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The Elusive Impact of Investing Abroad for Japanese Parent Firms: Can Disaggregation According to FDI Motives Help?

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TABLE OF CONTENTS

Non-technical summary 3
Abstract 4
Résumé non technique 5
Résumé court 6
1. Introduction 7
2. Heterogeneity in FDI motives and impact at home 9
3. Econometric Methodology 11
3.1. The Matching procedure 11
3.2. Data and variables 13
3.2.1. Identification of switchers 13
3.2.2. Determinants of switching and outcome variables 14
3.3. Propensity score matching 15
4. Difference in Difference estimations 16
4.1. Total sample 17
4.2. Manufacturing versus Nonmanufacturing 18
4.3. Location country heterogeneity 19
4.4. Vertical versus horizontal FDI 22
5. Conclusion 23
References 25
Appendix A 27
List of working papers released by CEPII 30

THE ELUSIVE IMPACT OF INVESTING ABROAD FOR JAPANESE PARENT FIRMS: CAN DISAGGREGATION ACCORDING TO FDI MOTIVES HELP?

NON-TECHNICAL SUMMARY

Previous findings on Japanese data (Hijzen, Inui and Todo, 2007; Ando and Kimura, 2007) show that the claim of industrial hollowing-out following the expansion of operations abroad is unwarranted.They suggest limited effects of investing abroad on the parent firm's performance. These results may however be explained by the aggregation of heterogeneous effects depending on the FDI motives, sectors and locations. We rely on a new dataset for the period 1994-2004 that combines information on manufacturing and non-manufacturing internationalizing Japanese firms with characteristics of their subsidiaries. These data will allow us to investigate the heterogeneity of the effect of moving abroad on employment, investment, productivity and trade performance. While much is known about parent firms characteristics (Greenaway and 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 discriminate between the various investment strategies of the Japanese firms and to study their specific impact at home.

One first sign that the 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 81% of the sales of manufacturing Japanese affiliates located in North America is made locally, in China, it is only 47%. The shares of sales back to Japan are respectively 30 and 45% for those two countries. In contrast, the share of purchases that are local is 57% in North America and 66% in China. These characteristics tend to show that Japanese firms are looking for low cost production sites in China (vertical division of labor), while they are following horizontal or market-seeking motives in the context of North American markets.

The impact analysis is based on propensity score matching techniques to construct a valid control group. Following Barba Navaretti and Castellani (2004) among others, we combine the propensity score matching with a difference-in-difference (DID) estimator to evaluate the causal effect of establishing a foreign affiliate on a set of domestic outcome variables. We focus on firms that switch from being a purely domestic firm to being a multinational firm. Our aggregate results confirm previous findings that on average Japanese outward FDI has limited effects (whether positive or negative) on the activity of internationalizing firms. Fears of huge production employment losses or hopes of massive TFP gains associated with outsourcing are rejected both on average and on our different sub-samples indicating that the lack of consideration for heterogeneity does not explain previous findings of the elusive impact of investing abroad.

We nevertheless find that FDI in manufacturing is associated with a faster labour productivity growth and reduced exports growth, while evidence of positive administrative employment gains is found for FDI in services, presumably reflecting the 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 of 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.

ABSTRACT

In the present paper, we investigate whether previous findings of limited effects of investing abroad on the firm's performance can be explained by the aggregation of heterogeneous effects depending on the FDI motives, sectors and locations. Results suggest, in line with previous work, that on average Japanese outward FDI has limited effects (whether 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, for which a contraction of employment and investment and exports is observed. By contrast, we observe a significant positive employment effect for FDI in services, presumably reflecting the operational complementarities between the affiliate and the parent. There is also some evidence of positive labour productivity gains deriving essentially from FDI in manufacturing in high GDP countries.

JEL Classification: F14, F21, F23
Key Words: FDI, multinationals, offshoring, propensity score matching

L'INSAISISSABLE IMPACT DE L'IMPLANTATION DE FILIALES À L'ÉTRANGER SUR LES MAISONS MÈRES JAPONAISES : UN PROBLÈME D'AGRÉGATION ?

RÉSUMÉ NON TECHNIQUE

Des travaux antérieurs effectués sur des données japonaises (Hijzen, Inui and Todo, 2007; Ando and Kimura, 2007) ont montré que les craintes d'un effet d'«évidement» suite à l'implantation de filiales à l'étranger n'étaient pas justifiées. Ils suggèrent globalement un effet faible de l'internationalisation sur l'activité des maisons mères. Nous cherchons ici à vérifier si ce résultat agrégé ne masque pas des différences entre firmes qui pourraient s'expliquer par la motivation initiale de l'investissement, son secteur ou sa localisation.

Nous exploitons une nouvelle base de données qui fournit, sur la période 1994-2004, des informations sur des entreprises japonaises des secteurs manufacturier et non manufacturier et sur leurs filiales. Cette base de données nous permet de contribuer à la littérature dans la mesure où si l'on a beaucoup progressé sur les caractéristiques des entreprises multinationales (Greenaway et Kneller, 2007), celles des filiales sont encore mal connues. En particulier, notre base de données nous permet d'identifier les motivations initiales de la décision d'implantation de filiales et leurs effets sur l'emploi, l'investissement, la productivité et la performance commerciale des maisons mères.

Une première indication de l'hétérogénéité des motivations des implantations est fournie par la répartition des ventes des filiales. Alors que 81% des ventes des filiales implantées en Amérique du Nord s'effectuent localement, cette part n'est que de 47% en Chine. La part locale des approvisionnements est de 57% en Amérique du Nord contre 66% en Chine. Ces faits stylisés suggèrent la primauté de la motivation verticale (de réduction des coûts de production) en Chine et horizontale (d'accès au marché) en Amérique du Nord.

Notre étude d'impact reprend la méthode initiée par Barba Navaretti et Castellani (2004) qui combine une technique d'appariement par score de propensité (*propensity score matching*) et une estimation de différence-en-différence (*DID*). Pour évaluer l'impact causal de l'implantation d'une filiale étrangère sur la performance de la maison mère, nous nous concentrons sur les entreprises japonaises qui s'implantent pour la première fois à l'étranger passant ainsi du statut de firme purement domestique à celui de multinationale.

Nos résultats agrégés confirment ceux des travaux précédents : l'impact (qu'il soit positif ou négatif) de l'implantation de firmes japonaises à l'étranger sur l'activité de la maison mère est limité, ne justifiant ni les craintes de pertes massives d'emplois productifs ni les attentes de gains importants de productivité totale des facteurs. Les résultats obtenus sur différents sous-échantillons confirment cet impact limité et font rejeter l'hypothèse initiale d'un biais d'agrégation.

Nous dégageons cependant plusieurs caractéristiques de l'impact de la création de filiales sur la maison mère qui différent selon le secteur ou la localisation de la filiale. Nous trouvons notamment qu'à la création de filiales manufacturières sont associés une croissance plus rapide de la productivité du travail mais une moindre progression des exportations. Les implantations dans les services s'accompagnent de gains en emplois administratifs au Japon, certainement en raison de la complémentarité entre les activités de la filiale et de la maison mère. Les craintes d'un effet d'«évidement» apparaissent plus justifiées dans le cas d'implantation dans les pays à bas revenu, pour lesquels une contraction de l'emploi productif, de l'investissement et des exportations est observée. Nous trouvons que les gains de productivité du travail sont limités aux implantations manufacturières dans les pays à haut revenu, hors Asie, reflétant sans doute des externalités technologiques entre la filiale et la maison mère.

RÉSUMÉ COURT

Ce travail cherche à déterminer si les précédents résultats sur l'impact limité de l'implantation de filiales à l'étranger sur l'activité de la maison mère peuvent s'expliquer par l'agrégation d'effets hétérogènes selon la motivation initiale de l'investissement, son secteur ou sa localisation. Nos résultats agrégés confirment ceux des travaux précédents qui identifient un impact limité (qu'il soit positif ou négatif) de l'implantation de firmes japonaises à l'étranger sur l'activité de la maison mère. Les craintes d'un effet d'«évidement» apparaissent plus justifiées dans le cas d'implantation dans les pays à bas revenu, pour lesquels une contraction de l'emploi productif, de l'investissement et des exportations est observée. A l'inverse les implantations dans les services s'accompagnent de gains en emplois administratifs au Japon, certainement en raison de la complémentarité entre les activités de la filiale et de la maison mère. Des gains de productivité du travail apparaissent pour les implantations manufacturières dans les pays à haut revenu, hors Asie, reflétant sans doute des externalités technologiques entre la filiale et la maison mère.

Classification JEL : F14, F21, F23
Mots-clefs : IDE, multinationales, délocalisations, appariement par score de propensité

THE ELUSIVE IMPACT OF INVESTING ABROAD FOR JAPANESE PARENT FIRMS: CAN DISAGGREGATION ACCORDING TO FDI MOTIVES HELP?[1]

Laura Hering[*], Tomohiko Inui[**] & Sandra Poncet[***]

1. INTRODUCTION

The often advanced claims of a link between expansion abroad and lay-offs in the public debate contrast sharply with the emerging empirical evidence suggesting limited effects of investing abroad on domestic employment and 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 were obtained suggesting that manufacturing 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; Ando and Kimura, 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, 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 across industries of moving abroad.

This paper investigates whether findings of non-significant effects (whether positive or negative) of initiating production abroad can be partly due to the failure of estimation techniques to take this heterogeneity into account. More precisely, findings of limited impact of developing 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 sector and location of the affiliates and the FDI motives. Preliminary evidence that the effects of outward investment differ depending on the investment strategies is given by Debaere, Lee and Lee (2009) for Korea and Hijzen, Jean and Mayer (2009). Therefore, this paper aims at studying how the effect of moving abroad on domestic employment and performance (investment, productivity and trade) of internationalizing Japanese firms depends

[1] The METI database used in this paper was prepared and analyzed in cooperation with the Research Institute of Economy, Trade and Industry (RIETI). Sandra Poncet gratefully acknowledges financial support from Nihon University during her stay in Japan. We thank Toshiyuki Maatsura for the assistance with the database and participants of the 2009 CAED conference, Tokyo, for helpful comments.

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on conditions related to the parent's sector of activities (manufacturing versus non manufacturing), FDI motives and their affiliates' characteristics.

We rely on a new dataset that combines information on manufacturing and non-manufacturing internationalizing Japanese firms with characteristics of their subsidiaries. These data will allow investigating 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 firms characteristics (Greenaway and 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 discriminate between the various investment strategies of the Japanese firms and to study their specific impact at home.

One first sign that the 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 81% of the sales of manufacturing Japanese affiliates located in North America is made locally, in China, it is only 47%. The shares of sales back to Japan are respectively 30 and 41% for those two countries. In contrast, the share of purchases that are local is 57% in North America, but with an analogous figure of 66% for China. These characteristics tend to show that Japanese firms are looking for low cost production sites in China (vertical division of labour) which they are following 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. One of the contributions of our paper is to exploit information on the country location and the regional decomposition of the affiliate's sales and purchases to distinguish between the two main motives for establishing an affiliate abroad that have been both broadly discussed in the literature on FDI: market-seeking (or horizontal) FDI or factor-seeking (vertical FDI). One might advance that the production factors displacement effect of vertical FDI is likely to be more pronounced than that of horizontal FDI. Pure horizontal FDI is however 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 the firm in Japan, we would ideally like to compare the performance of firms that go global with the counterfactual performance these firms would have had if they had not 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).[2] We follow Kleinert and Toubal (2008) who refine this technique in their analysis of growth in output, employment and productivity on German firms. Our matching technique thus 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 of 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).

Results suggest, in line with previous work, that on average Japanese outward 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 on the heterogeneous effect of moving abroad depending on the sector (manufacturing versus non-manufacturing), country of location and the FDI motives (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 of employment and investment and exports is observed. By contrast, we observe a significant positive employment effect for FDI in services, presumably reflecting the 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-Asia 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.

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

2. HETEROGENEITY IN FDI MOTIVES AND IMPACT AT HOME

One of the contributions of our paper is to investigate the potential heterogeneity of FDI effect on the parent firm according to the type of FDI the firm undertakes. Our dataset linking parents and affiliates details the decomposition of the affiliate's sales into sales to the local market, Japan and the rest of the world. This allows us to distinguish between the two main

[2] 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.

motives for establishing an affiliate abroad that have been identified 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 markets at a lower cost than direct exporting from the parent location. It is thus 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 than in the home country.

Recently, evidence has emerged on the 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 exports or local consumption is relocated in 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. In the former (vertical) case the relocation could concern all activities that can be produced cheaply under the host country's factor prices, while in the later (horizontal) case it would be limited to the part of production that was previously exported to a 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 to 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 the 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 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 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$), it drops to a mean of 46% for the poorest countries with per capita GDP below 1,500 US$. 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 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.

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 over our sample period, called the treated group, and those who never invested abroad. Observations of this untreated group will be 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 but this investment 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 for the treatment (the investment abroad).

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 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 determining appropriately 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 based on various firm characteristics such as size, age or productivity, this assumption is expected to be violated. A solution to the challenge of finding 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 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. Rosenbaum and Rubin (1983) show that the CIA remains valid once propensity score-matching is done appropriately. Hahn (1998) suggest that 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.[3] 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 of 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).

[3] As a robustness test, we perform also 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 one to mitigate the risk of the 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 existed already before switching.

3.2. Data and variables

3.2.1. 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 strength of the BSBSA 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. We obtain access to the answers for the period consecutive years 1994-2004 allowing us to compute the yearly change in performance of 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 to infer the nature and objective of the investment (notably the decomposition of sales and purchases between local, Japan and 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 when the operation started to identify affiliates (and their related parent firms) that appear to become multinationals starting in 1995. Some data limitations have to be considered nevertheless: whereas firms located in Japan report relatively well to the BSBSA, information of 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[4] abroad for the first time over 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). It is then 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. 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). We consequently exclude from our switcher group firms that report positive investment in a related firm abroad in 1991 or 1994 or that never report positive investment in the BSBSA. We finally exclude firms if more than 33% of their capital is hold by a foreign company.

Our final sample includes 150 of Japanese switching firms in non-primary sectors providing the necessary information to compute propensity scores and for which we find matching firms. Out of the 150, 115 manufacturing firms and 35 firms in the wholesale and 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[5] respectively. A number of important features are immediately apparent: the attraction of the US, the concentration of Japanese affiliates in Asia (especially China) and their quasi absence from the non-Asian developing world.

3.2.2. 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 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.

[4] 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.

[5] Manufacturing includes light industries, heavy industries, machinery, electronics and automobile. Non-manufacturing corresponds to wholesale and retail sales.

Our DID estimations investigate the impact of investing abroad on several indicators of the parent firm performance related to employment, investment, TFP, labour productivity (value-added over total employment), exports and imports. Employment refers alternatively to total employment, which is defined as the total employment of the firm and its two components business and administrative employment. Administrative employment is the employment at the headquarter of the firm dedicated to administrative and planning activities, notably survey & 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 firm and that of the matched domestic firms before and after the switch.

3.3. 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 firms that never switch and stay domestic all the time and 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:

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

The dependent variable FDI_start_{it} takes the value 0 if firm *i* is entrant into FDI at year t. 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 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 this sector-year pair separately.

When looking at Table A-5, 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 labour ratio and 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 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 five nearest neighbours within its sector-year sub-sample.[6] Note that we ensure that a switcher is allowed to match only with a purely national firm and not a firm that will switch later during our sample period.

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 reported characteristics: 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 have significantly reduced. 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.

Table 1: Balancing test: 5-nearest neighbour matching

		Mean		% reduction		t-test	
Variable	Sample	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

4. DIFFERENCE IN DIFFERENCE ESTIMATIONS

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

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

4.1. Total sample

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

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

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

	TFP	Labor 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 within sector and year

	TFP	Labor 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%*

The first part shows results without imposing that matching occurs 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 of the same sector. We see that results vary substantially according to the matching criteria. When restricting matching within the sector-year pair, we find that an outward FDI is associated with a significant reduction of exports and 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 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 nonmanufacturing 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 nonmanufacturing depending on the sector of activity of the parent firms. As a robustness check, in Table 4, the split is 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 our total sample.

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

Parents in manufacturing

	TFP	Labor 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 nonmanufacturing

	TFP	Labor 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%*

We find that FDI in manufacturing is associated with a faster labour productivity growth and reduced exports growth. Production in Japanese affiliates seems to be a substitute to previous exports from Japan. However overall there is no sign of a significant contraction of employment and 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 nonmanufacturing sector but the split uncovers an increase in the administrative employment in the Japanese headquarter following FDI in non-manufacturing. This result presumably reflects the complementarities between the parent and affiliates activities.

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

Affiliates in manufacturing								
	TFP	Labor 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 nonmanufacturing								
	TFP	Labor 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%*

4.3. Location country heterogeneity

We push further our analysis and investigate the role of the affiliates' location. 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 differentiated results between Asian and non-Asian locations appear to reflect a heterogeneity in income rather than 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$[7]) for which a contraction of employment and investment and 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 in poor (mainly Asian) countries.

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

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

Non Asian countries

	TFP	Labor 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	Labor 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 on performance of parent firms of moving abroad between 1995 and 2003:
Split by income of destination countries: High versus low income countries

High GDP countries

	TFP	Labor 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	Labor 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 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 made 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, affiliates creation in the US brings productivity gains and increases imports in the parent firm. This result similar to the one obtained on 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 at home some developments (notably related to new products or adaptation to the local market) emanating from affiliates in the US and other rich countries.

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

Affiliates in China

	TFP	Labor 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	Labor 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%*

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

4.4. Vertical versus horizontal FDI

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

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

Vertical FDI - Manufacturing affiliates only

	TFP	Labor 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	Labor 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%*

Whatever the economic performance indicator used, no significant impact is found for our sub-sample of vertical FDI projects. 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). We also find for the sub-sample of market-seeking FDI evidence of a reduction in exports growth. This effect appears to correspond to that we found on 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 move of production close to dynamic consumer markets.

5. CONCLUSION

In this paper, we investigate whether findings of limited effects of investing abroad on the firm's performance can be explained by the aggregation of heterogeneous effects. We analyze 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), FDI motives and their affiliates' characteristics.

Our aggregate results based on the combination of difference in difference technique and propensity score matching confirm previous findings that on average Japanese outward FDI has limited effects (whether positive or negative) on the activity of internationalizing firms. Fears of huge production employment losses 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 limited and elusive impact of investing abroad are thus not due to a lack of consideration for heterogeneity.

We nevertheless find that FDI in manufacturing is associated with a faster labour productivity growth and reduced exports growth, while evidence of positive administrative employment gains is found for FDI in services, presumably reflecting the 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 of 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): decomposition of sales and purchases depending on sector and country of affiliates

	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, 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 switching Japanese firms by establishment year of the 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 our 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 our 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)
Emp	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

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