Foreign Direct Investment Impact on the Productivity and Employment of Spanish Manufacturing Firms (2001-2010)[1]

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Abstract

The ongoing globalization of economies and, more recently, the international fragmentation of the production process, have increased economic and financial linkages between countries. One indicator of this change is the growth undergone by the foreign direct investment (FDI) flows across the world during the last decades. Both theoretical and many empirical studies highlight the role play by the FDI in a firm's performance. Against this background, the aim of this paper is to analyse the inward FDI impact on the productivity and employment of the Spanish manufacturing firms. Therefore, in a first stage the total factor productivity (TFP) is estimated following the procedures suggested by Levinsohn and Petrin (2003) and Wooldridge (2009). In a second step, in order to take into account the possible selection bias -multinational firms could invest in those domestic firms which are, ex-ante, more productive-, propensity score matching techniques are used to accurately disentangle the effect of FDI on productivity and employment. This approach is combined with a difference-in-difference estimator to consider those unobserved firm specific factors that remain constant over time. The findings of this paper show that Spanish manufacturing affiliates recorded a better TFP performance than the domestic firms did, whilst the effects on employment were not significant.

Keywords: foreign direct investment, TFP, propensity score matching, difference-in-difference estimator.

JEL classification: F23, D24, O33, C21.

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1 Introduction

The analysis of inward foreign direct investment (FDI) in Spain is getting more important. After a period at which the Spanish FDI outflows exceeded those coming from abroad, during the last years inward FDI in Spain is increasing its pace, surpassing those flows received from the rest of the world.[4] During the European sovereign debt crisis, many Spanish firms faced very restrictive conditions to access external financing. In this context, FDI flows performed relatively well, providing the required funds to support investment in the real economy, as they did by the late 1980s. During that period inward FDI in Spain helped to keep in track the investment dynamics, playing a main role in the Spanish economy opening and development process. Nowadays, FDI from abroad could help the Spanish economy to record a sustainable growth path, i.e., directly through the investment process and enhancing the resources reallocation to the tradable sector, and indirectly, posing competitiveness and efficiency gains. In the short term, as the Spanish economy recovery relies to a large extent on the exports evolution, the analysis of the inward FDI impact on the competitiveness of Spanish firms is very important. In addition, given the unit labour costs positive performance and the higher flexibility in the labour market, which could increase the potential role of Spain as FDI recipient, this paper proves to be of great interest.

Despite of its relevance, analysis of FDI inflows received by the Spanish economy in the last few years, and particularly, studies investigating their impact on the development of productivity and employment on the whole economy or on its affiliates,[5] have been scarce. Most of the available studies regarding FDI inflows into the Spanish economy adopt a macro perspective -at a national or sector level-, and those papers using firm level data are restricted to sample surveys, not covering the most recent period. In order to fill this gap, this paper estimates the FDI inflows impact on the productivity and employment manufacturing affiliates' dynamics. To do this, a database has been designed combining three different firm level statistical sources: Balance of Payments, in order to identify the international activity of the manufacturing firms, in particular those attracting FDI flows from abroad, and the Central Balance Sheet Data Office and Business Register data, which provide information about the characteristics of the firms. This database, besides its caveats, shows a much higher coverage than the one used in previous papers and it is referred to the most recent period (2001-2010). In addition, the methodology used for estimating the impact of FDI inflows on productivity and employment is a novel approach for the Spanish economy, relying on matching techniques in combination with a difference-in-difference estimator, following Heckman et al. (1997) proposal.

The remainder of the paper is structured as follows. The next section describes FDI inflows into Spain over the last few decades, focusing on the recipient sectors, as well as the country or area originators of these flows. Second, the main features of affiliates located in Spain and their main differences to domestic firms are described. After this, the total factor productivity (TFP) is estimated and matching techniques are used, in order to isolate the effect of FDI on productivity

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[4] According to FDI Regulatory Restrictiveness Index and AT Kearney FDI Confidence Index stress the reliability of the Spanish economy in terms of attracting long term investments through FDI flows, despite the toughening access to finance.

[5] In this paper we refer to affiliates as those firms receiving net FDI inflows (they include both investments and disinvestments), according to Balance of Payments statistics.

and employment of the Spanish affiliates in the manufacturing sector. Finally, the last section summarizes the main conclusions.

2 Foreign direct investment in Spain: evolution over the last few decades

FDI is a financial flow characterized by the intention of the investor to obtain certain control over the acquired company and, therefore, it reflects the purpose of a long-term relationship in the capital of the company. Hence, traditionally FDI has been considered a particularly attractive type of financial flow due to the positive impact on the recipient firms and the potential externalities that can be generated in the host economy, compared to other more volatile and speculative sources of investment.

Chart 1 shows the development of foreign direct investment flows in Spain over the last few decades. According to these data, which provides from the Balance of Payments statistics (BOP),[6] the arrival of FDI inflows into Spain took place in different stages, where both specific factors of the Spanish economy (also known as "*pull factors*") and others coming from external sources ("*push factors*") played a relevant role. During the first period, which started in the early eighties and continued until the beginning of the nineties, a significant rise in FDI inflows into Spain took place. The trigger for this first wave of permanent capital inflows in Spain coincided with the entry to EU-EEC. The gains in terms of macroeconomic stability that entailed, along with the flow of structural funds from the EU and their impact on the Spanish economy's growth prospects, undoubtedly increased the attractiveness of Spain for foreign investors.

After a less dynamic period (1993-1997), FDI inflows that arrived to Spain started again a path of notable dynamism, fostered by privatization processes of Spanish firms, which, initially, along with the devaluation of the Spanish *peseta* and, later, the Spanish economy's positive growth prospects, increased its appeal as a FDI host economy. This period of sustained growth of FDI flows into Spain lasted until the start of the current century, in a context of significant rising FDI flows on global terms. According to the UNCTAD it was spread to developed countries as well as to developing and emerging economies. EMU membership and the large economic expansion which had started in the middle of the nineties, in a worldwide liquidity availability background, sustained Spain´s role as an FDI destination, in spite of pressure coming from emerging economies, in particular from Eastern European countries.[7]

Between 2003 and 2005 FDI inflows in Spain decreased, following the maximum recorded in previous years. This evolution was also observed in global FDI flows, particularly in those into developed countries, which recorded a deep contraction at the start of the last decade associated

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[6] FDI flows from the BOP are net flows, i.e., investments minus disinvestments. Besides BOP statistics, in Spain there is another important statistical data source, the Foreign Investments Register (FIR), compiled by the Ministry of Economy and Competitiveness. It provides quarterly (annual) information on FDI flows (stocks) from abroad into Spain, based on the firms' equity structure. Apart from the different coverage, higher in the case of BOP data, there are other important methodological differences between both statistics. For more information regarding FIR statistics see (available only in Spanish) http://www.mineco.gob.es/stfls/mineco/prensa/ficheros/noticias/2014/140320_Informe_InversionExtranjera_2013.pdf.

[7] The incorporation of some of these countries to the EU along with the improved institutional and political stability that entailed, their geographical closeness to the EU, as well as their lower labour costs with respect to Spain, it increased significantly the appeal of this region as a potential recipient economy of FDI flows.

with an international environment of uncertainty in terms of growth prospects. In 2006, FDI from abroad into Spain recovered a growing pace, slightly delayed compared with the worldwide flows, which had started one year earlier. After reaching a historical maximum in 2008, in 2009 there was a slump, reflecting the negative impact on international capital flows and in particular on FDI, in a climate characterized by uncertainty and liquidity problems generated by the international financial and economic crisis. The shutdown of FDI projects affected developed countries to a greater extent, while developing countries were less impacted and recovered faster, reaching pre-crisis levels in 2010, exceeding the flows into developed countries during the last two years. In contrast, flows into developed countries still appeared to be more volatile. In this context, since 2010 onwards, net FDI flows from abroad into Spain have been regaining some dynamism[8], albeit without reaching the level prior to 2009.

 It is important to point out that since 2009, FDI in Spain has been negatively affected by net outflows in the form of intercompany debt. This is due to the repatriation of funds by parent companies from their Spanish affiliates, in a context of difficulties to access to external financing. Even so, according to the latest BOP data, in 2013 the FDI from abroad into Spain recorded a 47% rate of growth (compared with a 6% and 3% increase for developed and developing countries, respectively). This development took place in a wage moderation environment, a factor that strengthens the appeal of Spain as a possible host economy for FDI. These flows will hopefully have a positive impact on Spanish exports, not just for the increase in productive resources invested in the tradable sector (*scale effect*), but also for the productivity improvement in those companies receiving FDI flows, and therefore, in their competitiveness. This second aspect, which will be dealt with in detail in this article, is considered by theoretical literature to be one of the positive FDI externalities. The most recent data, still preliminary and referred only to the first months of 2014, point to a moderation scenario both in the case of FDI inflows into Spain and worldwide.

Given the objective of this article, it is interesting to examine the characteristics of the recipient sectors of FDI in Spain, as its impact on the economy's productivity and efficiency can depend on the degree of the technological intensity of those recipient sectors (see, again, chart 1). As a consequence, it is interesting to stress those funds received in the financial, manufacturing and, to a lesser scale, energy sectors in the years prior to the 2009 crisis.[9] In the most recent period, inflows into the manufacturing sector stood out, while those received in the other sectors were characterized, in general, by their weakness. According to the Foreign Investments Register (FIR), by the end of 2012 (the last year for which there is information available) manufacturing firms represented around 36% of the foreign direct investment stock in Spain, regarding shares and other equity. Next in order of importance are energy supplies, the wholesale and retail trade, financial and insurance activities, construction and real estate, and finally, the information and communication sector. Focusing on FDI inflows in the manufacturing sector, they have been mainly channeled to mid-low technology level sectors (in particular, non-metallic mineral products

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[8] According to FIR statistics, *greenfield* (new plant) projects, which account for 80% of the total in Spain, increased slightly in 2013, whilst mergers and acquisitions recorded a sharp growth during the same period.

[9] BOP statistics classify FDI in Spain according to the sector of the resident firm receiving FDI flows. FDI classification regarding technological intensity used in this paper follows the OECD methodology (http://www.oecd.org/dataoecd/43/41/48350231.pdf). From 2009 onwards there is a break in the sectorial data due to the NACE-2009 start (analogous to NACE Rev. 2 classification), which affects comparability with previous years, for which NACE-93 was the classification of reference (analogous to NACE Rev. 1.1 classification).

and metallurgy) as well as to mid-high level (among these, according to FIR data, chemical industry and motor vehicle, trailers and semi-trailers manufacturing sectors).[10] FDI flows into the high-technology sector, even though it represents a low share on total, it has been showing a rising trend in the last few years. In principle, given the positive relationship that some studies identify between FDI flows and productivity in those sectors (firms) of higher technological content,[11] it seems that FDI flows into Spain were not channeled at such sectors with greater possibilities of experiencing productivity gains, although in the last few years, some changes have been identified.

Finally, as one of the channels across which FDI enhance affiliates' productivity is the transfer of technology from the parent company, it is interesting to analyze the geographical origin of these funds.[12] According to Balance of Payments statistics, FDI from the Euro Area accounted for 65% of the total stock at the end of 2013, whilst the rest of developed countries made up 25% of the total (in accordance with the figures from the FIR, the geographical pattern of stock in the manufacturing sector is very similar). Unlike the previous analysis by FDI recipient sectors, the fact that foreign multinationals (MNE) that invest in Spain are from developed countries (more developed than Spain, in general), fosters the possibility of technology transfers from parent companies to their Spanish affiliates.

3 Affiliates of foreign companies in the Spanish manufacturing sector

Foreign direct investment (FDI), as previously mentioned, has traditionally been positively assessed due to its long-term scope and also for its expected positive externalities over productivity. The most recent internationally-available empirical studies use firm-level data to analyze the relationship between FDI and productivity - or employment-. This approach allows us to take into account the potential existing selection bias when the parent company decides to invest in a foreign company. In addition, it also helps to differentiate between those direct effects of FDI on affiliates and the indirect effects (*spillovers*) on the domestic firms, those belonging to the same sector or region of the country where the acquired firm is located.[13] Regarding the latter, its sign and intensity is not clear according to the available empirical evidence (Görg and Greenway (2003) provides an exhaustive overview), depending to a large extent on the approach used to measure this phenomenon (Barrios, Görg and Strobl (2011))[14].

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[10] Despite the modest trend observed over the first half of 2014, it should be highlighted those investments in the automobile sector in the main manufacturing plants in Spain, referred to different brands, eg., Mercedes, Renault or Opel, with a positive impact in terms of employment. For more details see http://www.investinspain.org/invest/en/index.html.

[11] See, e.g., Guadalupe et al. (2012) in the case of Spanish affiliates, and Arnold and Javorcik (2009) in the case of Indonesia.

[12] Benfratello and Sembenelli (2006), focused on Italian firms, estimate a positive impact from FDI on affiliates' productivity, in the case of FDI inflows from United States.

[13] Spillover effects on domestic firms would be channeled both through technology transfer via intermediate inputs trade, and the hiring of skilled employees from affiliates to domestic firms.

[14] Some studies estimate a negative impact on domestic firms' productivity [Aitken and Harrison (1999) in the case of Venezuelan firms, probably reflecting structural issues of the host country economy], whilst others find a positive spillover effect, both in the case of developed and developing countries [Havranek and Irsova (2011) and Nourzad (2008)], independently of the country origin of the FDI flows [Moran and Oldenski (2013)].

Before estimating the impact of FDI flows on productivity and employment dynamics in the Spanish affiliates, the next section includes a brief description of the micro database used in this paper, followed by the main features of the Spanish affiliates in the manufacturing sector.

3.1 Description of the Banco de España's database

The database used in this paper joins information about the Spanish manufacturing sector from three different statistical sources: Balance of Payments (BOP), the Central Balance Sheet Office (CBA by its Spanish name) and the Annual Accounts deposited in the Business Register (CBB).[15] This database differs from the one used in previous studies about the internationalization of Spanish companies, above all, in the type of variables that it contains. BOP statistics[16] provide firm-level information related to international activities of non-financial corporations located in Spain (exporting and importing activities, if it receives or makes FDI in equity and other shares), including the amount, type of transaction and destination/sourcing country of their activities, from 2001 to 2010. It is important to explain that, unlike previous studies, in this case a distinction is made about whether the net FDI investment was positive or negative (disinvestment), which allows a differential treatment among the affiliate companies receiving these kind of flows. The CBA and the CBB provide information on the balance sheet items of the companies (balance sheets and income statements) as well as other variables related to their workforce characteristics (temporary nature and qualifications of employees) or firm age.

From all the companies that received net FDI flows between 2001 and 2010, those resident companies recipient of positive net FDI flows in shares and other equity are considered affiliates in our database. In this way, companies that only recorded negative net FDI flows (i.e., disinvestments) are excluded. This is due to the fact that the impact on productivity and employment, if any, would have taken place before 2001, when positive inflows were received. Additionally, those companies that declared both positive and negative net FDI flows throughout this period are also discarded, because it is not clear how the latter flow might have impact on firm performance. Finally, the companies, according to CBA data, that stated foreign shareholders in their capital structure with a (direct or indirect) weight equals or higher than 10% of the total in 2001[17], have been excluded from the sample, because it is supposed that the impact on the company's productivity would have already happened.[18] Therefore, one of the limitations of the database used is that the capital structure of companies belonging to the CBB prior to 2001 is unknown, and it is not able to identify those Spanish firms that received FDI flows below the BOP

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[15] The CBB minimizes the bias that the CBA shows towards large companies.

[16] In 2008 the threshold below which it is not compulsory to report the details of transactions was raised up to EUR 50,000, which adds a break on the number firms obliged to report external transactions. It should be noted the aforementioned break affects mainly those companies exporting and/or importing goods and services, whilst the impact on the number of firms reporting FDI transaction is much lower given the high FDI average transaction values (especially those on shares and other equity). Therefore, according BOP data the average number of firms receiving FDI flows on share and other equity decreased from 5,727 firms during 2001-2007 (72,119 goods and services exporting firms), to 3,101 firms during 2008-2010 (36,451 goods and services exporting firms).

[17] In this way, 315 companies have been excluded from the sample. If the threshold is raised to up to 50%, which would imply to consider 62 additional companies, it does not affect the results presented in this paper.

[18] A crucial variable in this paper is the one determining the moment when a domestic firm becomes an affiliate, because, from then on, it is when the firm's productivity and employment could show a different evolution to what would have happened without the FDI funding. It is assumed, in line with other studies, that the FDI impact on productivity is not immediate and needs some time to take form. Therefore, to ease the impact on the estimates of these assumptions, it is necessary to identify the companies in the sample that, while they have a foreign presence in their ownership structure, received their first flow(s) many years before, meaning the impact on productivity and employment in such companies was recorded before 2001, the first year for which the information is available in this paper.

threshold.[19] Resident companies which, according to information from BOP, did not receive any FDI net flow between 2001 and 2010, and that at the same time according to the CBA did not declare a foreign capital share greater than 10% in 2001, have been included in the domestic firms group. Additionally, this paper focuses on the study of the manufacturing sector due to its importance as a FDI flows recipient (also according to the stock figures provided by the FIR), as mentioned in the previous section, and for their weight in terms of employment and exporting activity of the whole Spanish economy. In light of the above, the results obtained in the next section should be interpreted with some caution.

With regard to the variables included in the database, it may be wise to remind that not all of them show the same degree of coverage. Therefore, to illustrate, information related to employment, firm age and labour productivity is available for 85% of the sample. However, variables related to innovation activity and to skilled workforce, the degree of coverage is much lower, representing approximately 1% of the sample, since they are only available for companies with more than 100 employees that collaborate with the CBA.

3.2   Main features of the manufacturing Spanish affiliates of foreign companies

In line with the available evidence for other countries, affiliates of multinational enterprises (MNE) in Spain are characterized as being larger, with a noticeably greater propensity to innovate, relying on temporary employment contracts to a lesser extent and having a more skilled workforce than domestic firms (see tables 1 and 2).[20] Also, significant differences in those wages paid by affiliates to their employees are observed, which are higher, even though unit labour costs (ULC) are lower, which reflect greater productivity from their workforce. The affiliates use more diversified sources of financing, as the fact that, on average, they are quoted on stock exchanges more frequently.[21] With regard to their financial structure, although the external financing ratio is very similar in the two groups of firms, the level of leverage of affiliates is higher when the indebtedness ratio is considered.

New international trade theories (the so-called "*new-new trade theory*") indicate that only the most productive companies are able to start international activities successfully, whilst less efficient companies are limited to the domestic market. Helpman, Melitz and Yeaple (2004) develops a theoretical model according to which the process of internationalizing the activity is gradual, first exporting, and as a second step, opting to externalize their activities via FDI or IO (*international outsourcing*),[22] whose entry costs are higher. In short, only the most efficient companies can undertake activities abroad. The results from table 2 point in this direction, not only confirming that Spanish affiliates of foreign companies have a higher propensity to export compared with domestic companies, but also confirming that the aforementioned activities are undertaken with greater intensity. In the same way, affiliates are more likely to carry out FDI abroad.

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[19] See footnote 16.

[20] The differences observed in the distribution of the variables analyzed in this section between affiliate and domestic firms are always significant, according to the Wilcoxon's ranksum and Kolmogorov-Smirnov's equality tests.

[21] According to the information supplied by the FIR, unlisted companies make up approximately 85% of the total value of capital of resident companies in Spain owned by foreign companies.

[22] International outsourcing of an activity occurs with a third company which is subcontracted.

One stylized fact that characterizes affiliates is that they are a very small group of companies within the firms' population of every country. According to the Banco de España's database, it can be seen how they only represent 1.3% of the companies in the sample.[23] This proportion increases noticeably depending on the size (14.2% of large firms received positive FDI net flows between 2001 and 2010). The differences observed for manufacturing as a whole have largely stayed the same in every subsector and size class, diminishing, in any case, as the sizes of companies increase.

As previously mentioned, Spanish affiliates of foreign companies recorded, on average, a labour productivity higher than domestic firms. This productivity measure, that quantifies the amount of output per employee, provides a partial proxy of a company's efficiency by excluding other production factors different from labour. Hence, in this paper, the analyzed variable is the total factor productivity (TFP), a more accurate measure of productivity, which is also comparable between companies belonging to different sectors. TFP estimation using firm-level data is not without its caveats, related with the econometric problems that its estimation poses (e.g., endogeneity or simultaneity problems). Among the different methodologies used in the literature, in this paper the semiparametric approach in two stages proposed by Levinsohn and Petrin (2003) and the non-parametric one by Wooldridge (2009) have been chosen. This second procedure gives more efficient estimations for two reasons: it allows for standard error calculation in a robust way, and avoids the possible existence of correlation between the error terms of the equations of the semiparametric procedure in two stages. A detailed description of both methodologies and the variables used can be found in the appendix.

The results obtained when estimating TFP under both procedures are very similar (see chart 2). The TFP distribution of affiliates is situated more to the right than the one corresponding with domestic firms, which implies that they exhibit a higher productivity level. To be precise, in the manufacturing sector, the average TFP of domestic companies is 55% lower than that of the affiliates. This gap is more noticeable than the one identified in the case of labour productivity (around 43%). This stylized fact can be verified in each manufacturing sector and by size class, the difference observed between both distributions being significant in all cases.[24]

4 Impact of foreign direct investment on productivity and employment

From an empirical point of view, most studies that investigate the relationship between FDI inflows and productivity –both at aggregate and firm level-, find a positive correlation between both variables. However, it is difficult to determine the reason behind of the causal relationship, as there may be a selection bias when the MNE decides whether investing, which is known in the literature as "cherry picking". In other words, it is difficult to know whether a strong performance of affiliate companies is caused by FDI inflows or whether MNE choose the most productive firms within each sector *ex-ante* ("cherries"). To isolate the impact of foreign direct investment (FDI) on

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[23] According to the FIR, at the end of 2012, there were 13,059 resident companies in Spain with foreign participation in their capital through FDI.
[24] Differences in the TFP distributions of affiliates and domestic companies are always significant, both for manufacturing as a whole and for the different sectors and size classes, according to Wilcoxon's ranksum equality test.

firms´ productivity is essential to use appropriate econometric techniques. If they are not used, just like Navaretti and Venables (2004) state, the impact would be overestimated. Most of the studies published in the last few years –e.g., Arnold and Javorcik (2009)-, which take into account the aforementioned selection bias, identify a positive and significant FDI impact on the productivity of affiliates,[25] albeit lower than the one obtained if the "cherry picking" phenomenon is not taken into account. This increase could result in an improvement in the economy's aggregate productivity and, therefore, in its competitiveness. Unlike productivity, the studies that analyze the effect of FDI inflows on employment are inconclusive and the final result depends on the features of the investment made (new plants –*greenfield* investments- or mergers and acquisitions).[26]

With the aim of taking the selection bias described in the previous paragraph into account, in this paper impact evaluation techniques have been used in order to estimate the effect of FDI flows on the development of productivity (TFP) and employment of Spanish affiliates of foreign companies during 2001-2010. This procedure has been used frequently in the literature to assess the consequences of certain economic policy measures, particularly in the labour market, however its use being more recent in empirical papers of international economics. The application of these techniques requires knowledge of what would have happened to the affiliates if they had not received FDI, information that is unavailable since it is unobservable by definition. Hence, to resolve this problem in this paper, *propensity score matching* (PSM) techniques, a non-parametric procedure, have been used.[27] Basically, PSM allows identification of those domestic firms that are similar to the affiliates, according to a set of variables, just before they receive the first positive net FDI inflow.[28] The first group of companies, i.e., the domestic firms similar to the affiliates, constitutes the *control group*, and the second, i.e., the affiliates, the *treatment group*.

In this paper the *control group* selection was made following Rosenbaum and Rubin (1983) proposal. These authors propose the use of a *probit* or *logit* model to estimate, based on a set of variables, the probability of a company receiving the treatment (in other words, being a positive net FDI flows recipient):

$$\mathrm{P}(FDI_{ist} = 1) = \Phi(\alpha + \beta X_{ist} + \gamma_s + \delta_t + \varepsilon_{ist}) \qquad [1]$$

Where the *FDI* variable has the value of 1 if the firm *i* of the sector *s* receives the first positive net FDI flow at the time *t,* and *0* if it is a domestic firm. The vector X_{ist} gathers a series of features of the Spanish manufacturing sector that, according to theoretical and empirical literature, determine the MNE's decision to invest in the affiliates, i.e., to register positive net FDI flows in our sample. All the variables enter in the model lagged one period, with the exception of firm age, to avoid

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[25] However, there are recent papers such as Fons-Rosen et al. (2013) that estimate a positive but non-significant impact in the productivity evolution of affiliates for a wide range of countries. Other documents verify the existence of such a causality relationship in specific cases, e.g. Girma et al. (2006), for British exporting companies. In contrast, Harris and Robinson (2002) find that FDI inflows negatively influence the productivity evolution of British affiliates.

[26] Available empirical evidence, in general terms, points towards the lack of significant effects on employment [Arndt and Mattes (2010)], or in any case positive [Arnold and Javorcik (2009)], primarily affecting skilled work [Bandick and Karpaty (2007)].

[27] See Caliendo and Kopeinig (2008) for a detailed description.

[28] In order to apply PSM two primary assumptions need to be verified. The first is that productivity -or employment- and being an FDI recipient are not correlated, once controlled by a combination of firms' characteristics. This assumption implies that unobservable factors do not play any role for a MNE when deciding to invest in a Spanish manufacturing company (*conditional independence assumption, CIA*). The second one refers to the need for *treatment group companies* (affiliates) to have a counterpart within the *control group* (domestic firms), and for all companies to show a positive probability of receiving FDI flows (*common support assumption*).

endogeneity problems. The dummies γ_s and δ_t give information, respectively, about the manufacturing sector that the company belongs to (12 manufacturing sectors are identified) and the reference year. Regarding the estimation results (see table 3), all the coefficients show the expected signs and all the variables are statistically significant. In this way, larger and younger firms, with a more skilled workforce, exporting and undertaking FDI activities abroad have a higher probability of receiving positive net FDI flows.[29]

Once the probability of a company becoming an affiliate has been estimated, the matching of each affiliate with domestic firms that share similar features is performed (what is known as *counterfactual*).[30] In order to do this exercise, there are different procedures. In this article, with the aim of preserving the robustness of the results, different options are considered. Firstly, *nearest neighbor* is used, with and without replacement, i.e., considering the likelihood that the same domestic company is simultaneously matched with more than one affiliate.[31] Also, one-to-one and one-to-five matches are allowed (in the latter, one affiliate is matched to five *counterfactuals*). Lastly, the algorithm known as *radius matching* is also used, according to which, once a range has been specified for the estimated likelihood of receiving FDI, each affiliate in the sample is matched with all the domestic companies which could have received FDI within that probability range. As table 4 illustrates,[32] once matching has been performed, it is feasible that variables determining a MNE's decision to invest through FDI in a Spanish manufacturing firm could have a different value in affiliates (*treatment group*) and domestic companies (*control group)*, but this difference is not significant. The results obtained upon applying the usual contrasts, i.e., balance tests, guarantee the quality of the matching, and therefore, the use of domestic companies as a *proxy* of how the affiliates would have behaved had they had not been object of FDI (the aforementioned *counterfactual*).

The different development of employment and productivity in affiliates and their corresponding *counterfactuals* proxies the average FDI impact on these variables. Following Heckman et al. (1997) proposal,[33] the average expected value of the analyzed variables, i.e., the accumulated growth in employment and TFP in both groups of companies [which is known as the *average effect of the treatment on the treated* (ATT)] is estimated:

$$ATT_{DD} = \frac{1}{n}\sum[E(Y_{t+d}^1 - Y_t^1|D=1) - E(Y_{t+d}^0 - Y_t^0|D=1)] \qquad [2]$$

Where *D* is a dummy variable that takes the value of 1 if the company receives FDI and 0 otherwise. Y^1 is the analyzed variable (accumulated growth in employment or TFP) of the affiliates, and Y^0 refers to the *counterfactual*. Finally, *d* refers to the number of years since the first positive

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[29] It should be mentioned the reason why those variables related to innovation activity and financial restrictions were not included in the *probit* model. The former is due to, albeit significant, the number of observations decrease drastically, which avoids estimating the average FDI impact accurately. Regarding the financial constraints, sometimes they were not significant (namely if they are listed in a stock exchange and indebtedness ratio), which it may be explained again by the low number of observations. With respect to external liabilities variable, after running the balancing tests they were not qualified (they inform about the *common support* assumption validity) in some cases.

[30] In all cases the matching is performed using as counterfactual domestic firms from the same sector and reference year as those of the affiliates.

[31] Different ranges (*calipers*) are applied on the estimated probability of receiving FDI, when the matching is performed. In particular, ranges from 0.1%-1% are considered, in line with previous empirical studies.

[32] Due to space constraints, in the table 4 only the balancing tests with respect to nearest neighbor 1-1 with replacement algorithm, for a 1% *caliper*, are presented in the case of FDI average impact on productivity. Balancing tests results about the other algorithms included in tables 5, as well as those regarding the average impact on employment (table 6), are very similar (available upon request).

[33] Heckman et al. (1997) propose to estimate the ATT combining PSM with a difference-in-difference estimator, in order to enhance the efficiency of the estimates, considering those unobserved firm specific factors that remain constant over time.

net FDI flow was recorded, which is represented as *t*. In tables 5 and 6, the results obtained are summarized, which it may be interpreted with some caution given the caveats mentioned in the previous section. The impact of FDI on the affiliates´ productivity dynamics turns to be positive and significant in all the cases. This impact reaches its maximum value two years after having received the first positive net FDI flow, registering an accumulated growth in the TFP of the affiliates of between 18.6%-19.6% higher than those of domestic companies (*counterfactuals*). This result is in line with the most recent empirical papers available. However, the impact on employment in manufacturing affiliates, although negative, is not significant in any case, in line with Arndt and Mattes (2010) regarding German affiliates.[34]

The results presented in this paper are in line with those identified in other studies focusing on Spanish affiliates. In general, the effect of FDI on productivity is higher in sectors with higher technological content or in regions with a typically higher FDI base level [Bajo et al. (2010)]. At the firm level studies, positive effects on productivity in affiliates undertaking R&D activities are estimated [Guadalupe et al. (2012)]. As for the impact of FDI on employment, the available evidence for Spain finds a reduced effect regarding the manufacturing sector [Fernández-Otheo and Myro (2008)].

The estimations obtained confirm the positive FDI impact on productivity for the affiliates and, as a consequence, on their competiveness and exporting capacity. These improvements in competitiveness would ease the possibility for the Spanish economy to retrace a sustainable growth path in the future. Therefore, measures aimed at eliminating the barriers that make the introduction of FDI in Spain difficult should be positively assessed. In this context, the labour reform has promoted the continuation of the wage moderation process. Keeping labour costs evolution under control will generate improvements in competitiveness, not only directly, through cost-cutting, but also indirectly, through the appeal of FDI inflows into Spain and their positive impact on productivity.

5 Conclusions

In a context of restricted access to external financing, foreign direct investment (FDI) inflows are contributing to support investment in Spain. Empirical evidence finds a positive relationship between FDI inflows and affiliates´ productivity. Therefore, it is of great interest to analyze the impact of this financing channel on the development of productivity and employment in Spain, particularly for Spanish manufacturing firms with foreign capital share in their ownership structure. Furthermore, this analysis is of great relevance in an environment of diminishing unit labour costs (ULCs) and labour market flexibilization. These factors will strengthen the role of Spain as an FDI host economy in the coming years.

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[34] Besides the decrease in the sample size due to the matching, it should be noted that the sectorial structure of those firms analysed in tables 5 and 6 is very similar to the one of the full sample. In addition, the results obtained are not biased towards the FDI inflows of a given year. FDI impact on productivity and employment restricting the dynamics up to 2 years was also estimated, providing very similar results as those presented in this paper. Finally, robustness exercises considering alternative *probit* models or a wider definition of affiliates were also performed. The results obtained are, again, in line with those described in this paper (these estimations are available upon request).

In order to study the impact of FDI on firm's performance a database has been designed combining firm-level data from three different statistical sources: Balance of Payments, the Central Balance Sheet Data Office and the Business Register. This database offers a much higher coverage than those used in previous studies on Spain both in terms of the number of firms and the time period (2001-2010). Even though, the data presents some caveats, which require interpreting the estimated results with caution. In line with the evidence available both for Spain and others countries, Spanish affiliates of foreign companies in the manufacturing sector make up a very small percentage of all the companies, are larger, have a more skilled workforce, perform most of innovation in each sector and have a more intense and diversified international activity. At the same time, their productivity level is higher than that of domestic companies, as much if we consider labour productivity as, especially, the total factor productivity (TFP).

In line with the most recent studies, this paper estimates the impact of FDI on the TFP dynamic and employment accurately, using a methodology which allows to correct the selection bias which may occur when foreign multinational firms pick *ex-ante* the most productive firms within each sector (*cherry picking*). The procedure known as propensity score matching (PSM) allows this selection bias to be taken into account, and combining it with a difference-in-difference estimator permits to properly estimate the impact of FDI inflows on firms' performance. The results obtained confirm that with regard to the Spanish manufacturing sector, FDI inflows have had a positive impact on the productivity of affiliates. This result could be explained by the internationalization theory hypothesis that states that MNEs directly transfer a range of intangible assets to their affiliates, experiencing a more beneficial development in their productivity. This result is of great importance, since the existence of positive direct channels that affect the productivity of affiliates is an essential condition for *spillover* effects to occur in domestic firms. In addition to this, with the current context where the recovery of the Spanish economy depends on the boosting of the external sector, a positive impact of FDI on the TFP of affiliates should be assessed positively, to the extent that it can allow their production to be increased and their exporting potential to be raised.

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APPENDIX

Total factor productivity (TFP) is calculated as the difference between the output (gross value added, GVA) and those inputs used (capital and labour). From the different available specifications, this paper initially uses a Cobb-Douglas production function, and after applying a logarithmic transformation the following equation is derived:

$$y_{it} = \beta_0 + \beta_k k_{it} + \beta_l l_{it} + \varepsilon_{it} \qquad [1]$$

Where y_{it} is the log of the output of firm i in year t, whilst k_{it} y l_{it} are the inputs (in logs) related to capital and labour, respectively. β_0 estimates info on the average efficiency of firms over time. The error term, ε_{it}, can be disentangled in two components. First, the productivity shocks ω_{it}, which are not observed but they are known by the companies[35] (and which corresponds the TFP to be estimated), and an independently and identically distributed error term (i.i.d.), called η_{it}, which represents those deviations due to measurement errors or other unexpected circumstances:

$$y_{it} = \beta_0 + \beta_k k_{it} + \beta_l l_{it} + \omega_{it} + \eta_{it} \qquad [2]$$

As ω_{it} is not observed, it adds a simultaneity problem in the previous equation, as it implies that the error term will be correlated with the inputs. In order to solve it, Levinsohn y Petrin (2003), following the Olley y Pakes (1996) proposal, suggest to use intermediate inputs or energy consumption as an instrument to proxy ω_{it}, as there is always information available on them and they respond smoothly to production shocks. In addition, Wooldridge (2009) implements the whole procedure in only one equation under the generalized method of moments (GMM) non-parametric approach. This proposal provides more efficient estimates due to two reasons: standard errors are calculated in a robust way, and it avoids the possible correlation between the error terms of the equations in the semiparametric two steps procedure.
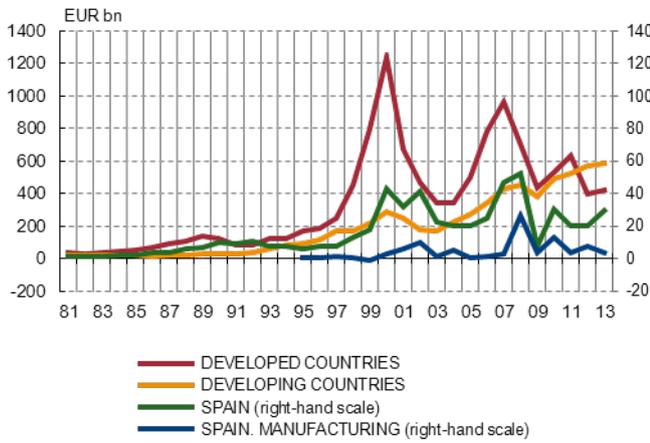
In relation to the variables need for the estimation, regarding the firm output the gross value added (GVA) at factor cost terms is used as a proxy, defined as the difference between production and intermediate consumption. All the variables are in real terms, so GVA deflators from the National Accounts at the NACE-2009 two-digit level are used[36] to deflate the output. Labour input is referred to the average number of employees reported by firms. Capital is proxied by the fixed assets accounting value, which is deflated dividing it by the gross fixed capital formation deflator provided by National Accounts. Finally, intermediate inputs accounting value is deflated using an industrial prices weighted average index from those sectors providing intermediate inputs, following Javorcik et al. (2004) proposal. Weights are derived from 2008 input-output tables, and they represent the share of those inputs used in every sector.

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[35] Firms react to negative productivity shocks lowering their production level, which implies a lower usage of inputs (capital and labour). On the other hand, positive productivity shocks imply an output increase, demanding more inputs as a consequence.

[36] The two-digit GVA deflators of the NACE-2009 are not available in some cases. For example, the food products, beverages and tobacco sectors (which correspond with divisions 10 to 12 of the NACE-2009 classification) appear together as one sector. For this reason, the sector breakdown used in this paper considers 12 manufacturing sectors.

INWARD FDI TRANSACTIONS EVOLUTION

EUR bn

DEVELOPED COUNTRIES
DEVELOPING COUNTRIES
SPAIN (right-hand scale)
SPAIN. MANUFACTURING (right-hand scale)

INWARD FDI TRANSACTIONS IN SPAIN: BREAKDOWN BY SECTOR (average) (a)

EUR bn

REAL ESTATE
OTHER
FINANCIAL AND INSURANCE ACTIVITIES
TRANSPORTATION AND STORAGE
WHOLESALE AND RETAIL TRADE
CONSTRUCTION
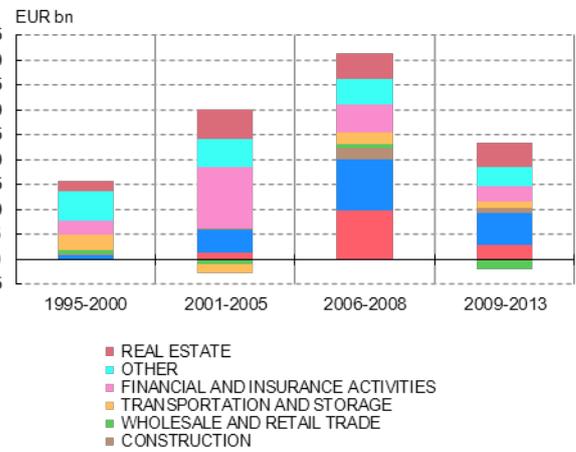
INWARD FDI TRANSACTIONS IN MANUFACTURING SECTOR: BREAKDOWN BY TECHNOLOGICAL CONTENT (b)

EUR bn

LOW-TECHNOLOGY INDUSTRIES
MEDIUM-LOW-TECHNOLOGY INDUSTRIES
MEDIUM-HIGH-TECHNOLOGY INDUSTRIES
HIGH-TECHNOLOGY INDUSTRIES
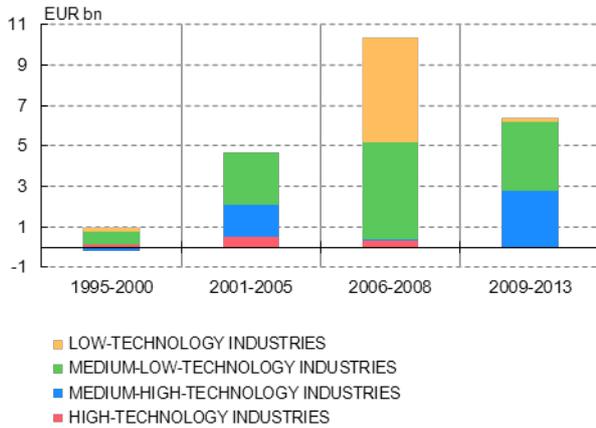
FDI LIABILITIES STOCK. GEOGRAPHICAL BREAKDOWN. YEAR 2013

EUR bn

EMU17
OTHER DEVELOPED COUNTRIES
LATIN AMERICA
ASIA AND OCEANIA (c)
REST OF THE WORLD
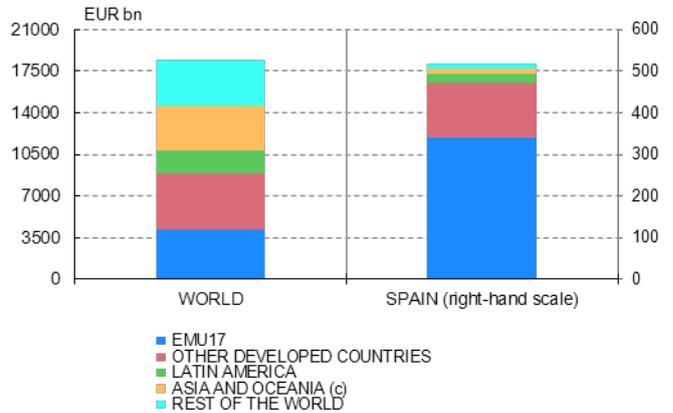
SOURCES: UNCTAD, Reuters and Banco de España.

a. It should be taken into account that during 1995-2007 NACE-93 Rev. 1 classification is used, being replaced by NACE-2009 classification as from 2008.
b. OECD ISIC Rev. 3 technology intensity definition is used. based on NACE-93 Rev. 1 during 1995-2007, NACE-2009 during 2008-2013.
c. Australia and Japan are excluded.

Affiliates vs domestic firms (b)
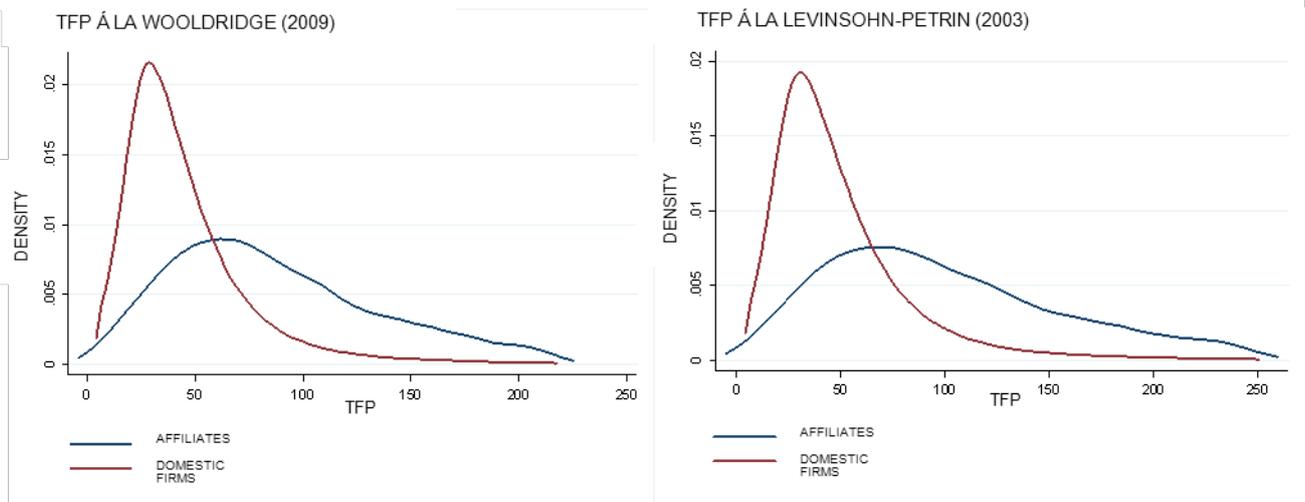
SOURCE: Authors' calculations based on Balance of Payments, Central Balance Sheet Data Office and Business Register statistics.

a. These distributions are estimated using a Kernel density function, in particular, the Epanechnikov function. Previously those observations below/above P1/P99 percentiles have been deleted from the sample. TFP definition can be found at the annex.
b. Affiliates are those firms receiving positive net FDI flows in shares and other equity during 2001-2010. Therefore, those companies receiving negative (disinvestments) and both positive and negative net FDI flows are excluded.

	Description
Workforce	Number of employees
Firm age	Firm seniority (2010-year of creation)
Innovation	Dummy which takes a value of 1 if the firm carried out R&D activities
Innovation intensity	R&D expenses share on gross value added (GVA) at basic prices
Skilled workforce	Share of managers, support scientific and intellectual, technical, professional and similar staff on total workforce
Temporary ratio	Non-permanent employees on total workforce ratio
Fixed capital per employee ratio	Share of fixed capital (EUR thousands) on total workforce
Indebtedness ratio	Percentage of interest-bearing external funds on interest-bearing liabilities at current prices
External liabilities ratio	Long and short term external liabilities (suppliers included) on total assets
Listed on stock exchange	Dummy which takes a value of 1 if the firm is listed on a stock exchange
Labour productivity (GVA/workforce)	Share of gross value added at factor cost (EUR thousands) on total workforce
Average wages	Personnel costs (social security expenses included, EUR thousands) share on total workforce
Relative unit labour cost (ULC)	Percentage of every firm ULC on the euro area sectorial ULC (excluding Spain). ULC is defined as the share of personnel costs on GVA at factor cost
Importing intensity	Goods and/or non-tourism services imports share on turnover
Exporting intensity	Goods and/or non-tourism services exports share on turnover
Exporter	Dummy which takes a value of 1 if the firm exported goods and/or non-tourism services
FDI abroad	Dummy which takes a value of 1 if the firm undertook FDI abroad in shares and other equity

SOURCE: Authors' own elaboration based on Balance of Payments, Central Balance Sheet Data Office and Business Register statistics.

SPANISH MANUFACTURING AFFILIATES CHARACTERISTICS (a)
2001-2010 median

Table 2

	Affiliates (b)	Domestic firms	Number of observations	
			Affiliates (b)	Domestic firms
Workforce	28.0	6.0	5,902	716,790
Firm age	15.0	15.0	5,875	713,702
Innovation (c)	3.6	0.3	229	1,722
Innovation intensity	3.7	3.0	226	1,708
Skilled workforce	14.4	12.6	777	5,914
Temporary ratio	6.7	7.8	5,285	647,527
Fixed capital per employee ratio	40.8	12.4	5,539	673,192
Indebtedness ratio	36.7	27.7	1,276	24,998
External liabilities ratio	57.1	58.5	5,098	592,462
Listed on stock exchange (c)	0.2	0.0	30	234
Labour productivity (GVA/workforce)	46.7	26.5	5,229	657,653
Average wages	32.2	21.1	5,539	673,972
Relative unit labour cost (ULC)	2.7	18.2	5,115	632,979
Importing intensity	11.1	3.1	3,852	93,612
Exporting intensity	13.5	3.0	3,818	89,872
Exporter (c)	80.8	26.7	8,394	156,096
FDI abroad (c)	18.8	1.1	701	3,167
Sample total number of firms	1,645	127,679		

SOURCE: Authors´ calculations based on Balance of Payments, Central Balance Sheet Data Office and Business Register statistics.

a. The database includes 822,520 observations referred to 129,324 firms. NACE-2009 classification is used, assigning the most recent available 4-digit code to every firm throughout the whole sample. Coke and refined petroleum products manufacturing sector is excluded due to confidentiality issues.
b. Affiliates are those firms receiving positive net FDI flows in shares and other equity during 2001-2010. Therefore, those companies receiving negative (disinvestments) and both positive and negative net FDI flows are excluded.
c. The value of this variable indicates the percentage of firms having the characteristic in question. For example, innovation value should be interpreted as 3.6% of affiliates carried out R&D activities, whilst this share stood at 0.3% for domestic firms.

Dependent variable	Affiliates
Workforce (b)	0,00075***
	(0,000)
Fixed capital per employee ratio (b)	0,00023*
	(0,000)
Firm age (b)	-0,00100***
	(0,000)
Average wages (b)	0,00181***
	(0,001)
Temporary ratio	-0,00002**
	(0,000)
Importing intensity	0,00005***
	(0,000)
Exporting intensity	0,00002***
	(0,000)
Exporter	0,00150***
	(0,000)
FDI abroad	0,00155**
	(0,001)
Sector and year dummies	YES
Likelihood function	-1,554.2
Pseudo R^2	0.100
Prob > Chi^2	0.000
Number of observations	106,141

SOURCE: Authors' calculations based on Balance of Payments, Central Balance Sheet Data Office and Business Register statistics.

a. Variables definition can be found at Table 1. The probit model includes a constant. Dependent variable takes a value of 1 in the period at which the firm received the first postive net FDI inflow, 0 if it is a domestic firm. Average marginal effects are reported. Standard deviations are in brackets. *, **, *** denote statistical significance at 10%, 5% and 1%, respectively. All variables, except firm age, are lagged one period.
b. As natural logarithm.

MATCHING BALANCING TESTS: FDI IMPACT ON AFFILIATES PRODUCTIVITY (a) Table 4
Matching algorithm: nearest neighbor 1-1 with replacement. Caliper 0.01

Variable (b)	Sample	Affiliates	Domestic firms	p-value	standard bias (%) (c)
Workforce (d)	Unmatched	4.4	3.0	0.000	106.3
	Matched	4.4	4.2	0.487	11.7
Fixed capital per employee ratio (d)	Unmatched	3.7	2.9	0.000	68.1
	Matched	3.7	3.6	0.663	6.2
Firm age (d)	Unmatched	3.2	3.0	0.000	32.7
	Matched	3.2	3.2	0.711	-6.2
Average wages (d)	Unmatched	3.4	3.2	0.000	79.9
	Matched	3.4	3.4	0.701	5.6
Temporary ratio (d)	Unmatched	13.4	18.6	0.030	-27.0
	Matched	13.5	13.2	0.898	1.7
Importing intensity	Unmatched	18.8	8.7	0.000	59.1
	Matched	17.5	18.0	0.871	-2.8
Exporting intensity	Unmatched	20.8	11.0	0.000	45.7
	Matched	18.5	22.2	0.299	-17.0
Exporter	Unmatched	91.8	67.1	0.000	64.0
	Matched	91.4	90.1	0.788	3.2
FDI abroad	Unmatched	11.8	1.2	0.000	43.5
	Matched	11.1	8.6	0.601	10.2

SOURCE: Authors´ calculations based on Balance of Payments, Central Balance Sheet Data Office and Business Register statistics.

a. Affiliates are those firms receiving positive net FDI flows in shares and other equity during 2001-2010. Therefore, those companies receiving negative (disinvestments) and both positive and negative net FDI flows are excluded.
b. Average values of every variable, as well as equality test p-values and standard bias are reported. Variables definitions can be found at Table 1. All variables, but firm age, are lagged one period.
c. Standard bias of every X variable is defined as in Rosenbaum and Rubin (1985):
$SB=100*(X_1-X_0)/\sqrt{(0,5*(V_1(X)+V_0(X)))}$
Where X_1 is the affiliates average value, and X_0 the one referred to domestic firms. $V_1(X)$ y $V_0(X)$ are mean variances of the aforementioned variables of affiliates and domestic firms, respectively.
d. As natural logarithm.

Table 5

Matching algorithm		ΔIn(TFP) (b)			
		Acquisition year	One year later	Two years later	Three years later
Nearest neighbor 1-1 with replacement. Caliper 0.01	Affiliates	0.138	0.098	0.095	0.071
	Domestic firms	0.020	-0.026	-0.091	-0.067
	ATT_{DD} (c)	0.119**	0.124	0.186**	0.139*
		(0.057)	(0.099)	(0.078)	(0.079)
	Number of affiliates	81	81	81	81
Nearest neighbor 1-5 with replacement. Caliper 0.001	Affiliates	0.159	0.186	0.139	0.117
	Domestic firms	0.024	-0.001	-0.049	-0.054
	ATT_{DD} (c)	0.135*	0.187**	0.188**	0.171*
		(0.069)	(0.086)	(0.081)	(0.091)
	Number of affiliates	56	56	56	56
Nearest neighbor 1-1 without replacement. Caliper 0.01	Affiliates	0.138	0.098	0.095	0.071
	Domestic firms	0.020	-0.026	-0.091	-0.067
	ATT_{DD} (c)	0.119**	0.124	0.186**	0.139*
		(0.054)	(0.087)	(0.073)	(0.077)
	Number of affiliates	81	81	81	81
Radius matching. Caliper 0.001	Affiliates	0.159	0.186	0.139	0.117
	Domestic firms	0.021	-0.006	-0.057	-0.069
	ATT_{DD} (c)	0.138**	0.192**	0.196***	0.186**
		(0.068)	(0.083)	(0.073)	(0.080)
	Number of affiliates	56	56	56	56

SOURCE: Authors' calculations based on Balance of Payments, Central Balance Sheet Data Office and Business Register statistics.

a. Affiliates are those firms receiving positive net FDI flows in shares and other equity during 2001-2010. Therefore, those companies receiving negative (disinvestments) and both positive and negative net FDI flows are excluded.
b. It is always calculated with respect to the pre-acquisition period (when the fist positive net FDI flow is recorded).
c. Average FDI effect on affiliates' TFP is reported, combined with a difference-in-difference estimator (DD). See equation 2 from section 4. Standard deviations estimated via bootstrapping with 100 replications are in brackets. *, **, *** denote statistical significance at 10%, 5% and 1%, respectively.

Matching algorithm		Δln(Workforce) (b)			
		Acquisition year	One year later	Two years later	Three years later
Nearest neighbor 1-1 with replacement. Caliper 0.01	Affiliates	0.010	0.013	0.000	-0.089
	Domestic firms	0.032	0.062	0.041	0.035
	ATT$_{DD}$ (c)	-0.022	-0.049	-0.041	-0.124
		(0.033)	(0.041)	(0.049)	(0.076)
	Number of affiliates	89	89	89	89
Nearest neighbor 1-5 with replacement. Caliper 0.001	Affiliates	-0.001	0.003	-0.007	-0.112
	Domestic firms	0.026	0.038	0.026	0.002
	ATT$_{DD}$ (c)	-0.027	-0.035	-0.033	-0.114
		(0.038)	(0.046)	(0.055)	(0.120)
	Number of affiliates	64	64	64	64
Nearest neighbor 1-1 without replacement. Caliper 0.01	Affiliates	0.010	0.013	0.000	-0.089
	Domestic firms	0.032	0.062	0.041	0.035
	ATT$_{DD}$ (c)	-0.022	-0.049	-0.041	-0.124
		(0.032)	(0.041)	(0.044)	(0.082)
	Number of affiliates	89	89	89	89
Radius matching. Caliper 0.001	Affiliates	-0.001	0.003	-0.007	-0.112
	Domestic firms	0.017	0.030	0.018	0.004
	ATT$_{DD}$ (c)	-0.018	-0.027	-0.025	-0.116
		(0.031)	(0.037)	(0.052)	(0.088)
	Number of affiliates	64	64	64	64

SOURCE: Authors' calculations based on Balance of Payments, Central Balance Sheet Data Office and Business Register statistics.

a. Affiliates are those firms receiving positive net FDI flows in shares and other equity during 2001-2010. Therefore, those companies receiving negative (disinvestments) and both positive and negative net FDI flows are excluded.
b. It is always calculated with respect to the pre-acquisition period (when the fist positive net FDI flow is recorded).
c. Average FDI effect on affiliates' TFP is reported, combined with a difference-in-difference estimator (DD). See equation 2 from section 4. Standard deviations estimated via bootstrapping with 100 replications are in brackets. *, **, *** denote statistical significance at 10%, 5% and 1%, respectively.