The heterogeneity of the impact of investing abroad: Evidence from matched Japanese firms[¥]

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Long abstract

In the present paper we analyze the effects of investing abroad using firm-level data for Japan for the period 1994-2004. We adopt propensity score matching techniques in combination with a difference-in-differences (DID) estimator to evaluate the causal effect of establishing a foreign affiliate on a set of domestic outcome variables of interest. We focus on firms that switch from being a purely domestic firm to being a multinational firm.

Our identification strategy of switching firms, i.e. Japanese firms investing for the first time abroad between 1995 and 2003, relies on the confrontation of information coming from two different data sets: 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 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, the country of location and other details of the nature and objective of the investment. The data set also allows the attribution of affiliates to their parent firm via a parent identification code. We use the information on when the operation started to identify affiliates (and their related parent firms) that appear to become multinationals after 1994.

Our final data set then combines information on manufacturing and non-manufacturing internationalizing Japanese firms with characteristics of their subsidiaries and allows us to investigate the heterogeneity of the effect of moving abroad on employment, investment, productivity and trade performance. This data set thus allows to contribute to the literature since until today while much is known about parent firms characteristics (Greenaway D. and R. Kneller, 2007), little is known about characteristics of subsidiaries in international economics literature. Our data set gives us new interesting insight into characteristics of the affiliates and their relation with the parent firms that will help us to identify investment strategies of the Japanese firms and the according impact on the parent firm.

Whereas preliminary results at the aggregated level are in line with existing literature (Hijzen et. al 2007), suggesting that Japanese outward FDI has limited effects on domestic

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employment and the performance of internationalizing firms on average, we see that results differ significantly depending on the sector (manufacturing versus non manufacturing), country of location and the FDI type (vertical or horizontal).

We find horizontal FDI more likely to spur productivity growth but at the expenses of export performance. Fears of job losses associated with production relocation are rejected on average but results strongly vary depending on the country of destination.

Japanese manufacturers that established a foreign affiliate in rich countries (especially North America) enjoyed significant white collar employment creation. Although horizontal FDI seems to create TFP gains on average, increase in productivity for vertical FDI is only witnessed in low income countries. Fears of "Hollowing out" effects seem to be justified in the case of relocation to low income countries, for which a contraction of employment and investment is observed.

Keywords: FDI, multinationals, offshoring, propensity score matching

JEL Code: F14, F21, F23

1-Introduction

The often advanced claims of a link between relocation and lay-offs in the public debate contrast sharply with the emerging empirical evidence suggesting limited effects of relocation of production on domestic employment and performance of internationalizing firms (Aubert and Sillard, 2005; Brown and Spletzer, 2005; Barba Navaretti and Castellani, 2004 and Kleinert and Toubal, 2008).

In the context of Japan, results on manufacturing firms moving abroad even suggest that Japanese outward FDI tends to strengthen the domestic economic activities of internationalizing firms in terms of both output and employment (Hijzen, Inui and Todo, 2007). This finding is held to be in line with the stylized fact in the literature that FDI and exports are complements. As far as the effect on productivity is concerned, no significant effect is found in manufacturing (Hijzen, Inui and Todo, 2007). However productivity gains seem to occur in services (Ito, 2007) suggesting a heterogeneous impact across industries of moving abroad.

Previous results might be partly driven by an inappropriate estimation technique that does not take into account this heterogeneity. More precisely, findings of limited impact of relocation of production abroad on average may coexist with the fact that the aftermath of moving

abroad varies considerably across sectors and depends on a variety of conditions related to the location of the affiliates and the FDI motives.

Therefore, this paper aims at studying how the effect of moving abroad on domestic employment and performance (investment, productivity and trade performance) of internationalizing firms depends on conditions related to the parent's sector of activities (manufacturing versus non manufacturing), FDI motives and their affiliates' characteristics.

Despite the recent boost of FDI in the service sector, comparison between manufacturing and service internationalizing firms has scarcely been done.[1] While most of the literature concentrates on manufacturing because concerns about job losses in that sector have been widespread, it is of interest to investigate also the influence on relocation on services. Indeed, one potential effect of relocation is productivity improvements, typically expected in a market-seeking FDI setup. Improving the productivity of service industries is seen as a top priority for achieving sustainable growth in the Japanese economy at a time when the nation's population is set to decline (Morikawa, 2007a and 2007b). Despite recent efforts to understand the sources of productivity in the services sector (Kim, Kwon, and Fukao, 2007), the potential effect of FDI has not been studied.[2] Since internationalization may be thought of as a strategy to boost TFP, this paper aims at measuring the effects of relocation abroad on Japanese firms in the recent period which is a crucial prerequisite to formulating strategies to help Japanese retailers and wholesalers to internationalize in order to boost their productivity.

We rely on a new dataset that combines information on manufacturing and non-manufacturing internationalizing Japanese firms with characteristics of their subsidiaries to investigate the heterogeneity of the effect of moving abroad on employment, investment, productivity and trade performance. This dataset thus allows to contribute to the literature since until today while much is known about parent firms characteristics (Greenaway D. and R. Kneller, 2007), little is known about characteristics of subsidiaries in international economics literature. Our data set gives us new interesting insight into characteristics of the

[1] Ito (2007) is the only exception applied to the Japanese context we know of.

[2] Amiti and Wei (2006) show that service outsourcing by manufacturing sector has positive influence on value added of that industry, using US manufacturing data of 1992-2000. But they do not analyze activities by domestic service industries.

affiliates and their relation with the parent firms that will help us to identify investment strategies of the Japanese firms and the according impact on the parent firm.

One first sign that FDI impact on domestic performance of Japanese firms' internationalization is context-specific comes from the cross-country variation in the allocation of affiliates' sales. While 87% of the sales of manufacturing Japanese affiliates located in North America is made locally, it is only 53% in China. The figures for sales to Japan shares are 19 and 47% respectively for those two countries. In contrast, the share of purchases that are local is 50% in North America, but with an analogous figure of 64% for China. This arguably attests to the role of vertical motives in China and of horizontal or market-seeking motives in the context of North American markets.
These contrasting cases reflect diverging FDI motives for establishing an affiliate abroad by internationalizing firms.

In order to evaluate the potential effects of the role of outward FDI on the economic performance of the firm in Japan and how these effects depend on characteristics of the affiliate as the host country or its sector, we would ideally like to compare the output of firms that go global with the counterfactual outcome these firms would have had if they hadn't decided to become a multinational.

Since this counterfactual outcome is per definition unobservable, we use propensity score matching techniques to construct a valid control group of domestic Japanese firms. Matching involves re-constructing the missing information ex post for those who become multinational had they not decided to do so when a randomised control group is not available. The comparison of the performance of the 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) will allow us to extract the pure effect of becoming a multinational. We combine the propensity score matching with a difference-in-difference estimation to compare the performance of the two types of firms. This method was first employed to the estimation of the effect of investing abroad by Barba Navaretti and Castellani

(2004).[3] Kleinert and Toubal (2008) refine this technique in their analysis of growth in output, employment and productivity on German firms.

In the empirical section of the paper, we will differentiate between different sectors and different types of investment. This approach has been adapted also by Hijzen et al. (2006). Also when differentiating between industries, these authors do not find any statistical differences for French firms between sectors or types of FDI.

Also in our case, preliminary results suggest that Japanese outward FDI has limited effects on domestic employment and performance of internationalizing firms on average. However, we see that results differ significantly depending on the sector (manufacturing versus non manufacturing), country of location and the FDI type (vertical or horizontal). We find horizontal FDI more likely to spur productivity growth but at the expenses of export performance. Fears of job losses associated with production relocation are rejected on average but results strongly vary depending on the country of destination.
Japanese manufacturers that established a foreign affiliate in rich countries (especially North America) enjoyed significant white collar employment creation. Although horizontal FDI seems to create TFP gains on average, increase in productivity for vertical FDI is only witnessed in low income countries. Fears of "Hollowing out" effects seem to be justified in the case of relocation to low income countries, for which a contraction of employment and investment is observed.

The remainder of this paper is structured as follows. Section 2 provides some background. In Section 3 we provide a detailed discussion of the methodology and present the data used for this study. Section 4 analyses the determinants of becoming a multinational in order to construct an appropriate counterfactual that we need to evaluate the effects of investing abroad. Section 5 presents the results. Finally, Section 6 concludes.

2-Horizontal versus vertical FDI

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

In this paper, we attempt to disentangle the effect of FDI on the parent firm according to the type of FDI the firm undertakes. We distinguish between two main motives for establishing an affiliate abroad that have been both broadly discussed in the literature on FDI. The first is the 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 by its production there instead of paying high transport costs for exporting. This type of investment usually allows a firm to reach more markets and is supposed to lead to the replication of identical activities in different locations.
The second motive is the 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 then in the home country.

The consequences of relocation are thus depending on its chosen FDI type. Both horizontal and vertical investment strategies may result in job losses when domestic production for exports or domestic consumption is substituted to the foreign affiliate. However, one might advance that the displacement effect of vertical FDI is likely to be more pronounced than that of horizontal FDI. Pure horizontal FDI is only expected to lead the relocation of that part of production that was previously exported to a specific foreign market.

But becoming a multinational does not necessarily have to result in job losses at the firm level. Jobs might be created when the establishment of foreign plants: i) represents expansionary investment, ii) involves scale effects due to productivity improvements, or when there are iii) important production complementarities.

Another consequence of the relocation of domestic production to a foreign country is a potential reduction in efficiency through a decreasing plant-level scale effect (Barba Navaretti and Venables, 2004). This effect would apply both to a vertical and a horizontal FDI due to the loss of a production stage or to the decrease in exports which would also result in lower production capacities.
For vertical FDI, moving abroad may induce the contraction of home activities following relocation ("Hollowing-Out Effect") but may fuel productivity gains as the less productive assembling activities are sent abroad.

When we look at the Japanese oversea affiliates, a first indicator, that both types of FDI motives are important for Japanese firms, can be found in analyzing the share of local sales in total sales for the affiliates in our sample. For this variable, we observe a strong heterogeneity across countries in the Japanese affiliates' share of local sales in total sales. 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$), it drops to a mean of 48% for the poorest countries with per capita GDP below 1,500 US$. In contrast, the average share of sales to Japan is 27% for developed countries and rises to 48% for the poorest countries.

These contrasting cases reflect the two diverging FDI motives for establishing an affiliate abroad by internationalizing firms. The sales figures for developed countries are typical of the first main motive that is market-seeking or horizontal FDI.
The figures for poorest countries are in contrast suggestive of the second motive that is the factor-seeking or vertical FDI,

In this paper we wish to shed some more light on these possible positive or negative effects of an investment abroad on the parent firm and we will in particular look at the difference between horizontal and 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 hadn't decided to engage in outward FDI. This approach classifies firms into two categories: those that have invested abroad between 1995 and 2004, called the treated group, and those who never invested abroad. This is the group of the untreated and observations of this category will be used to construct the counterfactual of the outcome of a switching firm.

An important feature in the accurate construction of the counterfactual is the selection of a valid control group which has comparable observable characteristics as the treated group. The

purpose of matching in this context is to pair each exiting firm with a firm that continues to export on the basis of some observable variables. By 'matching' firms from the group of untreated firms (those who didn't invest abroad) that are very similar in their pre-treatment observable characteristics to the treated (those who invested abroad), we can compare the mean difference in outcomes between the treated and the untreated.

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

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

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 firms is treated and 0 otherwise.

Since matching involves comparing multinational and national firms across a number of observable pre-internationalization characteristics (notably productivity, size, age) it is difficult to determine along which dimension to match the firms, what type of weighting scheme to use.

The presented matching method relies on two assumptions: the conditional mean independence assumption (CIA) and the common support assumption (CS).

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 based on firm characteristics as size, age or productivity, this assumption is violated. Rosenbaum and Rubin (1983) have shown that CIA remains valid when using the propensity score-matching. This method matches firms according to their probability of switching into a multinational, which is conditional on the pre-switching characteristics of firms. This reduces this 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.

$$E(D \,|\, y, X) = E(D = 1 \,|\, X)$$

In Section 4, we will estimate the propensity score for each firm, i.e. the probability of becoming a multinational via a logit model.

The literature proposes various matching methods. Since we can draw from a large control group, we use the three nearest neighbors matching method. Each switching firm will be matched to the three firms in the same sector and year that have the most similar propensity score.

Nevertheless, the propensity score is conditional on only a limited number of observable characteristics. 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. In order to reduce the risk of the violation of the CIA, for the estimation of the treatment effect on the treated, we employ a difference-in-differences estimator following Heckman et al. (1997) and Blundell et al. (2004). 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. We thus compare differences in growth rates after the year of the switch, taking into account potential differences in growth rates that existed already before switching.

3-2-Data and variables

3-2-a-Identification of switchers

In this paper, we focus on firms that switch from being a purely domestic firm to being a multinational firm. Our identification strategy of switching firms, i.e. Japanese firms investing for the first time abroad between 1995 and 2003, relies on the confrontation of 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 basic survey on Overseas Business Activities[4] provides yearly data on more than 27,000 Japanese investments in operation between 1995-2004 containing information on the starting date, sector, the country of location and other details of the nature and objective of the investment. The data set also allows the attribution of affiliates to their parent firm via a parent identification code. We use the information on when the operation started to identify affiliates (and their related parent firms) that appear to become multinationals after 1994.

[4] We obtain access to the answers for the period consecutive years 1995-2004.

Some data limitations have to be considered nevertheless: whereas firms report relatively well to the BSBSA, information of the affiliates is not compulsory and so we have a high number of Japanese affiliates that does not report regularly and the exact number of affiliates not sending back the survey at all is not known.

The initial selection of 601 parents initiating relocation projects[5] abroad for the first time over the period 1995-2003 was essentially driven by the requirement of covering only affiliates providing consistent information over time (notably on the country of location, the date of entry and the sector of operation). We compute outward FDI characteristics at the parent level (such as the allocation of purchases and sales between local and Japanese markets) as the average features of its affiliate's characteristics over the period from the establishment year to 2004.

Obtained information on the Japanese switching firms' overseas activities is merged with Japanese firms' domestic information (such as size and productivity) from the Basic survey of Japanese Business Structure and Activity through the Japanese parent identification code. The strength of the survey is its sample coverage and the reliability of 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.[6] Out of the 601 parents identified in the basic survey on Overseas Business Activities, only 4 were not present in the BSBSA.[7] This survey provides information on overseas activities which allows to double check the "first time abroad after 1994" character of the Japanese firms. We use information on loans and investments in a related firm abroad reported in 1991 and yearly since 1994 to identify switching firms as firms which report positive loans and investments in a related firm abroad for the first time after 1994 (and not prior). Consequently we exclude from our switcher group the 153 Japanese firms that report positive investment in a related firm abroad in 1991 or 1994 and the 23 Japanese firms that never report positive investment in the BSBSA. We further exclude from the 421 identified switchers 9 which report that more than 33% of their capital is hold by a foreign company.

[5] 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.

[6] The results of the Basic Survey of Japanese Business Structure and Activities are prepared annually by the Research and Statistics Department, METI (1994-2003). This survey was first conducted in 1991, then again in 1994, and annually thereafter. The main purpose of the survey is to paint a comprehensive statistical picture of Japanese corporate firms, including their diversification-, globalization-, R&D- and information technology-related activities. The sample firms account for about one-third of the total national workforce, 99 % of total exports, and 69 % of total imports for Japan in 2002 (Kiyota and Uruta, 2007).

[7] One rationale for missing parents is that the affiliates survey has no sample restriction in terms of firm size or sector, while the Basic survey of Japanese Business Structure and Activity excludes firms small firms and non-manufacturing sectors such as finance, insurance and software services.

The impact of investing abroad on the economic outcome of these switching firms will be assessed based on a propensity score matching technique in combination with a difference-in-difference (DID) estimator. The method which will be detailed in the following section consists in comparing switchers with domestic firms[8] (no overseas subsidiaries at any point during the sample period) that have similar observable characteristics (as synthesized by the propensity score) before the switch.

Due to the unavailability or inconsistency of parent statistics, our final sample covers 410 Japanese switching firms in non-primary sectors, of which 372 provide the necessary information to compute propensity scores. These include 264 manufacturing firms, 92 firms in the wholesale and retail sector and 16 in other services.

Further details concerning the data used in the estimations can be found in the data appendix (Appendix A), which includes Tables A-2 and A-3 showing the number of Japanese switching firms by year and by country and sectors[9] respectively.

Map 1 uses this data to plot the accumulated number of switching Japanese firms in the countries in which they invested between 1995 and 2003. A number of important features of Japanese investment patterns are immediately apparent: the concentration in Asia (especially China), the attraction of the US, and their quasi absence from the non-Asian developing world.

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

In a first step, we estimate a logit model that evaluates the probability for a domestic firm to become a multinational. This will give us the propensity score for each firm needed for the matching. Our logit specification follows the literature on the determinants of FDI by including the firm's profit over sales ratio, its age, the total factor productivity (calculated following Olley and Pakes, 1996), the capital/labor ratio; and its mean wage level (Kleinert and Toubal, 2006; Hijzen et al., 2006).

It would be more sensitive to use lags of at least one year for the independent variables. However, given the short time span of our sample, this would result in an important loss of observations, so we renounce to the lagging of the right hand side variables.

[8] We exclude from our domestic sample firms that report that more than 33% of their capital is hold by a foreign company.

[9] The decomposition into sectors follows a 3-sector nomenclature including manufacturing (light industries, heavy industries, machinery, electronics &automobile), wholesale and retail sales, and other non-manufacturing (utilities & construction, and other services).

For the DID estimations, we will concentrate on certain outcome variables that are of particular interest for the firm; the employment level, the total factor productivity, the investment, total sales and trade performance.

Our data set contains rich information on different type of employment within the parent firm. We distinguish between i) the total employment the firm in all its plants within Japan, *emp* and ii) the administrative employment of the headquarter*, emp_adm*. Typically, we would expect that when creating a new affiliate, more administrative jobs would be needed to ensure the communication and the administration of the new plant. This last variable can also be interpreted as an indicator for white collar workers, whose evolution is linked to the evolution of skill intensity in the parent firm. In the case of vertical FDI, when unskilled labor is replaced by low wage workers in developing countries, one would expect an increase in the skill intensity associated with a decline in blue and white collar employment, where the former is supposedly being more affected. For market-seeking FDI, to the extent that headquarter services are retained at home and become in charge of the administration of foreign affiliates, administrative employment is expected to increase.

The outcome variable *sales* is defined as total sales of the parent firm. In addition, since our data set includes also detailed trade data, we can look at the impact of FDI on imports, *imports*, and exports, *exports.* The latter allows us in particular to test for the theoretical prediction of export substitution in the case of horizontal FDI.

Investment is defined as "Investement and other assets" and is called *inv* in our regressions.

In the DID estimations we use the same TFP variable*, tfp*, as in the logit model, which is constructed following the method of Olley and Pakes (1996). As a robustness check, we also use labor productivity (value added over total employment). Results stay qualitatively the same.

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

4-Propensity score matching

To obtain the propensity score for each firm, treated or 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 i) firms that never switch and stay domestic all the time and ii) firms that switch from being a domestic to being a multinational within the time span of our sample period 1994 to 2004. Our logit model takes the following form:

$$FDI = \propto + bAge + bTFP + Profit + Emp + KL + e$$

The dependent variable *FDI* takes the value 0 if the firm is non-entrant into FDI at year t. This is valid for domestic firms as well as multinationals before their entry during 1995 -2004. We define the observation as 1 at year t when 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 matching of a firm in the textile sector in 1996 with a firm in electronic machineries in 2002, we classify our firms into 7 sectors and allow only matching for observations from the same year (as proposed by Kleinert and Toubal (2006)). We thus obtain 66 sector-year pairs. Our logit model is therefore estimated for each of this sector-year pair separately.

When looking at Table A-4, where we display a pooled logit estimation for all sectors and years, we see that all explanatory variables have the expected signs and the coefficients are all significant. The propensity of domestic firms to establish a foreign presence abroad depends positively on the level of TFP, the level of profits, the size of the firm (proxied by employment), the capital to labor ratio and age. These results are very much line with the model presented in Helpman, Melitz and Yeaple (2004) which suggests that more productive and larger firms self-select into multinationals.

The obtained coefficients of the regressions are then used to predict the probability of a firm to become 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 3 nearest neighbors within its sector-year sub-sample.[10] Note that we

[10] The advantage of using 3 instead of only one nearest neighbor reduces the impact of outliers in the control group sample

ensure that a switcher is allowed to match only a purely national firm and not a firm that will switch later during our sample period.

Table 1 displays the Balancing test for the 3 nearest neighbors matching method. It reports the means of a range of variables. The two groups of firms vary substantially in the reported characteristics: the means of profit/sales, employment as well as the K/L ratio are significantly different for the treated and the control observations in the unmatched sample. However, after matching, we see that the difference in the mean is insignificant for all variables, indicating that the balancing condition is satisfied in our matched sample.

The correcting impact of matching is reflected in the bias reduction, which is 93% for profit/sales.

5-Results

In the following sections we discuss the results from our difference-in-difference estimations. After having obtained the propensity scores for the matching of the two firm groups, we first estimate the impact of FDI in general on the different outcome variables (growth of employment, investment, productivity, sales and trade performance) before we go into more detail by differentiating the impact according to different criteria.

Having verified that our control group is valid, we can start to look at the impact of outward FDI on the performance of the parent firm. As most other papers on this subject, we are mainly interested in the impact on the growth of employment and total factor productivity growth, but we are also looking at growth rates for investment and for exports and for imports.

5-1 Total sample

Table 2 reports the DID results for all outcome indicators for the total sample.[11] Our sample size varies from 252 treated for administrative employment to 278 for sales and total employment.

The estimates show that the average causal effect of locating production abroad on the growth rate of employment at home is positive but not significant in the first after locating the activities abroad. We observe a positive and significant effect of FDI on TFP growth. In contrast, the effect on growth in investment and in export is significantly negative in the first year. The growth of sales and imports are not significantly affected by the internationalization decision.

These first results differ from Hijzen et al. (2006) since the former finds a strengthening of domestic employment following FDI but no productivity effect. These differences might be due to the limitation of our sample to switching firms with information on their affiliates or to the inclusion of nonmanufacturing firms. In the next section, we will thus separate between these two sectors to see whether impacts vary across industries.

3-2 Manufacturing versus Nonmanufacturing

In Table 3, we thus split sample into manufacturing and nonmanufacturing firms. We find that results for the total sample are mainly driven by the manufacturing sector. This shouldn't come as a surprise as this sector accounts for nearly 70% of our total sample.

As found above, we observe a negative impact on investment and exports growth, as well as a significant effect on the TFP growth rate. No such positive impact is present in the nonmanufacturing sector but the split uncovers a strong decrease in the imports for this sector.

5-3 Location country heterogeneity

In a next step, we look at the location of the affiliates. We will split our sample between Asian and non-Asian countries. In addition, we focus on affiliates in China and the US, since these two countries attract a particular high number of affiliates (28% and 20% of the affiliates in our sample are located in China and in US, respectively).

[11] From Table 2 on, we report results from DID estimations.

Our outcome variables of interest in Table 4 are employment and TFP. The results for the aggregate sample do not reveal any significant differences between countries. However, when reducing the sample to manufacturing firms, we see that the TFP gains identified previously come mainly from Non-asian countries and are strongest for North America.

Although on average there is no significant effect of FDI on employment, employment losses seem to follow implantation in China and job creation is identified in Non Asian countries and North America.

Those results may suggest a link between the FDI impact and the development level of host countries. High income countries are typically known to attract market-seeking investments, whereas low income countries have the comparative advantage to propose lower wages and often also lower prices for intermediate goods than Japan.

In Table 5, we thus split our sample into high income countries that are defined as having an income per capita superior to 1500 $.[12]

We see that effects vary substantially according to the development level of the country in which the FDI takes place.

For FDI in high income countries, we find a positive and significant impact on the total employment and the administrative employment in the high income countries. This would be in line with the expectation that more administrative jobs are created, when complementary or horizontal FDI occurs.

The effect is the reverse when the FDI is located in a low income country, indicating a substitution of Japanese employment by foreign workers. Further, our estimates show that while no productivity gains are apparent in the high income countries, a positive impact on the TFP is obtained from FDI in low income countries.

The split of the sample into these two groups shows also, that the strong negative impact on investment is mainly driven by the FDI in low income countries. Fears of "Hollowing out" effects seem to be justified in the case of relocation to low income countries, for which a contraction of employment and investment is observed. However, these negative effects are accompanied by TFP gains.

[12] The countries' gdp per capita used for the definition of the threshold are the means of the gdp per capita over the period 1995 to 2004. This guaranties, that a country will stay throughout the sample period in the same category.

One possible interpretation of these results would be that the low income countries are mainly vertical FDI. To pursue this idea, in the next section, we attempt to classify our FDI projects into horizontal and vertical.

5-4 Vertical versus horizontal: the role of FDI motives

In this section, we create two indicators to determine whether an affiliate is horizontal or vertical FDI. Horizontal FDI is associated with high share of sales to the local market, and a low share to the home country, whereas vertical FDI is characterized by a high share of local purchases and also a high share of its sales that goes back to the home country.

We classify a firm as doing vertical FDI when the share of local purchases of the affiliate is superior to 70% and its share of sales to Japan is superior to 60%. A firm is considered to engage in horizontal FDI if the affiliate's share of local sales is equal or superior to 70% and its share of sales to Japan is equal or inferior to 20%.[13]

Table 6 reports results for these categories on labor productivity and trade performance. As expected from theory that claims horizontal FDI to be a substitute for exports, we can see a strong negative and significant impact of horizontal FDI on the export variable.
No such impact can be found for vertical FDI. Instead, vertical FDI is characterized by a very strong increase in imports. This is also expected, as intermediate production stages are delocalized into a foreign country and Japanese firms import intermediate goods from these affiliates. This increase in imports is thus likely to be due to an increase in intra-firm trade.

In the last lines of Table 6, we see a positive and significant impact of horizontal FDI on TFP. Not much research has yet been conducted on the channels by which the parent TFP could be influenced in the case of horizontal FDI. One possible explanation is that the expansion of the activities could increase efficiency through scale effects. Moreover, productivity gains could derive from information sharing between the parent and its affiliate (Ito, 2006). This would also be in line with the existence of an additional advantage of FDI over exports which is the

[13] The results are maintained also when changing the thresholds for the two indicators and also, when horizontal is defined only as the share of local sales superior to 0.7.

enhanced capacity of firms to adapt their products and processes to the requirements of foreign consumers. TFP gains may be obtained from the foreign R&D activity meant to suit the local conditions.
However, no such a positive impact is observed for vertical FDI. These results seem to contradict our previous findings of significant productivity gains of FDI projects in low income countries, which we considered to be in majority vertical FDIs.

To better understand the impact on TFP, we further split our vertical FDI projects between low and high income countries. Even if the limited sample size calls for caution in the interpretation, we find that vertical FDI in low income countries has indeed a positive and significant effect on TFP.
When performing the same decomposition of our horizontal FDI projects, we see that here, it is the fact that FDI is located in high income countries that drives the TFP gains for horizontal projects.
These findings underline the heterogeneity of the impact of investing abroad due to country location that goes further then the simple horizontal/vertical dichotomy.

6-Conclusion

In this paper, we analyze how the effect of moving abroad on domestic employment and performance (investment, productivity and trade performance) of internationalizing firms depends on conditions related to the parent's sector of activities (manufacturing versus non manufacturing), FDI motives and their affiliates' characteristics.

This paper starts with the observation that although emerging empirical evidence suggest limited effects of relocation on domestic employment and performance of internationalizing firms on average, the aftermath of relocation abroad varies considerably across firms and depends on a variety of conditions related to the FDI motives and their affiliates' characteristics. In the context of Japan, results on manufacturing firms moving abroad even suggest that Japanese outward FDI tends to strengthen the domestic economic activities of internationalizing firms in terms of both output and employment (Hijzen, Inui and Todo, 2007).

In this study, we confirm previous results but find that positive effects may coexist with the fact that the aftermath of moving abroad is negative in some contexts, typically vertical projects in low income countries.

We indeed find that horizontal FDI is more likely to spur productivity growth but at the expenses of export performance. Fears of job losses associated with production relocation are rejected on average but results strongly vary depending on the country of destination.
Japanese manufacturers that established a foreign affiliate in rich countries (especially North America) enjoyed significant white collar employment creation. Although horizontal FDI seems to create TFP gains on average, increase in productivity for vertical FDI is only witnessed in low income countries. Fears of "Hollowing out" effects seem to be justified in the case of relocation to vertical FDI projects in low income countries, for which a contraction of employment and investment is observed.

Our findings thus underline the heterogeneity of the impact of investing abroad due to country location that goes further then the simple horizontal/vertical dichotomy.

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APPENDIX A

Table A-1

Strategy of FDI: average share of local/Japan purchase and local/Japan sales

	Share of sales		Share of purchases	
	local	Japan	local	Japan
Total sample	0.63	0.35	0.58	0.48
Sector of Japanese firms	Manufacturing sector only			
	Share of sales		Share of purchases	
	local	Japan	local	Japan
Total manufacturing sample	0.61	0.36	0.56	0.49
Developed countries (GDP per capita>10.000 $)	0.76	0.27	0.52	0.58
Low income countries (GDP per capita<1.500 $)	0.48	0.48	0.56	0.45
China	0.53	0.47	0.64	0.41
North America	0.87	0.19	0.50	0.60
Europe	0.61	0.35	0.77	0.53
Asia	0.54	0.41	0.57	0.46

Note: These figures are based on average over the FDI projects. Sales and purchases are typically divided into local, Japan and other markets origin or destination. The importance of other markets should correspond to the residual share after local and Japan market shares are deduced. The fact that the sum of local and Japan markets shares is sometimes higher than 100% in this table is due to rounding up issues.

Strategy of FDI: average share of local/Japan purchase and local/Japan sales

Sector of Japanese firms	Sales		Sales	
	Share of sales		Share of purchases	
	Local	Japan	local	Japan
Total sales sample	0.72	0.28	0.59	0.49
Developed countries (GDP per capita>10.000 $)	0.82	0.12	0.53	0.57
Low income countries (GDP per capita<1.500 $)	0.52	0.52	0.71	0.33
China	0.44	0.54	0.82	0.25
North America	0.94	0.07	0.39	0.76
Europe	0.79	0.31	0.90	0.38
Asia	0.66	0.33	0.61	0.43

Note: These figures are based on average over the FDI projects. Sales and purchases are typically divided into local, Japan and other markets origin or destination. The importance of other markets should correspond to the residual share after local and Japan market shares are deduced. The fact that the sum of local and Japan markets shares is sometimes higher than 100% in this table is due to rounding up issues.

Table A-2: Number of switchers by establishment year

Year	Total	1995	1996	1997	1998	1999	2000	2001	2002	2003
Switchers	372	107	79	41	17	18	22	36	29	23
of which in manufacturing	264	87	60	29	9	12	11	22	21	13

Table A-3: Summary Statistics on switching firms: 288 observations in sample (difference in employment evolution)

	Manufacturing	Non manufacturing	Sales (wholesale & retail)
Total sample	203	85	73
Developed countries (GDP per capita>10.000 $)	75	48	41
Low income countries (GDP per capita<1.500 $)	95	24	21
China	66	15	13
US	39	18	14
North America	42	20	15
South America	1	1	0
Europe	9	3	2
Asia	151	61	56

Map 1: Number of switching Japanese firms by country between 1995 and 2003

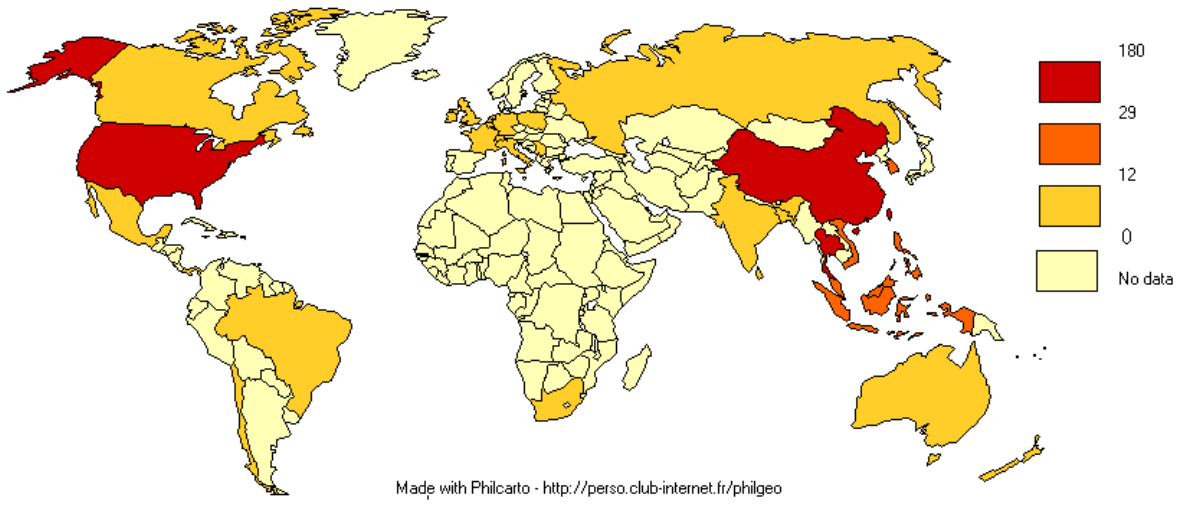

Table Table A-4: Logit estimation. whole sample

Tfp	0.2561***
	(8.96)
Profit/sales	0.1591***
	(8.59)
Emp	0.3667***
	(13.88)
K_L_ratio	0.0007**
	(2.57)
Age	0.0008***
	(4.91)
Constant	-8.4497***
	(11.78)
Time and sector fixed effects	Yes
Observations	188031
Pseudo R-squared	0.07

TABLES:

Table 1: Balancing test: 3-nearest neighbor matching

Variable	Sample	Mean		%bias	% bias	t-test	
		Treated	Control		reduction	t	p>|t|
Tfp	Unmatched	2.0577	2.0471	1.2		0.49	0.623
	Matched	2.0577	2.0573	0.0	96.4	0.01	0.988
profit/sales	Unmatched	5.2928	5.2142	4.4		1.85	0.064
	Matched	5.2928	5.2872	0.3	92.9	0.11	0.914
Employment	Unmatched	5.4367	5.3578	8.1		3.40	0.001
	Matched	5.4367	5.4062	3.1	61.4	1.07	0.285
K/L-ratio	Unmatched	16.967	15.272	5.2		2.22	0.026
	Matched	16.967	16.414	1.7	67.4	0.54	0.588
Age	Unmatched	39.395	38.726	1.5		0.63	0.531
	Matched	39.395	38.691	1.6	-5.3	0.56	0.574

Table 2: Growth of domestic activities: difference-in-difference analysis: All Sample

	DID 1year Employt	DID 1year Employment Admin.	DID 1year Investment	DID 1year TFP	DID 1 year Sales	DID 1 year Exports	DID 1 year Imports
	Sample based on combined information of Japanese parents and affiliates (used sample in this paper)						
Coefficient	0.0112	0.06	**-0.113**	**0.0751**	-0.01	**-0.53**	-0.13
Standard deviation	(0.0149)	(0.08)	**(0.051)****	**(0.029)****	(0.015)	**(0.19)*****	(0.38)
Treated nb	278	252	268	271	278	246	237
Control group nb	4691	3942	4328	4573	4691	4328	4227

Table 3 : Manufacturing versus Non-Manufacturing

	DID 1year Employt	DID 1year Employment Admin.	DID 1year Investment	DID 1year TFP	DID 1 year Sales	DID 1 year Exports	DID 1 year Imports
	Manufacturing						
Coefficient	0.015	-0.057	**-0.050**	**0.09**	-0.003	**-0.62**	0.26
Standard deviation	(0.011)	(0.099)	**(0.065)*****	**(0.038)*****	(0.014)	**(0.24)****	(0.49)
Treated nb	196	177	196	189	196	182	174
	Nonmanufacturing						
Coefficient	-0.026	0.26	-0.079	0.03	-0.021	-0.13	**-0.97**
Standard deviation	(0.0313)	(0.17)	(0.11)	(0.044)	(0.027)	(0.33)	**(0.49)****
Treated nb	82	75	79	81	82	64	63

Table 4: Split between different destinations

All sample

DID 1year Labor productivity	China	US	North america	Asia	Asia w/o China	Non Asia
Coefficient	0.04 (0.047)	0.012 (0.047)	0.015 (0.045)	0.044 (0.034)	0.046 (0.044)	0.013 (0.042)
Treated Nb	80	57	62	211	131	75
Control Nb	4863	4863	4863	4863	4863	4863

Manufacturing only

DID 1year Labor productivity	China	US	North america	Asia	Asia w/o China	Non Asia
Coefficient	0.038 (0.056)	**0.080 (0.049)***	**0.091 (0.046)***	0.038 (0.043)	0.038 (0.061)	**0.076 (0.04)***
Treated Nb	65	39	42	150	85	52
Control Nb	3193	3193	3193	3193	3193	3193

All sample

DID 1year employment	China	North america	Asia	Non Asia
Coefficient	**-.037 (.018)****	.018 (.022)	-.0141 (.0167)	.028 (.021)
Treated Nb	81	62	212	76
Control Nb	4,918	4,918	4,918	4,918

Manufacturing only

DID 1year employment	China	North america	Asia	Non Asia
Coefficient	**-.028 (.016)***	**.040 (.021)***	.0009 (.012)	**.050 (.024)****
Treated Nb	71	42	151	52
Control Nb	3,266	3,266	3,266	3,266

Table 5: High versus Low income countries
Split between high income countries: High gdp per capita: >2000 Dollar

	DID 1year Employment		DID 2years Employment	
	High GDP per capita	Low	High	Low
Coefficient	.0152 (.0162)	**-.0250 (.0147)***	**0.028 (0.001)***	-0.018 (0.022)
Treated Nb	168 (of which 93 Asian)	119 (all in Asia)	157	103
Control Nb	4918	4,918	3891	3891

	DID 1year Employ admin		DID 2years Employ admin	
	High	Low	High	Low
Coefficient	**0.19 (0.088)****	**-0.195 (0.10)***	**0.26 (0.013)****	-0.143 (0.18)
Treated Nb	152	100	139	85
Control Nb	3942	3942	3088	3088

	DID 1year TFP			DID 2years TFP	
	High GDP per capita		Low	High	Low
Coefficient	0.03 (0.029)		**0.13 (0.06)****	-0.0004 (0.05)	**0.16 (0.06)****
Treated Nb	161		109 (all in Asia	153	110
Control Nb	4573		4573	3763	3763
	Asia	Non Asia			
Coefficient	.0471 (.0642)	.048 (.053)			
Treated Nb	93				

DID 1year Invest	High	Low
Coefficient	-0.021 (0.07)	**-0.16 (0.06)*****
Treated Nb	157	110
Control Nb	4328	4328

Table 6: Horizontal versus Vertical

Split between horizontal : share of local sales >=0.7 and share of sales to Japan<=0.2
Vertical : share of local purchases>=0.7 and share of sales to Japan>=0.6

DID 1year Exports	All sample	Horizontal	Vertical
Coefficient	**-0.69** **(0.18)*** **	**-0.94** **(0.31)*** **	0.37 (0.47)
Treated Nb	254	91	21
Control Nb	3558	3558	3558

DID 1year Labor productivity	All sample	Horizontal	Vertical
Coefficient	0.036 (.027)	**0.073** **(0.04)***	.002 (0.072)
Treated Nb	287	105	25
Control Nb	4863	4863	4863

Split between horizontal : share of local sales >=0.6 and share of sales to Japan<=0.35
Vertical : share of local purchases>=0.6 and share of sales to Japan>=0.5

DID 1year Exports	All sample	Horizontal	Vertical
Coefficient	**-0.69** **(0.18)*** **	**-0.91** **(0.28)*** **	0.59 (0.50)
Treated Nb	254	111	27
Control Nb	3558	3558	3558

DID 2years Imports	All sample	Horizontal	Vertical
Coefficient	-0.18 (0.43)	-0.59 (0.73)	**2.5** **(1.0)** **
Treated Nb	214	79	20
Control Nb	2359	2359	2359

DID 1year Labor productivity	All sample	Horizontal		Vertical	
Coefficient	0.036 (0.027)	**0.075** **(0.043)***		-0.0059 (0.066)	
Treated Nb	287	127		33	
Control Nb	4863	4863		4863	
		High income	Low income	High income	Low income
		0.12 **(0.057)** **	n.s.	n.s	**0.09** **(0.05)***