the benefits, such as higher profitability, accruing to enterprises through spatial clustering (Becattini 1990; Brusco 1990; Gray, Golob and Markusen 1996; Keeble and Wilkinson 1999; Rama and Calatrava 2002; Signorini 1994; Suarez-Villa and Rama 1996). Multinational enterprises (MNEs) are frequently attracted by agglomerations (Dunning 1998; Head, Ries and Swenson 1995).

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 & Audretsch, 1996; Fagerberg, 1995). However, the importance of relationships that firms within regions maintain with firms outside has been probably both underestimated and largely overlooked (see, for example, Henderson et al., 2002, Coe et al., 2004, Giuliani et al., 2005, Wai-chung et al., 2006).

2.2. The networking behaviour of FDI plants

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*". Here, we aim at understanding whether FDI plants show distinctive traits concerning such decision.

McCann and colleagues (2002) claim 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 such companies in isolation. Are FDI plants able to create local networks similar to those of domestic firms? Comparative research on this topic is scanty (Nachum and Keeble, 2001) and its results inconclusive. Some authors maintain that affiliates are unable to build

networks similar to those of domestic firms because of their liability of foreignness (LOF) i.e. the additional costs of doing business abroad which is not incurred by domestic firms. This view 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.

Empirical research has not yet provided a clear answer to this question. For instance, the study by Nachum and Keeble, (2001) of business service industries finds considerable differences between the networking patterns of affiliates and domestic firms in Central London. The LOF, the authors argue, may limit affiliates' ability to construct networks similar to those of indigenous firms. Another theory maintains that due to common externalities and similar competitive conditions in specific regions, MNEs, despite their international nature, and domestic firms may have similar networking behaviour. "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). In the case of Italian industrial districts large companies are able to develop social capital which my facilitate their interaction with local firms Bellandi, (2001). This argument is supported by various case studies of Spanish regions (López 2003; Rama and Ferguson 2007). Nachum and Keeble, (2003) study the networking of foreign affiliates in the media cluster of Central London and find, some differences notwithstanding, considerable similarity with indigenous firms' behaviour. They believe this reflects a similar response to the common pressures upon (and opportunities available to) both types of companies. Comparing domestic firms and affiliates in the Toronto electronics cluster, Britton (2003) shows that neither group is strongly embedded in the region. Analyzing the networking relationships of 184 electronics establishments located in Madrid, Catalonia and the Basque Country (Spain), Holl and Rama (2009b) find that FDI plants show cooperative arrangements similar to those of domestic plants. These studies suggest, in our view, that the analysis of domestic firms is useful for the understanding of affiliates' networking behaviour. Table 1 summarises some of the main contributions to research concerning FDI plants located in agglomerations.

[Insert Table 1 about here]

We hypothesize:
H1. The networking patterns of FDI plants and domestic plants are similar.

A limitation of most previous studies is FDI and domestic plants have been compared using only one specific type of linkage, often outsourcing arrangements. We believe that distinguishing specific types of linkages could be useful because companies' networking patterns may vary according to different types of collaboration. Consequently, we compare FDI plants and domestic plants both with regard to: i) outsourcing and ii) five other forms of collaboration (joint purchases of inputs or equipment, joint-marketing, joint commercialization in Spain, temporal project cooperation and R&D collaboration). We analyse the question in a variety of circumstances: in the full sample and in three sub-samples of companies classified according to R&D intensity of the industry. We also tests our hypotheses specifically for companies located in Madrid and Barcelona. There are two good reasons to single out these locations for analysis. Firstly, they are the largest industrial agglomerations in Spain. Secondly, foreign MNE concentrate in Madrid and Barcelona; hence, the need to focus specifically on such sites.

2.3. Co-location and cooperation

Co-location in specific regions may occur without linkages being produced among proximate firms (Gordon and McCann, 2000, Torre and Rallet, 2005, Wai-chung 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, Brown and Defillippi 2000). MNEs are no exception. The localisation of foreign facilities in a region does not necessarily imply strong linkages between subsidiaries and regional firms. 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, Brown and Defillippi 2000; Kearns and Görg 2002; McCann, Arita and Gordon 2002; Morris

1992; Turok 1993). The extent of MNEs' local linkages depends on a variety of reasons, such as the costs and quality of local supplies, the reliability and proximity of suppliers, etc. (UNCTAD 2001). Foreign linkages may also be more important for FDI plants than for domestic plants.

However, the nature of the activity involved in the network relation may also influence the relative importance of local versus cross-locality linkages. Where face-to-face contacts are required and where contracts and linkages must be renegotiated frequently, network partners will have a greater need for proximity. For instance, in the Spanish electronics industries, Holl and Rama,(2009c) find that subcontracting networks tend to be highly localised while other networks span over broader geographic areas.

Thus, we test the following hypothesis:

H2. FDI plants involved in production outsourcing are regionally embedded

Once again, we compare FDI plants to domestic plants. The hypothesis is tested for the full sample and for each of the three sets of industries classified by R&D intensity.

3. The Spanish manufacturing industry

With a value added of 117,954 million € in 2004, the Spanish manufacturing industry ranked fifth in the EU-27, after Germany, the United Kingdom, France and Italy (European-Commission 2008; EuropeanCommission 2008). In Spain, the average hourly labour cost in the industry was 14,21 € in 2003 (22,42 €, on average, 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. According to the Register of Foreign Investments, it amounted to 187,459 billion € at the end of 2004, of which around 75 % arrived after 1986, when Spain joined the European Union (EU) (Moreno Pinedo, 2006). According to the same source, 40.7% arrived in 1995-2004. This is an important consideration since, as held by the theory, "the ability to form linkages is likely to be an incumbent prerogative", while new entrants are likely to be relegated in this concern (Ahuja 2000, p. 234). Concerning the formation of local linkages, we infer, many of the FDI

plants operating in Spanish manufacturing industries may lack the advantages of incumbency. The most important source-countries for FDI are France, the United States and Germany. Madrid and Catalonia are the main receiving regions, both in terms of investment volume and employment.

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 vehicles, chemicals and food (Moreno Pinedo, 2006). According to the regional statistical office, the electronic, electronics and high-tech industries account for 10% of the accumulative flows received by Catalonia in 1995-2003 (services included) (Artige and Nicolini 2005), one of the most important host-regions.

Following Italy and Portugal, Spain hosted the largest EU-15 outsourcing industry by the end of the 1990s (EUROSTAT, 1998). Using a panel of 93 manufacturing industries for 1993-2002, Díaz-Mora (Díaz-Mora 2008) reports evidence of the rising importance of outsourcing in the Spanish manufacturing industries. She finds that outsourcing of production is positively related to unit labour costs, skill requirements, export orientation and national ownership of the company. In other words, in her study, the share of foreign MNE in an industry is negatively associated to outsourcing intensity. Subcontracting and other forms of collaboration, such as R&D cooperation, are common for instance among Spanish electronics firms, which have a long and chequered history of inter-firm collaboration (Benton 1990; Estevan 1988; European-Commission 1992; European-Commission 1997b; Holl and Rama 2009a).

4. The data

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) from 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. Provinces (52 in total) are smaller

territorial divisions. 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 industry. For a confidence level of 95.5%, the sampling error is ± 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 commenced. At the company level, in most cases we interviewed Directors of Production, each personal interview lasting approximately one hour. The survey does not suffer from significant item non-response. Some of the questions follow ordinal Likert scales, indicating the interviewee's assessment. In contrast to variables which capture objective and quantitative information, it is well known that subjective evaluations may contain a greater degree of error. On the other hand, such variables are sufficiently robust and allow valuable dimensions of a factor, which would otherwise remain concealed, to be captured. Moreover, assessments and evaluations are a basic facet of organizational life.

The sampled companies were asked whether they participated in some form of business collaboration. They were also asked, more specifically, whether they had outsourced some production in the last three years. Finally, the participating companies were asked about the geographical location of their partners regarding joint production or subcontracting. In focusing on the subcontracting aspects, we questioned clients (contractors) on the most important geographical location of their suppliers (subcontractors). Finally, they were asked to rate the importance of five different reasons for contracting out manufacturing tasks. Companies were also

asked to rate on a 1-5 Likert scale the importance of the other types of cooperation. Other data collected by the survey at the establishment level list employment, capital reserves, ownership, sector and geographic distribution of sales. At the company level, the survey also includes information on the origin of capital (European Union, United States, Japan and Other). The survey is not hampered by significant item non-response.

The regional dimension of company linkage patterns is important for policy makers. Spanish regions have a considerable degree of autonomy and fiscal prerogatives, and develop their own spatial programmes (Suárez-Villa and Cuadrado Roura 1993). Our survey also includes detailed information on the location of inter-linked firms at the provincial level.

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, according to the R&D intensity (average R&D/ turnover) of the industry where they operate: 1) firms operating in Low R&D intensity industries[1]; 2) in Medium-Low R&D intensity industries[2]; and 3) in Medium-High[3] and High [4] R&D intensity industries. In doing so, we used the OECD classification which establishes the following cutpoints for average R&D/turnover: 0.9%; 3%; and 5%, respectively. For instance, in industries classified as Low R&D intensity, the average R&D/turnover is below 0.9%. Hypotheses are tested with data for the full sample of firms and for each of the three subsets. The distinction is important because the firm's propensity to outsource may differ in traditional and high tech industries (Díaz-Mora 2005; European-Commission 1997a); also, the propensity to offshore (foreign outsourcing) seems to be negatively related to R&D intensity (Tomiura 2008). On the other hand, the importance of FDI varies by industry.

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. On the other hand, outsourcers, 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 in accordance with previous studies on outsourcing in various Spanish industries (Díaz-Mora 2005; Suarez-Villa and Rama 1996) and with

EUROSTAT (1998). 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).

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 employment. In his analysis of chemical plants, Ahuja (2000) found that the firm's commercial capital represented the most important influence on linkage formation for the average firm In our sample, commercial capital is measured by the 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. Here, we compare FDI plants and domestic plants in this respect and find no difference between them. This is a relevant consideration since, as noticed by Ahuja (2000), companies lacking commercial capital may be at great disadvantage in the linkage "market". Table 2 also shows that FDI plants tend to operate in high tech industries; a result coherent with previous studies on FDI in Spain and its regions (Moreno Pinedo, 2006; (Artige and Nicolini 2005; BBVA 2008). Conversely, domestic firms tend to operate in medium and low tech industries. FDI plants and domestic plants also differ regarding their main markets. The former tend to focus on the international market and the latter on the regional or the domestic market. Closer examination of the data show that companies which operate in low-tech industries, both FDI plants and domestic plants, tend to target the regional or the domestic market; no statistically significant difference between both types of companies could be found (results not displayed). By contrast, differences between FDI plants and domestic plants are statistically significant among firms which operate in medium and high tech industries; FDI plants are more turned towards the international market (significant at 1%). These findings confirm the need to test hypotheses about the respective linkages of such companies for different groups of industries, as we do in this article. Finally, the location of both types of companies significantly differs since FDI plants are heavily concentrated in Madrid and Barcelona while domestic plants are more territorially dispersed. When we focus exclusively on firms which outsource some production, the geographical concentration of FDI plants is still accentuated. Fig 1

shows a map of Spain with the distribution of outsourcers, foreign firms and domestic firms, by province. 44% of the FDI plants which outsource some production are located in Barcelona. Domestic outsourcers are also concentrated in Barcelona (24.0% of such companies) and Madrid (7.3%); however, their presence is also substantial in some other industrial agglomerations, such as Valencia.

[Insert Table 2 about here]

[Insert Figure 1 about here]

5. Domestic plants, FDI plants and their respective networks

This section presents the results of the statistical analyses performed for hypotheses H1 and H2.

5.1. A comparison of cooperation levels and reasons for outsourcing

The first step of the analysis is a comparison of cooperation levels between domestic and FDI plants. According to our results, FDI plants show cooperation levels similar to those of domestic firms (see results of t- tests on Table 3, 1st row).

[Insert Table 3 about here]

We test now whether FDI plants display distinctive features concerning the boundaries of the firm. We take into account the incidence and depth of outsourcing, and the content of outsourcing arrangements. Again, we compare FDI plants and domestic plants. The importance of networking for MNEs operating in Spain is confirmed when outsourcing relationships are specifically examined. We could find no significant difference between FDI plants and domestic plants concerning the incidence of outsourcing (% of firms which outsource some production); a result confirmed for each of the three sets of industries classified by R&D intensity (see Appendix A Tables 3a, 3b and 3c). This result does not support those of Girma and Görg, (2004) and Batra *et.al.,* (2003), who find that in the United Kingdom and Malaysia, respectively, foreign firms are more likely to outsource than domestic firms.

Secondly, in our sample, the share of subcontracting with regard to sales, i.e. the depth of outsourcing, is not significantly different in domestic and FDI plants, except for low R&D intensity industries where domestic firms are more likely to outsource a larger share of production than FDI plants.

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 (contractor) 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). For both types of sampled companies, the most important incentive for subcontracting is to gain flexibility, not to solve temporary work overloads; again, flexibility is assigned the maximum importance in each of the industrial sets (see Tables 3, and Appendix Tables 3a, 3b and 3c). 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). We also ascertained the importance of cost reduction as a general motive for outsourcing both in the Spanish industry (López-Bayón, Ventura and González-Díaz 2002; Rama, Ferguson and Melero 2003) and elsewhere (Girma and Görg 2004; Kakabadse and Kakabadse 2002; Sako 2005). 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. A Chi-square test shows that differences between both are not statistically significant (χ^2 (1) = 0.0013, Pr =

0.971). The companies were also asked whether their suppliers were fully responsible for product manufacturing. 66.7% of FDI plants and 67.1% of domestic plants provided a positive response. A Chi-square test shows no difference between FDI plants and domestic plants in this respect (χ^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.

As outlined in the previous section, FDI plants in Spain are mainly located in Barcelona and Madrid. We therefore specifically compare FDI plants and domestic plants located in these two provinces (see Appendix A Table 3d and 3e). Similitude between FDI plants and domestic plants is, in general, confirmed in the two largest Spanish agglomerations.

To summarize, outsourcing patterns in the Spanish manufacturing industry seem to be quite similar in FDI plants and domestic plants.

We turn now to other forms of cooperation: joint purchases of inputs and equipment, joint marketing, joint commercialisation in Spain, temporal project cooperation and joint R&D. Again, we found no differences between FDI plants and domestic plants operating in low and medium R&D intensity industries (Tables 3b and 3c). In high R&D intensity industries, however, domestic plants are significantly more inclined than FDI plants to undertake joint R&D and other types of business collaboration (Table 3a). Limited resources may give such companies good reasons to build inter-firm linkages in those industries where technological requirements are quite substantial. By contrast, FDI plants may find such resources within the multinational network. Our results seem to confirm those of Britton (2003) who finds, in a high-tech Toronto cluster, that technical cooperation is mainly an initiative of domestic firms as compared to foreign firms.

Our results seem to confirm that, in general, the organization of FDI plants is quite similar to that of domestic plants in terms of their networking practices. Similar incidence and intensity of outsourcing, and similar nature of the manufacturing tasks performed “outside” the firm suggest that the boundaries of FDI plants and domestic plants are quite similar. As suggested by Nachum and Keeble, (2003), both types of firms may respond to similar constraints and opportunities by adopting similar forms of governance (i.e. hybrids between hierarchies and markets). Domestic firms operating in high tech industries, however, may be more motivated to engage in

technical cooperation and other types of business cooperation.

H1 stating networking patterns of FDI plants and domestic plants are similar is confirmed by our empirical research. Some nuances, however, need to be taken into account.

Our results differ 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. This is explained, in their view, by the higher transaction costs incurred by foreign firms when they interact with external companies.

We now examine to what degree the linkages of FDI plants are regional.

5.2. Are FDI plants embedded?

Here, we compare levels of embeddedness in domestic and FDI plants.

[Insert Table 4 about here]

Firms were asked to state the main location of their subcontracting partners. With regard to production outsourcing, the level of embeddedness of FDI plants and domestic plants seem to be similar, at first sight, even at the provincial level (Table 4). 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. Showing that our results are statistically robust, 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 seem to support the proximity thesis. The nationality of the parent may affect the FDI plant's capacity to build local linkages. When the home-country and the host-country pertain to the same supranational trade block, an FDI plant may find more opportunities for foreign outsourcing (offshoring). Offshoring consists of an import of manufacturing products from the stand view of the host-country. On the other hand, cultural proximity between the home-country and the host country (Shenkar 2001) could reduce the transaction costs incurred

by the FDI plant and encourage it to build local linkages. Given that Spain is part of the EU, we tested for differences between the networking behaviour of FDI-EU plants and that of FDI-non EU plants. A t-test of means displays no differences between those companies (results not displayed). Also, we could find no differences between the networking behaviour FDI-EU plants and domestic plants (results not displayed). H2 stating FDI plants involved in production outsourcing are regionally embedded is confirmed by the statistical analysis.

Given the geographic concentration of FDI plants, it is important to determine not only whether they subcontract within their same region but also where in Spain do they subcontract production. The companies that had outsourced production were asked in which provinces their most important partners located (multiresponse question). We found that 52.3% of the FDI plants and 28.6% of domestic plants, irrespectively of their own location, declared that at least one of their most important supplier partners is located in Barcelona. This means that even FDI plants which are not located in Barcelona are likely, nevertheless, to contract out some important manufacturing tasks in Barcelona. Differences between FDI plants and domestic plans were statistically significant (χ^2 (1) = 29.010, Pr = 0.001). 15.%% of FDI plants and 11.4% of domestic plants declared that at least one of their most important supplier partners located in Madrid. Differences between both types of companies were not statistically significant (χ^2 (1) = 1.974, Pr = 0.105). For FDI plants, Barcelona not only seems to be a preferred site of location but also for contracting manufacturing tasks.

7. Conclusions

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

To support our hypothesis, we analyzed 1,031 establishments, foreign and national, located in Spain. We studied different types of cooperative arrangements, internal and external to a region (and to a province). Hypotheses were tested for three subsets of industries classified by R&D intensity; they were also tested, specifically, for companies located in Barcelona and Madrid, the largest Spanish

agglomerations.

In general, our results substantiate our initial hypothesis. According to the statistical tests, FDI plants show cooperation levels similar to those of domestic plants. This result confirms previous studies on FDI plants in other industries and locations (Nachum and Keeble 2003; Nachum and Wymbs 2002). More specifically, in both types of companies outsourcing arrangements seem to be similar concerning the diffusion of such practices, its intensity and the economic objective of subcontracting relationships. Participating in outsourcing networks appears to be an important strategy for FDI plants. In low and medium tech industries, the similarity between FDI and domestic plants is also observed for other types of cooperation (joint purchases of inputs and equipment, joint marketing, joint commercialization, and joint R&D). However, domestic plants which operate in high tech industries seem more motivated than FDI plans to participate in joint R&D and other forms of business collaboration. FDI plants operating in high tech industries probably find the resources they need within the multinational network. In conclusion, our results support the view that MNEs are able to create networks similar to those of domestic firms (Bellandi 2001; Mol, van Tulder and Beije 2005; Nachum and Keeble 2003), though with some nuances concerning specific forms of business collaboration in high tech industries.

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 networking 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 (DePropris, 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.

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. Both FDI plants and domestic plants value proximity. These results seem to support the proximity thesis for both types of companies.

FDI plants and domestic plants do not differ with regard to the types of outsourced tasks. Both tend to contract relatively complex manufacturing tasks and outsourcing is not mainly used to solve the problems derived of occasional production peaks. At least for Spain, concerns that FDI plants may contract out only low-value added services do not seem justify (De Propris and Driffield 2006; Morris 1992).

Therefore, FDI plants are able to build local linkages and, on the other hand, they outsource manufacturing tasks which may promote supplier development. These two characteristics would predict a positive effect on regional economies. However, two additional findings of our research should be taken into consideration to evaluate the potential impact of such companies. Firstly, in high tech industries FDI plants are less engaged than domestic plants in R&D networking. This fact limits the potential positive impact of foreign firms with regard to the transmission of knowledge to host-regions. Secondly, 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. Notwithstanding some differences, the situation found in the Spanish manufacturing industry displays some similarity to that analysed by Kearns and Görg (2002) in the Irish electronics industries: the geography of, respectively, domestic plants and FDI plants differs, a circumstance which limits to a few areas 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 confirm Dunning’s (1998) views: FDI is especially attracted by agglomerations.

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 agglomeration. To encourage foreign plants to network with local partners, policy-makers may find it useful to focus on complementary stimuli for domestic firms` linkages and national or regional systems of innovation. 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. Managers of FDI plants may find it useful; therefore, to examine the behaviour of domestic firms before deciding how to most effectively organize the foreign firm in the host country (region). The absence of such networks may suggest that the FDI plant will need to obtain parts and inputs through vertical integration or in arm’s length markets. In other words, potential foreign investors may find that the analysis of domestic firms’ networking patterns provides useful signals in establishing the governance of the new foreign plant.

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 patters of location and subcontracting, could contribute to exacerbating regional disparities. This circumstance suggests that, as noted by De Propris and Driffield (2006), over reliance on the role for FDI for regional development could be unwise. On the other hand, the utilization of financial stimulus to attract MNEs and stimulate their local linkages seems unnecessary in developed areas, such as Barcelona.

Our study presents, however, 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. On the other hand, FDI plants may establish, as above mentioned, a multiplicity of relationships at the local level. FDI plants 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.

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Table 1. The linkages of FDI plants located in agglomerations: a review of the literature

Authors	Empirical base	Methodology	Main findings
Bellandi (2001)	Italian manufacturing districts	Study case	Large "trans-local" companies, domestic and foreign, may develop social capital in industrial districts
Nachum and Keeble (2001)	Business services in Central London	Statistical analysis of a sample of 90 companies	FDI plants are not able to create local networks similar to those of domestic firms
McCann et al (2002)	The global semiconductor industry	Study case	FDI plants adopt different networking behaviour in different types of clusters
Bellandi (2003)	Italian manufacturing districts	Study case	Large "trans-local" companies, domestic and foreign, may embed in social relationships of industrial districts
Britton (2003)	The electronics industries of Toronto metropolitan area	Statistical analysis of a sample of 66 companies with more than 100 employees	Both FDI plants and domestic plants display low levels of local embeddedness Domestic plants develop more local R&D linkages
López (2003)	The telecomm industries of Madrid	Study case	FDI plants are able to create local networks and develop social capital
Nachum and Keeble (2003)	The media cluster of Central London	Statistical analysis of a sample of 49 companies	Considerable similarity in networking behaviour between FDI plants and domestic plants
Rama and Ferguson (2007)	The electronics industries of Madrid	Study case	FDI plants are able to create local networks and develop social capital

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

	Domestic plants	FDI plants	t-test of means difference	sig.
Size				
Mean number of employees	129	230	-5.414	***
Mean capital reserves (thousand euros)	6850	10803	-1.189	
Sectors				
% 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	***
Destination of sales (in % of total sales)				
Same region	33.0	24.3	3.64	***
Other Spanish regions	40.8	33.5	3.35	***
International	26.2	42.2	-7.45	***
Geographical location				
Madrid	6.2	14.9	-4.334	***
Barcelona	22.0	38.2	-5.120	***
Other provinces	71.8	46.9	-7.356	***
Number of establishments	773	249		
% of total number of establishments	75.6	24.4		

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

Table 3. Networking in domestic versus FDI plants

	Domestic plants	FDI plants	t-test of means difference	sig.
% of firms with cooperations	77.7	77.1	0.210	
% of firms that subcontract	65.4	64.9	0.152	
Other types of cooperation				
Joint purchases of inputs or equipment	6.8	6.2	0.378	
Joint marketing	6.5	6.2	0.161	
Joint commercialization	7.7	8.4	-0.338	
Temporal project cooperation	4.4	3.7	0.458	
Joint R&D	6.1	5.4	0.391	
Importance of subcontracting				
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. Spatial extent of subcontracting linkages: domestic versus FDI plants

	Domestic plants	FDI plants	t-test of means difference	sig.
Location of main subcontracting suppliers				
Full sample				
Same region	88.8	87.4	0.46	
- and same province	84.3	84.5	-0.063	
Other Spanish regions	19.6	21.4	-0.48	
International	7.62	8.18	-0.23	
High-technology firms				
Same region	89.5	87.5	0.442	
Other Spanish regions	19.4	23.8	-0.749	
International	7.3	10.0	-0.689	
Medium-technology firms				
Same region	91.4	84.8	1.305	
Other Spanish regions	20.4	15.2	0.780	
International	5.6	8.7	0.774	
Low-technology firms				
Same region	86.4	90.9	-0.717	
Other Spanish regions	19.2	24.2	-0.666	
International	9.4	3.0	1.215	
Establishments in Barcelona				
Same region	94.5	94.2	0.221	
Other Spanish regions	12.6	15.6	-0.636	
International	7.6	7.2	0.079	
Establishments in Madrid				
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

Appendix A

Table 3a. Networking in high-technology domestic and FDI plants

	Domestic plants	FDI plants	t-test of means difference	sig.
% of firms with cooperations	83.9	78.9	1.061	
% of firms that subcontract	77.5	71.1	1.211	
Other types of cooperation				
Joint purchases of inputs or equipment	8.8	6.3	0.758	
Joint marketing	6.3	5.4	0.314	
Joint commercialization	11.3	4.5	1.946	**
Temporal project cooperation	6.3	1.9	1.768	*
Joint R&D	8.7	3.6	1.662	*
Importance of subcontracting				
Importance < 25% of production	75.0	82.2	-1.202	
Importance 25-50% of production	19.8	11.4	1.563	
Importance > 50% of production	5.2	6.3	-0.342	
Motive for subcontracting (mean rating 1-5)				
Peak load	2.99	2.65	1.528	
Production cost reduction	3.21	3.25	0.154	
Lack of specialised employees	1.80	1.73	0.388	
Lack of specialised machinery	2.33	2.51	-0.838	
To gain in flexibility	3.55	3.22	1.579	

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

Table 3b. Networking in medium-technology domestic and FDI plants

	Domestic plants	FDI plants	t-test of means difference	sig.
% of firms with cooperations	79.9	77.3	0.482	
% of firms that subcontract	68.0	63.5	0.724	
Other types of cooperation				
Joint purchases of inputs or equipment	6.7	5.3	0.420	
Joint marketing	5.0	6.7	-0.548	
Joint commercialization	5.5	10.7	-1.552	
Temporal project cooperation	4.2	6.7	-0.862	
Joint R&D	7.6	8.1	0.144	
Importance of subcontracting				
Importance < 25% of production	90.7	89.1	0.313	
Importance 25-50% of production	5.6	6.5	0.237	
Importance > 50% of production	3.7	4.4	-0.192	
Motive for subcontracting (mean rating 1-5)				
Peak load	2.87	2.77	0.405	
Production cost reduction	2.54	2.40	0.530	
Lack of specialised employees	1.89	1.60	1.450	
Lack of specialised machinery	2.64	2.07	2.214	**
To gain in flexibility	3.09	3.07	0.110	

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

Table 3c. Networking in low-technology domestic and FDI plants

	Domestic plants	FDI plants	t-test of means difference	sig.
% of firms with cooperations	73.6	73.3	0.038	
% of firms that subcontract	58.5	55.0	0.504	
Other types of cooperation [1]				
Joint purchases of inputs or equipment	6.1	7.0	-0.268	
Joint marketing	7.5	7.1	0.105	
Joint commercialization	7.5	13.0	-1.349	
Temporal Project cooperation	3.6	3.5	0.042	
Joint R&D	3.9	5.4	-0.511	
Importance of subcontracting [2]				
Importance < 25% of production	75.5	90.6	-1.917	***
Importance 25-50% of production	14.4	6.3	1.265	
Importance > 50% of production	10.1	3.1	1.271	
Motive for subcontracting (mean rating 1-5)				
Peak load	3.13	2.81	0.961	
Production cost reduction	2.49	2.74	-0.825	
Lack of specialised employees	2.01	1.81	0.726	
Lack of specialised machinery	2.31	2.58	0.869	
To gain in flexibility	3.36	3.29	0.217	

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

Table 3d. Networking in domestic and FDI plants: Barcelona

	Domestic plants	FDI plants	t-test of means difference	sig.
% of firms with cooperations	81.8	85.3	-0.725	
% of firms that subcontract	71.6	75.5	0.687	
Other types of cooperation				
Joint purchases of inputs or equipment	10.0	9.6	0.111	
Joint marketing	8.9	6.5	0.716	
Joint commercialization	8.9	10.0	-0.296	
Temporal Project cooperation	4.7	4.3	0.178	
Joint R&D	8.9	4.3	1.378	
Importance of subcontracting				
Importance < 25% of production	80.5	92.9	-2.320	**
Importance 25-50% of production	13.6	5.7	1.690	*
Importance > 50% of production	5.9	1.4	1.480	
Motive for subcontracting (mean rating 1-5)				
Peak load	2.93	2.31	2.612	***
Production cost reduction	2.91	2.99	-0.320	
Lack of specialised employees	1.78	1.82	-0.186	
Lack of specialised machinery	2.43	2.63	-0.803	
To gain in flexibility	3.45	3.17	1.239	

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

Table 3e. Networking in domestic and FDI plants: Madrid

	Domestic plants	FDI plants	t-test of means difference	sig.
% of firms with cooperations	89.6	70.3	2.302	**
% of firms that subcontract	75.0	59.5	1.529	
Other types of cooperation				
Joint purchases of inputs or equipment	6.3	8.1	-0.328	
Joint marketing	8.3	2.7	1.089	
Joint commercialization	18.8	8.1	1.397	
Temporal Project cooperation	8.3	2.7	1.087	
Joint R&D	6.3	5.4	0.162	
Importance of subcontracting				
Importance < 25% of production	72.2	73.3	-0.069	
Importance 25-50% of production	11.1	6.7	0.430	
Importance > 50% of production	16.7	20.0	-0.240	
Motive for subcontracting (mean rating 1-5)				
Peak load	2.86	3.05	-0.435	
Production cost reduction	2.56	2.95	-0.822	
Lack of specialised employees	1.78	1.57	0.660	
Lack of specialised machinery	2.72	2.48	0.535	
To gain in flexibility	2.94	3.10	-0.345	

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

[1] Includes Wood, pulp, paper and printing; Food, beverages and tobacco; and Textiles, leather and footwear.

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

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

[4] 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.

Location of outsourcers in the Spanish manufacturing industry