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FDI HELP?

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MAX WEBER PROGRAMME

The Elusive Impact of Investing Abroad for Japanese Parent Firms:
Can an Analysis of the Motives for FDI help?

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Abstract

We investigate whether previous findings of only limited effects of investing abroad on the performance of firms can be explained by the aggregation of heterogeneous effects depending on the motive for foreign direct investment (FDI), sector and location. Our results suggest, in line with previous work, that on average outward Japanese FDI has limited effects (either positive or negative) on the activity of internationalizing firms. Fears of "hollowing out" effects seem to be more justified in the case of FDI to low income countries, in which case a contraction in employment, investment and exports is observed. By contrast, we observe a significant positive employment effect for FDI in services, presumably reflecting operational complementarities between the affiliate and the parent. There is also some evidence of labour productivity gains particularly from FDI in manufacturing in high GDP countries.

Keywords

FDI, multinationals, offshoring, propensity score matching

JEL Code: F14, F21, F23

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1-Introduction

The claims for a link between expansion abroad and redundancies which are often advanced in the public debate contrast sharply with emerging empirical evidence suggesting only limited effects of investing abroad on domestic employment and the performance of parent firms (Aubert and Sillard, 2005; Brown and Spletzer, 2005; Barba Navaretti and Castellani, 2004; Kleinert and Toubal, 2008; Hijzen, Jean and Mayer, 2009). In the context of Japan, somewhat more optimistic findings have been obtained suggesting that outward manufacturing foreign direct investment (FDI) tends to strengthen the domestic economic activities of internationalizing firms in terms of both output and employment (Hijzen, Inui and Todo, 2007; Ando and Kimura, 2007). This finding is in line with the prevalent view in the literature that FDI and exports are complementary. As far as an effect on productivity is concerned, Hijzen, Inui and Todo (2007) do not find any significant effect in manufacturing. However, productivity gains seem to occur in services (Ito, 2007) suggesting a heterogeneous impact of moving abroad across industries.

This paper investigates whether findings of non-significant effects (either positive or negative) of locating production abroad can be partly explained by a failure of estimation techniques to take this heterogeneity into account. More precisely, findings of a limited average impact of moving production abroad may coexist with the fact that the results of moving abroad vary considerably across sectors and depend on a variety of conditions related to the sector, the location of the affiliates and the motives for FDI. Preliminary evidence that the effects of outward investment differ depending on investment strategy is given by Debaere, Lee and Lee (2009) for Korea, and by and Hijzen, Jean and Mayer (2009). This paper therefore aims to study how the effects of moving abroad on domestic employment and the performance (investment, productivity and trade) of internationalizing Japanese firms depend on conditions related to the parent firm's sector (manufacturing versus non-manufacturing), its motives for FDI, and the characteristics of its affiliates.

We rely on a new dataset that combines information on manufacturing and non-manufacturing internationalizing Japanese firms with data on the characteristics of their subsidiaries. These data allow an investigation into the heterogeneity of the effect of moving abroad on employment, investment, productivity and trade performance across sectors and

countries. While much is known about parent firm characteristics (Greenaway and Kneller, 2007), little is reported about the characteristics of subsidiaries in the international economics literature. Our data set gives us a new interesting insight into the characteristics of affiliates and their relationship with their parent firms that helps us to discriminate between the various investment strategies of Japanese firms and to study the specific impact at home of these investments.

One first sign that the impact of FDI on the domestic performance of Japanese firms is context-specific comes from the cross-country variation in the destination of sales by affiliates. While 81% of the sales of manufacturing Japanese affiliates located in North America are made locally, in China the figure is only 47%. The shares of sales back to Japan are respectively 30% and 41% for these two countries. In contrast, the share of local purchases is 57% in North America, but the analogous figure for China is 66%. These statistics tend to show that Japanese firms are looking for low-cost production sites in China (vertical division of labour) while they are following horizontal or market-seeking strategies in the context of North American markets.

These contrasting cases reflect diverging motives for internationalizing firms establishing an affiliate abroad. One of the contributions of our paper is that it exploits information on the country location and the regional breakdown of affiliates' sales and purchases to distinguish between the two main motives for establishing an affiliate abroad that have been broadly discussed in the literature on FDI: market-seeking (horizontal) FDI or factor-seeking (vertical) FDI. It might be anticipated that the production factor displacement effect of vertical FDI is likely to be more pronounced than that of horizontal FDI. Pure horizontal FDI may however be expected to lead to the relocation of the part of production that was previously exported, resulting in a decline in exports.

In order to evaluate the potential effects of the role of outward FDI on the economic performance of firms in Japan, we would ideally like to compare the performance of firms that go global with the counterfactual performance these firms would have shown if they had not decided to become multinationals. Since this counterfactual outcome is by definition unobservable, we use propensity score matching techniques to construct a valid control group of domestic Japanese firms. Matching the firms involves re-constructing ex post the missing information on how multinationals would have performed had they not decided to

internalize when a randomised control group is not available. A comparison between the performance of firms that have turned into multinationals with the domestic firms identified by the matching procedure as having similar characteristics (as synthesized by the propensity score) allows us to extract the pure effect of going multinational. We combine propensity score matching with difference-in-difference estimation to compare the performance of the two types of firms. This method was first applied to the estimation of the effect of investing abroad by Barba Navaretti and Castellani (2004).[1] We follow Kleinert and Toubal (2008), who, in their analysis of the growth in output, employment and productivity of German firms, refine this technique. Our matching technique thus ensures that the performance of a firm initiating production abroad in a given year is compared with the performance of firms in the same sector in the same year. The control group is thus defined to be sector- and year-specific, a restriction not adopted in previous papers on Japan (Hijzen, Inui and Todo, 2007; Ito, 2007).

Results suggest, in line with previous work, that on average outward Japanese FDI has limited effects (whether positive or negative) on the activity of internationalizing firms. Fears of employment losses associated with production relocation are globally rejected. Our empirical findings however confirm previous insights that the effect of moving abroad is heterogeneous depending on the sector (manufacturing versus non-manufacturing), country of location and the motive for FDI (vertical or horizontal). Fears of "hollowing out" effects seem to be more justified in the case of FDI to low income countries, for which a contraction in employment, investment and exports is observed. By contrast, we observe a significant positive employment effect for FDI in services, presumably reflecting operational complementarities between the affiliate and the parent. There is some evidence of positive labour productivity gains, which seem to derive essentially from FDI in manufacturing in high GDP countries and notably non-Asian countries, presumably reflecting learning by doing and technological spillovers shared between the parent and the affiliate. These results are consistent with the finding of a substitute relationship between FDI and exports in the manufacturing sector but not in the non-manufacturing sector.

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[1] These authors apply this method to a data set of Italian firms for the years 1994 to 1998. They find that foreign investments improve the growth of total factor productivity and output, but not of employment.

The remainder of the paper is structured as follows. Section 2 provides some background on the link between the motivation for and the expected impact of FDI on activity at home. In Section 3 we provide a detailed discussion of the methodology, present the data used for the study and analyse the determinants of becoming a multinational in order to construct an appropriate counterfactual. Section 4 presents our results on the effects of investing abroad. Finally, Section 5 concludes.

2-Heterogeneity of motives for FDI and its impact at home

One of the contributions of our paper is an investigation into the potential heterogeneity of the effect of FDI on the parent firm according to the type of FDI the firm undertakes. Our dataset linking parents and affiliates details a breakdown of the affiliate's sales into sales to the local market, to Japan, and to the rest of the world. This allows us to distinguish between the two main motives for establishing an affiliate abroad that have been identified in the literature on FDI. The first is market-seeking or horizontal FDI. In this case, the parent firm typically chooses to produce in a foreign country in order to serve the foreign local market from its production there instead of paying high transport costs to export. This type of investment usually allows a firm to reach markets at lower cost than directly exporting from the parent's location. It is thus supposed to lead to the replication of identical activities in different locations. The second motive is factor-seeking or vertical FDI, where a firm decides to localize all or some of its production processes abroad because prices for factors or intermediate goods are cheaper there than in the home country. Recently, evidence has emerged of a so-called complex FDI strategy, whereby investing abroad responds to a combination of both vertical and horizontal motives.

The consequences of investing abroad on the parent's activity are likely to depend on the underlying FDI strategy. As far as employment at home is concerned, both horizontal and vertical investment strategies may result in job losses when domestic production for either export or local consumption is relocated to the foreign affiliate. However, one might expect that the displacement effect of vertical FDI is likely to be more pronounced than that of horizontal FDI. In the former (vertical) case, the relocation could concern all activities that can be carried out more cheaply under the host country's factor prices, while in the latter (horizontal) case it would be limited to the part of production that was previously exported to

the host market. In any case, becoming a multinational does not necessarily result in job losses at home. Jobs might even be created when the establishment of foreign plants represents an expansionary investment or involves scale effects due to productivity improvements, or when there are important production complementarities.

Concerning export activities, horizontal FDI is expected to reduce exports at home since production abroad to serve the local market would substitute previous exports from the parent location. In contrast, vertical FDI could trigger an increase in exports as intermediate inputs (made at home) are shipped to foreign affiliates for processing. The impact on imports is also likely to depend on the FDI strategy. Replication of identical activities in different locations should reduce the parent's imports, while the development of complementary activities whether upstream or downstream would have the opposite impact.

Another consequence of the relocation of domestic production to a foreign country concerns productivity. On the one hand, investing abroad could reduce efficiency at home through a decreasing plant-level scale effect (Barba Navaretti and Venables, 2004). This effect would derive from the loss of a production stage or from a decrease in exports, which would also result in lower production capacities. A negative impact is thus more likely for vertical than for horizontal FDI. On the other hand, investment abroad could produce learning by doing and the sharing of sunk costs (for example R&D) and information across affiliates, resulting in productivity gains at home. A priori, more significant productivity gains are expected from vertical FDI, as the less productive assembling activities are sent abroad allowing the parent firm to specialise in those production activities in which it is most efficient.

When we look at the characteristics of Japanese overseas affiliates, a first indicator that both motives for FDI are important for Japanese firms can be found by analyzing the share of total sales which are local for the affiliates in our sample. We observe much heterogeneity across countries for this variable. As shown in Table A-1 in the Appendix A, while this ratio is on average 76% in developed countries (with per capita GDP above 10,000 US$), it drops to a mean of 46% for the poorest countries with per capita GDP below 1,500 US$. In contrast, the average share of sales back to Japan is 28% for developed countries and rises to 43% for the poorest countries. These contrasting cases reflect the two diverging FDI motives for internationalizing firms establishing an affiliate abroad. The sales figures for developed countries are typical of the first main motive, which is market-seeking or horizontal FDI. The

figures for the poorest countries are in contrast suggestive of the second motive, which is factor-seeking or vertical FDI.

3- Econometric Methodology

3-1 The Matching procedure

In order to evaluate the impact of investing abroad on the economic outcome of Japanese firms, we adopt a propensity score matching technique in combination with a difference-in-difference (DID) estimator. This allows us to construct via a non-parametric method the missing counterfactual observation of the outcome of a switching firm if it had not decided to engage in outward FDI. This approach classifies firms into two categories: those that have invested abroad in our sample period, called the treated group, and those that did not invest abroad. Observations of this untreated group are used to construct the counterfactual of the outcome of a switching firm.

An important feature for the accurate construction of the counterfactual is the selection of a valid control group which has comparable observable characteristics to the treated group. The purpose of matching in this context is to pair each firm moving abroad with a firm that is similar in all aspects except that of investing abroad. By 'matching' firms from the group of untreated firms (those who did not invest abroad) that are very similar in their pre-treatment observable characteristics with the treated (those who invested abroad), we can infer the mean difference in outcomes resulting from the treatment (the investment abroad).

Once matched, the only observable difference between treated and untreated firms is their treatment status. Using our matched control group, we analyze the average effect of the treatment on the treated (ATT):

$$\hat{\alpha}_{ATT} = E(y^1 - y^0 \big| D = 1) = E(y^1 \big| D = 1) - E(y^0 \big| D = 1) \text{,} \qquad (1)$$

where y^1 and y^0 are the treated and non-treated outcomes respectively and D is a dummy variable, which equals 1 when a firm is treated and 0 otherwise. Matching is thus a non-parametric method that focuses on the mean difference in outcomes between the treated and the untreated over the common support, appropriately weighted by the distribution of

participants. The performance of this technique requires appropriately determining along which dimensions to match the firms and what type of weighting scheme to use.

The matching method relies on two assumptions: the conditional mean independence assumption (CIA) and the common support assumption (CS). The common support assumption requires that all treated firms have a counterpart in the untreated population and all firms have a positive probability of investing abroad. The CIA is a strong assumption that requires that, conditional on observables, the non-treated outcomes are independent of treatment status. Since firms normally self-select into the group of multinational firms as a result of various firm characteristics such as size, age or productivity, this assumption is expected to be violated. A solution to the challenge of finding an appropriate counterfactual when firms differ along several dimensions is the use of propensity score matching. This method matches firms according to their probability of switching into a multinational, which is conditional on their pre-switching characteristics. This reduces the dimensionality problem since matching is then performed on the basis of a single index that captures all the information from the (observable) characteristics of the firm before investing abroad. Rosenbaum and Rubin (1983) show that the CIA remains valid once propensity score-matching is done appropriately. Hahn (1998) suggests that a propensity score may also improve the efficiency of the evaluation.

The propensity score is defined as the propensity to establish an affiliate abroad as a function of observable characteristics X:

$E(D \mid y, X) = E(D = 1 \mid X)$.

It will be estimated in Section 3.3 via a logit model.

The literature proposes various matching methods. Since we can draw from a large control group, we use the five nearest neighbours matching method.[2] Following Kleinert and Toubal (2006), our matching technique ensures that the performance of a firm initiating production abroad in a given year is compared with the performance in the same year of firms in the same sector. The control group is thus defined to be sector- and year-specific, a restriction not adopted in previous papers on Japan (Hijzen, Inui and Todo, 2007; Ito, 2007).

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[2] As a robustness test, we also perform one and three nearest neighbours matching. We obtain results similar to those obtained with three neighbours (reported in Section 4).

Following Heckman et al. (1997) and Blundell et al. (2004) we combine propensity score matching with the difference-in-differences estimator. This method allows us to mitigate the risk of violation of the CIA due to unobservable characteristics unaccounted for in the matching procedure. As presented above, the propensity score is conditional on only a limited number of observable characteristics X. If a firm bases its investment decisions for example on future expected profits, which are unobserved by the econometrician, then the CIA assumption would still be violated. By comparing growth rates instead of levels before and after the year of the switch, we control to some extent for selection on unobservable characteristics that could influence firm performance but which have not been captured by the matching procedure. We thus compare differences in growth rates after the year of the switch, taking into account potential differences in growth rates that already existed before switching.

3-2-Data and variables

3-2-a-Identification of switchers

In this paper, we focus on firms that switch from being purely domestic to being multinationals. Our strategy for identifying switching firms, i.e. Japanese firms investing abroad for the first time between 1995 and 2003, relies on confronting information coming from two different datasets: the basic survey on Overseas Business Activities conducted annually by the Ministry of Economy, Trade and Industry (METI) and the basic survey of Japanese Business Structure and Activities (BSBSA). The strength of the BSBSA survey is its sample coverage and the reliability of its data, as the survey is compulsory for manufacturing and non-manufacturing firms with more than 50 employees and with capital of more than 30 million yen. We access data for the period of consecutive years 1994-2004 allowing us to compute the yearly change in performance resulting from becoming a multinational firm between 1995 and 2003.

The basic survey on Overseas Business Activities provides yearly data on more than 27,000 Japanese investments in operation between 1995-2004, containing information on the starting date, sector, country of location and other details allowing inference of the nature and objective of the investment (notably breakdowns of sales and purchases between local, to

Japan and to other locations). The data set also allows the attribution of affiliates to their parent firm via a parent identification code. We use the information on start dates to identify affiliates (and their related parent firms) that appear to become multinationals starting in 1995. Some data limitations nevertheless have to be considered: whereas firms located in Japan report relatively well to the BSBSA, information from the affiliates is not compulsory and so we have a high number of Japanese affiliates that do not report regularly and the exact number of affiliates not sending back the survey at all is not known.

An initial selection of 601 parents initiating FDI projects[3] abroad for the first time in the period 1995-2003 is obtained after cleaning to keep only affiliates providing consistent information over time (notably on the country of location, the date of entry and the sector of operation). This is then merged with the domestic information about the Japanese firms (such as size and productivity) from the Basic survey of Japanese Business Structure and Activity through the Japanese parent identification code. This survey provides information on overseas activities which allows us to double check the "first time abroad after 1994" character of the firms. We use information on loans and investments in related firms abroad reported in 1991 and yearly since 1994 to identify switching firms as those which report positive loans and investments in a related firm abroad for the first time after 1994 (and not before). We consequently exclude from our switching group those firms that report a positive investment in a related firm abroad in 1991 or 1994 or that never report positive investment in the BSBSA. Lastly, we exclude firms if more than 33% of their capital is held by a foreign company. Our final sample includes 150 Japanese switching firms in non-primary sectors providing the necessary information to compute propensity scores and we then find matching firms for them. Out of the 150, 115 are manufacturing firms and 35 are in the wholesale or retail sector.

Further details concerning the data used in the estimations can be found in the data appendix (Appendix A), which includes Tables A-2, A-3 and A-4 showing the number of Japanese switching firms by year and by country for manufacturing and non manufacturing[4] respectively. A number of important features are immediately apparent: the attraction of the

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[3] These include 121 investments in the wholesale and retail sector, 75 in other services, 5 in the primary sector and 400 in the manufacturing sector.
[4] Manufacturing includes light industries, heavy industries, machinery, electronics and automobiles. Non-manufacturing corresponds to wholesale and retail sales.

US, the concentration of Japanese affiliates in Asia (especially China) and their near absence from the non-Asian developing world.

3-2-b-Determinants of switching and outcome variables

As a first step, we estimate a logit model that evaluates the probability of a domestic firm becoming a multinational. This gives us the propensity score for each firm that is used for the matching. Our logit specification follows the literature on the determinants of FDI and accounts for the firm's profit over sales ratio, its age, the total factor productivity (calculated following Olley and Pakes, 1996), the capital to labour ratio, and its mean wage level (Kleinert and Toubal, 2006; Hijzen et al., 2006). Given the short time span of our sample, we rely on contemporaneous values for our right-hand side variables since using lags would result in an important loss of observations.

Our DID estimations investigate the impact of investing abroad on several indicators of the parent firm's performance: employment, investment, total factor productivity (TFP), labour productivity (value-added over total employment), exports and imports. Employment is subdivided into the two categories of business and administrative employment. Administrative employment is employment at the headquarters of the firm dedicated to administrative and planning activities, notably surveying and planning, IT services, international headquarters and other headquarter office activities. Business employment covers all other employees.

For all these variables, we calculate the yearly growth rates. In the DID estimations we then compare the differences between the growth rate of the switching firms and that of their matched domestic firms before and after the switch.

3-3-Propensity score matching

To obtain the propensity score for each firm, both treated and untreated, we first estimate a logit model, where we estimate the probability of switching. Since we are interested in the probability of switching from a purely domestic to a multinational firm, we limit our sample to firms that never switch and stay domestic all the time and firms that switch from being

domestic to multinational within the time span of our sample period 1994* to 2004. Our logit model takes the following form:

$$FDI\_start_{it} = a + b\mathrm{Age}_{it} + c\mathrm{TFP}_{it} + d\frac{\mathrm{Profit}_{it}}{\mathrm{Sales}_{it}} + e\mathrm{L}_{it} + f\frac{K_{it}}{L_{it}} + \varepsilon_{it}.$$

The dependent variable FDI_start_{it} takes the value 0 if firm i is not involved in FDI in year t, 1 if the firm starts FDI during that year, and any observation after the entry is not coded (Ito, 2007).

In order to compare the propensity scores of firms that have similar characteristics and to avoid, for example, matching a firm in the textile sector in 1996 with a firm in electronic machinery in 2002, we classify our firms into 7 sectors and allow matching only between observations from the same year and sector pair (as proposed by Kleinert and Toubal (2006)). We thus obtain 66 sector-year pairs. Our logit model is therefore estimated for each of these sector-year pairs separately.

Table A-5, where we display a pooled logit estimation for all sectors and years, shows that all explanatory variables have the expected signs and the coefficients are all significant. The propensity of domestic firms to establish a presence abroad depends positively on the level of TFP, the level of profits, the size of the firm (proxied by employment), the capital to labour ratio and its age. These results are very much in line with the model presented in Helpman, Melitz and Yeaple (2004), which suggests that more productive and larger firms self-select into multinationals.

The regression coefficients obtained are then used to predict the probability of a firm becoming a multinational in each year. This predicted probability is called the propensity score and will be the matching criterion. Each treated firm is then matched according to its propensity score to its five nearest neighbours within its sector-year sub-sample.[5] Note that we ensure that a switcher is only allowed to match with a purely national firm and not with a firm that will switch later during our sample period.

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[5] The advantage of using five instead of only one nearest neighbour reduces the impact of outliers in the control group sample.

Table 1 displays the balancing test for the five nearest neighbours matching method. It reports the means of a range of variables. The two groups of firms vary substantially in the characteristics reported: the average employment, profit over sales and capital over employment ratios are significantly different for the treated and the control observations in the unmatched sample. After matching, the differences reduce significantly. The correcting impact of matching is reflected in the bias reduction, which reaches 90% for age and the capital to employment ratio. This evolution indicates that the balancing condition is satisfied in our matched sample.

4-Difference in Difference estimations

In this section, we present the difference-in-difference estimations on the propensity scores obtained from matching the two groups of firms. We first estimate the impact of FDI for our complete sample and for our different outcome variables (growth in employment, investment, productivity and trade) and then explore the heterogeneity of the impact according to the motive for FDI.

4-1 Total sample

Table 2 reports the DID results for all outcome indicators for the total sample. The coefficients displayed can be interpreted as a change in the growth rate of the respective indicator in percentage points.

The first part shows results without the imposition that matching must occur within a sector-year pair (as in previous work on Japan); the second part follows the method described above, thus ensuring that the performance of a firm initiating production abroad in a given year is compared with the performance in the same year of firms in the same sector. We see that the results vary substantially according to the matching criteria. When restricting matching to sector-year pairs we find that outward FDI is associated with a significant reduction in exports and a significant increase in labour productivity. The impact of locating production abroad on employment and imports is also positive, but not significant.

These first aggregate results differ from those of Hijzen et al. (2006), who find a strengthening of domestic employment following FDI and no productivity effect. It is hard to pin down the exact reason for the difference. It may be due to the use of a different matching

procedure, the limitation of our sample to switching firms with information on their affiliates, or the inclusion of non-manufacturing firms. In the next section, we thus separate between manufacturing and non-manufacturing to see whether impacts vary across industries.

4-2 Manufacturing versus Nonmanufacturing

In Table 3, we split our sample into manufacturing and non-manufacturing depending on the sector of activity of the parent firms. As a robustness check, Table 4 shows a split based on the sector of activity of the affiliates. We find consistent results in both Tables. They suggest that the results obtained for the total sample are mainly driven by the manufacturing sector. This should not come as a surprise as this sector accounts for nearly 70% of the total sample.

We find that FDI in manufacturing is associated with faster labour productivity growth and reduced export growth. Production in Japanese affiliates seems to substitute previous exports from Japan. However, overall there is no sign of a significant contraction in employment or investment in the parent firm. In contrast, there is some evidence of positive labour productivity gains, which would be coherent with some information- or cost-sharing between the parent and the affiliate. No such effects are found in the non-manufacturing sector, but the split uncovers an increase in administrative employment in Japanese headquarters following FDI in non-manufacturing. This result presumably reflects complementarities between the parent and affiliate's activities.

4-3 Location country heterogeneity

We push our analysis further and investigate the role of the location of the affiliates. In Table 5, we split our sample between Asian and non-Asian countries. We see here that the negative impact on exports is entirely driven by the opening of affiliates in other Asian countries, whereas the positive impact on labour productivity comes from affiliates located in non Asian countries. FDI to non Asian countries is furthermore associated with an increase in imports. The difference in results for Asian and non-Asian locations appears to reflect heterogeneity in income rather than have a purely geographical explanation. Indeed, as shown in Table 6, evidence of "hollowing out" effects is found in the case of FDI to low income countries (income per capita below 1500\$[6]) for which a contraction in employment, investment and

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[6] Countries are defined as high or low income countries depending on their average GDP per capita over the period 1995 to 2004.

exports is observed, while the significant productivity gain is specific to FDI in high-income countries. Our results indicate that, on average, based on the aggregate data, there is no significant effect of FDI on employment. There is however some evidence of employment losses in productive activities associated with the relocation of production to poor (mainly Asian) countries.

Table 7 reports results specifically for FDI to China and the US respectively. Again, we find a consistent picture. China-based Japanese affiliates seem to host production previously carried out in Japan and exported to China. FDI to China is thus associated with a decline in exports and investment in the parent firm. The employment effect is negative but not significant, possibly because of the limited sample size. In sharp contrast, the creation of affiliates in the US brings productivity gains and increases imports to the parent firm. This result, similar to the one obtained for the high income countries sample, suggests productivity improvements through learning by doing and economies of scale based on shared sunk costs in production or in R&D activities. It is likely that the parent firm is able to repatriate some developments (particularly those related to new products or adaptations to the local market) emanating from affiliates in the US and other rich countries.

In the next section, we further investigate our contrasting results depending on the income level of countries. In particular, we assess the extent to which they reflect heterogeneous motives for moving abroad in parent firms. High income countries are typically known to attract market-seeking investments, whereas low income countries have the advantage of lower wages than Japan and often also of lower prices for intermediate goods. Our impact analysis is pursued by separating FDI projects into horizontal and vertical ones.

4-4 Vertical versus horizontal FDI
In Table 8, we investigate the specific impact of moving abroad on the subsamples of projects identified as horizontal FDI and vertical FDI. We define manufacturing affiliates characterized by a high share of local sales (>40%) as horizontal FDI and manufacturing affiliates with high shares of sales back to Japan (>50%) as vertical FDI.

Whatever the economic performance indicator used, no significant impact is found for our sub-sample of vertical FDI projects. The previously obtained results (on the total sample) of a positive impact of production abroad on labour productivity appear to derive exclusively from

affiliates created in order to supply the local market (horizontal FDI). For the sub-sample of market-seeking FDI we also find evidence of a reduction in export growth. This effect appears to correspond to that which we found for the low-income countries sub-sample (Table 6). This result suggests that part of FDI to low income countries is market seeking, and thus that FDI in China and other low income countries follows a complex strategy combining both the outsourcing of activities that can be produced more cheaply there and the movement of production close to dynamic consumer markets.

5-Conclusion

In this paper, we have investigated whether findings of limited effects of investing abroad on firm performance can be explained by the aggregation of heterogeneous effects. We have analyzed how the effect of moving abroad on domestic employment and performance (investment, productivity and trade) of internationalizing Japanese firms depends on conditions related to the parent's sector of activities (manufacturing versus non manufacturing), motives for FDI, and characteristics of their affiliates. Our aggregate results based on a combination of the difference in difference technique and propensity score matching confirm previous findings that on average outward Japanese FDI has limited effects (whether positive or negative) on the activity of internationalizing firms. Fears of huge employment losses in production or hopes of massive TFP gains associated with initiating production abroad are rejected both on average and on our different sub-samples. Previous findings of a limited and elusive impact of investing abroad are thus not due to a lack of consideration of heterogeneity.

We nevertheless find that FDI in manufacturing is associated with faster labour productivity growth and reduced export growth, while evidence of positive administrative employment gains is found for FDI in services, presumably reflecting operational complementarities between the affiliate and the parent. Fears of "hollowing out" effects seem to be more justified in the case of FDI to low income countries, for which a contraction in production employment, investment and exports is observed. We find that positive labour productivity gains essentially derive from FDI in manufacturing in high GDP countries and notably non-Asian countries, presumably reflecting learning by doing and technological spillovers shared between the parent and the affiliate.

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APPENDIX A

Table A-1 Summary Statistics on Japanese affiliates abroad (average over the period 1995-2004): breakdown of sales and purchases by sector and country of affiliate

	Share of sales (in %)		Share of purchases (in %)	
	local	Japan	local	Japan
Total sample of Japanese affiliates	0.65	0.32	0.58	0.47
Sector of Japanese firms	Manufacturing sector only			
	Share of sales		Share of purchases	
	local	Japan	local	Japan
All countries	0.61	0.35	0.56	0.46
Developed countries (GDP per capita>10,000 $)	0.76	0.28	0.58	0.49
Low income countries (GDP per capita<1,500 $)	0.46	0.43	0.54	0.41
China	0.47	0.45	0.66	0.34
North America	0.81	0.30	0.57	0.53
Europe	0.80	0.26	0.57	0.57
Asia	0.56	0.36	0.56	0.43
Sector of Japanese firms	Non-Manufacturing sector only			
	local	Japan	local	Japan
All countries	0.74	0.22	0.65	0.52
Developed countries (GDP per capita>10,000 $)	0.74	0.18	0.61	0.55
Low income countries (GDP per capita<1,500 $)	0.72	0.40	0.90	0.32
China	0.45	0.69	1	0.31
North America	0.88	0.19	0.63	0.70
Europe	0.58	0.13	1	0
Asia	0.71	0.23	0.64	0.45

Note: Sales and purchases are typically divided into local, Japanese and origin or destination in other markets. The other markets should correspond to the residual share after local and Japanese market shares are deducted. The fact that the sum of local and Japanese market shares is sometimes higher than 100% in this table is due to rounding up issues.

Table A-2: Number of switching Japanese firms by year of establishment of first affiliate

Year	Total	1995	1996	1997	1998	1999	2000	2001	2002	2003
Switchers	150	43	42	26	9	4	10	3	6	7
of which in manufacturing	115	33	35	20	6	3	5	2	5	6

Table A-3: Sectoral and regional allocation of the sample of 150 switching firms

	Manufacturing	Non-manufacturing: sales & services
Total sample	115	35
Developed countries (GDP per capita>10,000 $)	44	22
Low income countries (GDP per capita<1,500 $)	50	6
China	31	3
US	23	6
North America	25	7
South America	0	0
Europe	9	1
Asia	86	27

Table A-4: Country distribution of the sample of 150 switching firms

Country	Number	% of sample
Australia	2	1.33
China	34	22.67
Hong Kong	14	9.33
Indonesia	7	4.67
Korea	3	2.00
Malaysia	8	5.33
New Zealand	1	0.67
Philippines	8	5.33
Singapore	7	4.67
Taiwan	5	3.33
Thailand	20	13.33
U.K.	5	3.33
USA	29	19.33
Vietnam	7	4.67
Total	150	100

Table A-5: Logit estimation - whole sample. All Japanese firms between 1994 and 2004

	Decision to start investing abroad
Age	0.001***
	(0.000)
Tfp	1.655***
	(0.020)
Profit/sales	0.153***
	(0.019)
Employment	0.354***
	(0.030)
K over L ratio	0.002**
	(0.001)
Time FE	Yes
Sector FE	Yes
Observations	182,816
Pseudo R-squared	0.09

TABLES:

Table 1: Balancing test: 5-nearest neighbour matching

Variable	Sample	Mean		% reduction		t-test	
		Treated	Control	%bias	Bias red	T	p>t
TFP	Unmatched	1.7462	1.7155	21.8		7.12	0.000
	Matched	1.7462	1.7291	12.2	44.1	1.23	0.220
Profit /sales	Unmatched	6.1492	5.5382	37.0		12.21	0.000
	Matched	6.1492	5.6802	28.4	23.2	1.95	0.052
Employment	Unmatched	5.9291	5.657	27.8		9.75	0.000
	Matched	5.9291	5.7566	17.6	36.6	1.82	0.069
K/L-ratio	Unmatched	16.059	17.097	-5.3		-1.58	0.114
	Matched	16.059	16.107	-0.2	95.4	-0.86	0.389
Age	Unmatched	43.007	41.364	10.2		3.57	0.000
	Matched	43.007	39.157	23.9	-134.3	0.85	0.397

Table 2: Difference-in-difference analysis of performance of parent firms moving abroad between 1995 and 2003: Whole Sample

All parent firms - Matching without controlling for year and sector of switching firm

	TFP	Labour Prod.	Total Empl.	Business Empl.	Adm. Empl.	Capital	Exports	Imports
Treatment	0.003	0.093	0.001	-0.012	0.095	-0.053	-0.553[*]	0.080
St dev	0.006	0.058	0.020	0.036	0.138	0.090	0.292	0.484
Treated	150	150	150	150	134	150	150	150
Untreated	701	701	701	695	595	701	701	701
Obs	851	851	851	845	729	851	851	851

All parent firms - Matching by sector and year

	TFP	Labour Prod.	Total Empl.	Business Empl.	Adm. Empl.	Capital	Exports	Imports
Treatment	0.004	0.109[**]	0.001	0.003	-0.009	-0.074	-0.598[**]	0.352
St dev	0.005	0.054	0.017	0.032	0.113	0.089	0.291	0.385
Treated	150	150	150	150	134	150	150	150
Untreated	701	701	701	695	595	701	701	701
Obs	851	851	851	845	729	851	851	851

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3: Difference-in-difference analysis of performance of parent firms moving abroad between 1995 and 2003: Manufacturing versus non-manufacturing parents

Parents in manufacturing

	TFP	Labour Prod.	Total Empl.	Business Empl.	Adm. Empl.	Capital	Exports	Imports
Treatment	0.003	0.142**	0.002	0.021	-0.143	-0.071	-0.874***	0.538
St dev	0.006	0.070	0.017	0.031	0.124	0.108	0.328	0.431
Treated	115	115	115	115	103	115	115	115
Untreated	532	532	532	530	459	532	532	532
Obs	647	647	647	645	562	647	647	647

Parents in non-manufacturing

	TFP	Labour Prod.	Total Empl.	Business Empl.	Adm. Empl.	Capital	Exports	Imports
Treatment	0.007	-0.001	-0.006	-0.054	0.436*	-0.084	0.310	-0.258
St dev	0.008	0.059	0.043	0.090	0.246	0.125	0.534	0.682
NT	35	35	35	35	31	35	35	35
Untreated	169	169	169	165	136	169	169	169
Obs	204	204	204	200	167	204	204	204

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4: Difference-in-difference analysis of performance of parent firms moving abroad between 1995 and 2003: Manufacturing versus non-manufacturing affiliates

Affiliates in manufacturing

	TFP	Labour Prod.	Total Empl.	Business Empl.	Adm. Empl.	Capital	Exports	Imports
Treatment	0.005	0.156**	-0.009	0.002	-0.170	-0.123	-0.904**	0.448
St dev	0.006	0.076	0.018	0.037	0.126	0.113	0.364	0.451
Treated	104	104	104	104	92	104	104	104
Untreated	701	701	701	695	595	701	701	701
Obs	805	805	805	799	687	805	805	805

Affiliates in non-manufacturing

	TFP	Labour Prod.	Total Empl.	Business Empl.	Adm. Empl.	Capital	Exports	Imports
Treatment	0.002	0.001	0.021	0.007	0.344*	0.037	0.096	0.136
St dev	0.007	0.065	0.033	0.064	0.203	0.141	0.456	0.685
Treated	46	46	46	46	42	46	46	46
Untreated	701	701	701	695	595	701	701	701
Obs	747	747	747	741	637	747	747	747

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: Difference-in-difference analysis of performance of parent firms moving abroad between 1995 and 2003: Split by destination countries: Asian versus non-Asian countries

Non Asian countries

	TFP	Labour Prod.	Total Empl.	Business Empl.	Adm. Empl.	Capital	Exports	Imports
Treatment	0.005	0.157*	0.031	-0.028	0.001	-0.149	-0.019	1.418*
St dev	0.013	0.089	0.056	0.211	0.033	0.180	0.635	0.788
Treated	37	37	37	34	37	37	37	37
Untreated	701	701	695	595	701	701	701	701
Obs	738	738	732	629	738	738	738	738

Asian countries

	TFP	Labour Prod.	Total Empl.	Business Empl.	Adm. Empl.	Capital	Exports	Imports
Treatment	0.003	0.093	-0.006	-0.003	0.001	-0.049	-0.787**	0.003
St dev	0.005	0.067	0.038	0.124	0.018	0.102	0.326	0.434
Treated	113	113	113	100	113	113	113	113
Untreated	701	701	695	595	701	701	701	701
Obs	814	814	808	695	814	814	814	814

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6: Difference-in-difference analysis of performance of parent firms moving abroad between 1995 and 2003: Split by income of destination countries: High versus low income countries

High GDP countries

	TFP	Labour Prod.	Total Empl.	Business Empl.	Adm. Empl.	Capital	Exports	Imports
Treatment	0.004	0.118*	-0.005	0.165	0.003	0.030	-0.302	0.697
St dev	0.006	0.069	0.037	0.138	0.018	0.124	0.347	0.516
Treated	94	94	94	85	94	94	94	94
Untreated	701	701	695	595	701	701	701	701
Obs	795	795	789	680	795	795	795	795

Low GDP countries

	TFP	Labour Prod.	Total Empl.	Business Empl.	Adm. Empl.	Capital	Exports	Imports
Treatment	0.003	0.093	0.018	-0.310*	-0.004	-0.248*	-1.093**	-0.227
St dev	0.007	0.089	0.059	0.162	0.037	0.127	0.497	0.535
Treated	56	56	56	49	56	56	56	56
Untreated	701	701	695	595	701	701	701	701
Obs	757	757	751	644	757	757	757	757

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 7: Difference-in-difference analysis of performance of parent firms moving abroad between 1995 and 2003: China and US sub-samples

Affiliates in China

	TFP	Labour Prod.	Total Empl.	Business Empl.	Adm. Empl.	Capital	Exports	Imports
Treatment	-0.003	0.137	0.012	-0.235	-0.015	-0.245[*]	-1.186[*]	0.300
St dev	0.009	0.123	0.065	0.211	0.040	0.148	0.688	0.656
Treated	34	34	34	32	34	34	34	34
Untreated	701	701	695	595	701	701	701	701
Obs	735	735	729	627	735	735	735	735

Affiliates in the US

	TFP	Labour Prod.	Total Empl.	Business Empl.	Adm. Empl.	Capital	Exports	Imports
Treatment	0.007	0.190[*]	0.017	-0.017	-0.018	-0.198	-0.044	1.490[*]
St dev	0.019	0.108	0.060	0.260	0.039	0.215	0.808	0.891
Treated	29	29	29	26	29	29	29	29
Untreated	701	701	695	595	701	701	701	701
Obs	730	730	724	621	730	730	730	730

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 8: Difference-in-difference analysis of performance of parent firms moving abroad between 1995 and 2003: Horizontal versus vertical motives (manufacturing only)

Vertical FDI - Manufacturing affiliates only

	TFP	Labour Prod.	Total Empl.	Business Empl.	Adm. Empl.	Capital	Exports	Imports
Treatment	-0.001	0.059	-0.015	-0.014	-0.125	-0.106	-0.457	0.249
St dev	0.010	0.104	0.042	0.065	0.215	0.134	0.711	0.972
Treated	37	37	37	37	32	37	37	37
Untreated	701	701	701	695	595	701	701	701
Obs	738	738	738	732	627	738	738	738

Horizontal FDI - Manufacturing affiliates only

	TFP	Labour Prod.	Total Empl.	Business Empl.	Adm. Empl.	Capital	Exports	Imports
Treatment	0.008	0.243[*]	0.010	0.017	-0.074	-0.058	-1.071[**]	-0.117
St dev	0.010	0.126	0.023	0.047	0.223	0.172	0.472	0.797
Treated	54	54	54	54	49	54	54	54
Untreated	528	701	701	695	595	701	701	701
Obs	582	755	755	749	644	755	755	755

* significant at 10%; ** significant at 5%; *** significant at 1%

European University Press