Investing in Developing Countries and Performance at Home: the case of France

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Abstract

Relocation in developing countries of domestic activities is a central element of discussions in several EU countries. Indeed, the transfer of part of the production process to developing countries is often condemned by a part of the general public and policy makers as a threat for domestic employment. However, several recent contributions have shown that effects on home economies are often positive. Our paper contributes to this literature by examining effects of these outward investments on home economies. Based on a sample of French firms that turn multinational during the considered period, we compare their performances to the ones of domestic-oriented firms. Output, employment, factor productivity, value added and wages are retained as measures of performance. The analysis is carried out by using propensity score matching in order to build an appropriate counterfactual of national firms.

Key words: multinational firms, productivity, propensity score matching
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1. Introduction

Transferring low tech manufacturing jobs to cheap labour countries is often seen in the debates as a step into the de-industrialisation of European economies. Consequently, policy makers have increasingly been proposing measures aimed at limiting these types of international activities. In France, the 2005 budget offers subsidies to firms that transfer to France activities previously located outside of the European Union. Firms located in French regions highly specialized in one industrial activity and suffering from a high level of unemployment could also receive subsidies. Similarly, in Italy the government has just passed a new law preventing firms that transfer a substantial part of their activities abroad from acceding subsidised public funds to support exports or foreign investments. In May 2005, the European Parliament's Regional Development Committee has expressed a strong support for the European Commission proposal to impose financial penalties on firms which have received EU funding but then decide to relocate. The Committee also asked for legal measures to ensure that firms receiving European subsidies do not relocate for a *"long and predetermined"* period.

The central message of this paper is that the presumed negative effects of transferring part of production to developing countries is not supported by theory, neither by the available empirical evidence. In contrast, very often the effects of these investments are positive, particularly when compared to the base-line scenario of maintaining all production in the home country. Specifically, this paper develops a simple theoretical framework and then examines the impact of outward investment to developing countries for a sample of French firms. The effect of these investments will be assessed in comparison to the alternative scenarios of not investing abroad and of investing in developed countries. Specifically, we will look at the impact on the size (employment and output growth) and on the efficiency (total factor productivity) of economic activities at home.

Our work builds on Barba Navaretti and Castellani (2003). This earlier paper focussed on Italy and looked at the effects of foreign investment independently of its destination. It found that firms investing abroad have higher growth of total factor productivity and output, and no significant differences in employment growth than firms not investing abroad. It also showed that in order to isolate the effects of investing abroad on performance, it is important to construct an appropriate counterfactual: what would have happened to firms if they had not invested abroad. This was done by using propensity score matching. This paper has two major

differences compared to this earlier work. First, it specifically looks at the effects of investments to cheap labour countries with respect to the alternatives of not investing and compares it to the effect of investing in developed countries. These investments are expected to be essentially driven by differences in factor costs and to imply the geographical fragmentation of the production chain and the transfer of one or more stages abroad, hence the fear of losing economic activities at home. In contrast, investments to developed countries generally imply the duplication of home activities in a foreign country. Even though these investments are generally analysed as an alternative strategy to exporting, they rarely involve the shutting up of home activities. For this reason, by focussing on investment to developing countries we can address the relocation concern more directly. To do so, we develop a simple theoretical framework looking at the effect of vertical investments driven by factor cost differences on home production. Empirically, we extend propensity score matching to the possibility of multiple treatment, therefore comparing the effects of three alternative choices: investing in a developing country, investing in a developed country or staying at home. Second, this paper is based on France instead of Italy and it uses a newly constructed sample of French firms.

Our work is nested in the broader debate on the effects of outsourcing, which has in the US and in the UK mostly focussed on services (Amiti and Wei, 2004). In the case of continental Europe, this problem mostly concerns manufacturing, hence the focus of our paper. A very detailed analysis on France is Fontagné and Lorenzi (2005). In their report, the authors show that relocations explain only 10% of the deindustrialisation's process observed in France. Besides, relocations represent less than 3% of the stock of French foreign direct investments. Other studies focussing on European manufacturing are Egger and Pfaffermayr (2003). The authors use a similar methodology than ours on a sample of Austrian firms and find that firms investing abroad also raise their investments in R&D and in intangible assets at home. Using measures of imported inputs' shares, Görg, Hamley and Strobl (2004) also find that under many circumstances the effect of outsourcing is positive. Note that this paper focuses on FDI, and not on other looser forms of transferring production activities abroad, like for example subcontracting. Also other studies on FDI based on other methodologies generally find evidence that outward investments do not deplete home activities. These earlier empirical works have examined the effects of outward FDI on output (Head and Ries, 2001, Blonigen, 2001), home employment (Brainard and Riker, 1997a, 1997b, Braconier and Eckholm, 2002, Konigs and Murphy, 2001, Bruno and Falzoni, 2000, Blomström, Fors and Lipsey, 1997, Lipsey, 1999, Bassino, 1998, Mariotti, Mutinelli and Piscitello, 2003, Marin,

2004), productivity (Braconier, Eckholm, Midelfart-Knarvik 2001, van Pottelsberghe de la Potterie and Lichtenberg, 2001). However, these studies are based on sectoral/regional evidence or, when addressing the question at the firm-level, only focus on the activities of MNEs and thus fail to take into account the appropriate counterfactual to this problem.

The remainder of the paper is structured as follows: Section 2 develops a simple partial equilibrium model of the effects on home production of investments driven by factor cost differences. In section 3, we present our empirical setting. The data are described in section 4. The results of the empirical application are detailed in section 5. Section 6 concludes.

2. Why investing in cheap labour countries may be your best option: theory

In this section we develop a very simple partial equilibrium theoretical framework to show under what circumstances the fragmentation of the production chain and the transfer of one stage of production to another country can be a better alternative than preserving integrated production at home. This framework is derived from Barba Navaretti and Venables, (2004, chapter 4). For simplicity we look at the cost minimising locations of a firm in which production involves two distinct stages, *c* and *a*, referring to components production and to assembly respectively. To focus on the way in which cost differences shape production, we assume that the decision to fragment and locate activities is simply driven by factor costs differences across countries and not by product market considerations. Therefore, we assume that the activities transferred abroad do not compete with existing firms in the host country and that the output is sold on an integrated world market or exported back to the parent, rather than just being sold on the local market. We also assume perfect competition and constant returns to scale, and all firms to be identical.

We suppose that both stages *c* and *a* use two primary inputs, labour and capital, with country *i* prices w_i and r_i. Both component production and assembly operate with constant returns to scale, so the costs of primary factors used at each stage to eventually produce one unit of final output can be described by unit cost functions $c(w_i, r_i)$ and $a(w_i, r_i)$. Production of a unit of final output involves a fixed number of components (which we can set equal to one). This means that the two elements enter total costs additively. Therefore, unit costs for firm *j* with integrated component production and assembly in country *i* are given by:

$$g_j = a\,(w_i,r_i) + c(w_i,r_i)$$

In figure 1 we report factor prices on the axes and the lines are iso-cost lines. Now, imagine that trade costs for components are prohibitively high and therefore there is no option of fragmenting production. Integrated production takes place in country 1 and perfect competition implies that:

$$p = a\,(w_1,r_1) + c(w_1,r_1)$$

II is the iso-cost for integrated production, and it combines values of w and r for which integrated production has the same unit costs as in 1. Therefore:

$$II \;=> p = a(w,r)+c(w,r)$$

It has a slope equal to the capital-labour ratio on integrated production. If there are no trade costs on final products, then all other countries' factor prices must lie on or above line II -- otherwise it would be profitable to start up production in a lower cost country.

Now suppose that fragmentation is possible at no cost, i.e. there are no transport costs for components and all other disintegration costs are 0. Besides, suppose that AA is the iso-cost for assembly, given component unit costs at $c(w_1,r_1)$; and line CC is for components, given assembly unit costs at $a(w_1,r_1)$. For simplicity these are constructed for fixed coefficient technologies, hence giving straight lines. Their equations are:

$$AA \;=> p = a\,(w,r) + c(w_1,r_1)$$
$$CC \;=> p = a\,(w_1,r_1) + c(w,r)$$

Thus, line AA is the locus of factor prices below which assembly is profitable, given that the goods price stays at p and component production remains in country 1 at factor prices $\{w_1, r_1\}$. Its gradient is the capital-labour ratio in assembly, and we assume that assembly is more labour intensive than components and integrated production. Line CC is the analogous line for components production, given that assembly continues to take place at factor prices $\{w_1, r_1\}$ and the goods price stays at p.

Assume that component production continues to take place in country 1 and ask, will assembly relocate? This fragmentation will occur if some country has factor prices below AA (so assembly is profitable) but above II (it is not profitable for the integrated production to move). As drawn, country 2 with factor prices $\{w_2, r_2\}$ lies in this region. Assume

fragmentation occurs and assembly moves to country 2. Consequently, assume that because of competitive pressure output price falls, given factor prices in each country. The new price would then be $p' = a(w_2, r_2) + c(w_1, r_1)$, $p' < p$. The dashed line I'I' parallel to II is the locus of factor prices at which integrated production could compete with fragmented production at these factor prices $\{w_2, r_2\}$ and $\{w_1, r_1\}$:

$$I'I' \Rightarrow p' = a(w,r)+c(w,r)$$

A'A' is instead the iso-cost for assembly with respect to producing in 2 given component unit costs at $c(w_1,r_1)$:

$$A'A' \Rightarrow p' = a(w,r) + c(w_1,r_1)$$

Now, what is the effect of fragmentation on activities in country 1? They decline as assembly moves away to 2, and this is of course a loss. However, it is a loss compared to preserving integrated production in 1. But is this a likely scenario? Not really. Once there emerges the possibility of moving the labour intensive stage of production to a cheap labour country like 2, adjustment in competitive prices make integrated production in 1 no longer viable. As shown by the downward shift of the iso-cost of integrated production to I'I', now II is a locus of factor prices where integrated production is no longer profitable. Yet, the whole process was triggered by fragmentation. As integrated production is anyway cheaper in 1 than in 2 (2 lies above II), policymaker could intervene and prevent fragmentation by making it sufficiently costly to offset factor cost gains. This is an option if consumers' welfare has little weight in the objective function of policy makers. But it might be terribly short sighted. Imagine a new country like 3, enters into the picture. Note that 3 lies below II. Thus, compared to 2 it has also an advantage in integrated production, not just in assembly. Then 1 would loose all its activities as integrated production moves to 3. Note, instead that if assembly is in 2 and factor costs of 3 lie above A'A', then component production will stay in 1. Therefore, 1 is able to preserve component production thanks to fragmentation. Its alternative would have been to completely close down activities. In other words fragmentation allows country 1 to retain more of the industry than it otherwise would have. It is only by moving assembly to country 2 that country 1 is able to retain any presence in the industry whatsoever, given the incipient competition from country 3.

How can the results form figure 1 be generalised? The first issue is that policy makers do no really know where iso-cost lines lie with respect to countries' factor costs. In principle, if 3 were above II, there could be scope for preventing fragmentation. Note however that fragmentation preserves 1's competitiveness in components for a wide range of factor costs combinations, all those lying above CC. In the uncertainty of where 3 lies it could be wise to focus on preserving the competitiveness of C in 1. Also, a policy preventing fragmentation is ineffective if implemented unilaterally by one country under free trade in final products. In fact if producers from other high factor cost countries transfer assembly in 2 then the competitive pressure on prices could make integrated production in 1 not viable anyway.

A second issue is that the model does not take into account the effects of the reduction in production costs and prices on output. As total output increases, also the output of components would increase, partially offsetting the loss of production in assembly. If then we were to reason in a dynamic context with imperfect competition, output could rise further if, because of the reduction in unit costs, firms transferring production abroad gain market shares.

3. Empirical setting

3.1. Performances of investing firms

The empirical implementation of the theoretical framework described above implies comparing the performance of a given firm which has transferred one or more stages of production to a foreign country, with the performance it would have had if it had kept integrated production at home. In terms of Figure 1, this means comparing performance for a configuration with components in 1 and assembly in 2 with a configuration with integrated production in 1. Of course the hypothetical benchmark of integrated production in 1 cannot be observed for firms which have fragmented production, and this poses several methodological problems. First, if we observe only MNEs we cannot single out the hypothetical benchmark: performance if the MNEs had not invested abroad. Moreover, if we observe only MNEs, we do not know if changes in performance are due to unobservable shocks equally affecting all firms, national and multinational alike. It is therefore important to benchmark MNEs to a sample of national firms. However, when comparing the performance of MNEs and national firms, we face a second problem: we do not know if differences are due to other observable or

unobservable characteristics of the two types of firms (e.g. size, ability of management etc.) rather than to their being multinational or strictly national. In particular, foreign investments and performance are jointly determined. Given that investing abroad entices large costs, with imperfect financial markets only the (*ex ante*) most productive firms will invest abroad. The recent theoretical literature on the decision to export and invest abroad with heterogeneous firms establishes a very clear link between *ex ante* performance and international activities: entering international markets entail fixed costs and only the most profitable firms will be able to invest abroad (Helpman, Melitz and Yeaple, 2004). Thus, if we observe that *ex post* MNEs perform better than national firms, we do not know if this is so because of foreign investments or because these firms performed better anyway, even before the investment.

Figure 2 is derived from Clerides, Lach and Tybout's (1998) paper on exporting firms' performance. We adapt it to the case of foreign investments. We draw average hypothetical trajectories in home performance for three types of firms: those which are always MNEs, i.e. with at least one foreign subsidiary during all the period observed; those which never have a foreign subsidiary in the period observed (NATIONALs) and those that open their first foreign subsidiary in the period observed and therefore switch from being national into being MNEs (SWs) at time *t*. As mentioned above and accordingly to the recent literature, MNEs perform better than national firms. More can be learned if we now focus on switching firms, those which invest for the first time at *t*. If the investment has a positive effect on productivity their trajectory becomes steeper at *t* and performance converges to the one of MNEs. Thus, our empirical question can be answered by comparing their trajectory after the investment to the one that they would have followed had they not invested. If the investment does indeed improve performance, this hypothetical trajectory lies below the one of the switching firms after *t*, as represented by the dotted line in figure 1. This comparison is important, as if we just focus on effective performance, even if we observe that it improves, this could be the outcome of other unobserved random factors which have nothing to do with the investment. Unfortunately, the dotted line cannot be observed and we need to proxy it. National firms are a good candidate for the counterfactual. However, the trajectory of the appropriate counterfactual should indeed differ from the one of switching firms just because of the different investment decision. Due to the fixed costs on entry on international markets, a self-selection process will occur and only firms possessing some intangible capital giving them a competitive edge over national firms will invest abroad (Dunning, 1993; Markusen, 1995). Thus, switching firms are *ex ante* different from national ones and this difference may affect *ex post* performance. If we want to isolate the effect of investing, we need therefore to build a

counterfactual made of a subsample of national firms which are as similar as possible to firms which have invested abroad.

To do so, we will derive a control group from a propensity score matching procedure. The performance trajectory of this control group is the closest approximation to the dotted line.

3.2. Propensity score matching with binary and multiple treatment

As previously mentioned, our aim is to evaluate the effect of becoming a multinational firm on economic performance at home, Δy (where Δy denotes the rate of growth of employment, output or total factor productivity in the home activities of the investing firm)[1]. Let SW_{it} be an indicator taking a value equal to one if firm *i* switches into becoming a multinational by investing abroad for the first time at time *t* (i.e. between *t-1* and *t*). Let also $\Delta y^1_{i,t+1}$ be firm *i*'s post-investment performance and $\Delta y^0_{i,t+1}$ the hypothetical performance achieved at *t+1* if *i* had not invested abroad. The effect of investing abroad on economic performance for firm *i* would then be measured by $\Delta y^1_{i,t+1} - \Delta y^0_{i,t+1}$. More formally, this average effect can be expressed as follows[2]:

$$\hat{\alpha} = E(\Delta y^1_{t+1} - \Delta y^0_{t+1} \mid SW_{it} = 1) = E(\Delta y^1_{t+1} \mid SW_{it} = 1) - E(\Delta y^0_{t+1} \mid SW_{it} = 1) \qquad (1)$$

However, the last term is unobservable, *i.e.* we do not know what would have been the average performance of switching firms if they had not invested. We therefore need to construct an appropriate counterfactual, based on the right control group. As firms choose endogenously whether to invest or not, this counterfactual could not be draw randomly. To overcome the problem of self-selection we use the method of matching, which aims at re-establishing the conditions of a natural experiment with non-experimental data (Heckman et al. 1997, Blundell et al. 2004). This methodology has also been used to evaluate the effects of

[1] This is usually defined the "outcome" in the evaluation literature. See Blundell and Costa Dias (2000, 2002), and Wooldridge (2002, Ch. 18) for reviews.

[2] In the literature this is referred to as the average treatment effect on the treated (ATT). The original idea is derived from natural sciences, where some outcome from individuals who receive a treatment (i.e. a medical treatment) is compared to identical individuals (randomly drawn from a population) who did not receive treatment. In economics things are complicated by the fact that non-treated individuals are non-randomly selected.

exporting and of acquisitions on firms' performances and returns to scale by Girma, Greenaway and Kneller (2004), Girma, Kneller and Pisu (2003), Wagner (2002) and Girma and Görg (2004). Egger and Pfaffermayr (2003) use matching estimators to analyse the effects of outward investments on the decision to invest at home in tangible assets and in R&D.

The main idea is to match each investing firm with one (or more) with similar *ex ante* characteristics drawn from a sample of non-investing ones. To obtain a measure of the effect of investing abroad on performance at home as free as possible from any self-selection bias we first estimate a logit model of the decision to become MNE that can be represented as follows:

$$P(SW_{it} = 1 | X_{i,t-1})$$

where $X_{i,t-1}$ is a vector of observable firm *i*'s characteristics at t-1.

It is then possible to compute the probability of switching for each firm and pair each investor with one (or more) firms which had a very similar *ex ante* probability of switching but remained national. This latter group is our counterfactual. Subsequently, average performances in the group of investing firms and in the counterfactual can be compared by using a standard matching estimator (SM) given by the following equation:

$$\hat{\alpha}_{SM} = \Delta\bar{y}^{1}_{t+1} - \Delta\bar{y}^{0}_{t+1} \qquad (2)$$

where $\Delta\bar{y}^{1}_{t+1}$ is the mean performance growth of investing firms after switching and $\Delta\bar{y}^{0}_{t+1}$ is a weighted mean of performance growth the control group over the same period. In other words, the standard matching estimator (SM) can be thought as a test for the equality of means in performance growth over the switching and the matched control groups.

In this paper we have the additional problem that firms may switch both in developed countries (DC) and in less developed countries (LDC). Therefore our outcome is not a binary indicator, that is we face a multiple treatment problem (Lechner, 2001). We address this issue by estimating a multinomial logit and computing propensity scores for each of the three possible outcomes: non switching (denoted as outcome=0), investing in LDC (outcome=1)

and investing in DC (outcome=2). With the propensity scores for choice 1 and 2, we can run the matching algorithm and find the appropriate counterfactual in both cases. Unlike the binary treatment case, when the outcome variable can take multiple values, each choice can be compared to more than one counterfactual. Figure 3 illustrates this issue. We will focus on cases C and E. We also explored other cases, but we found that, given the low number of observations which end up being in the control groups, matching turn out very inaccurate. Therefore, our analysis allows us to tell whether switching in LDC or in DC affect performances relative to hypothetical alternative of remaining national.

4. Sample and data

To construct the French sample we used two different databases: the 2002 version of the database "Enquêtes filiales" constructed by the Direction of Foreign Economic Relations (DREE) of the French Ministry of Economic and Finances and the Amadeus database of Bureau Van Dijck. The former provides the list of all affiliates of French firms and reports for each of them the year of investment and the chosen country. The latter gives information on balance sheet and other economic data of French firms. The panel used in this paper includes French firms with more than 20 employees and with observations between 1994 and 2000. By merging the two databases, we obtain the three types of firms discussed earlier in the paper: the switching firms (SWs), which set up their first foreign subsidiary in the period observed, multinational firms (MNEs), which have at least one foreign subsidiary at the beginning of the period and domestic firms (NATIONALs), which do not have foreign subsidiaries at the beginning of the period and never invest in the period observed. Besides, switching firms include firms investing in developing countries and firms investing in developed countries (OECD countries). The composition of the sample[3] by investing status for each year is described in table 1. The first row includes firms which were MNEs at the beginning of the period or become such because they have invested abroad in the previous year. The second one reports firms that invested abroad that year. Row 3 (respectively 4) provides the number of switching firms in developing countries (respectively developed countries). The last row includes national firms. Thus, every year *t* a number of switching firms transit from being

[3] Firms with less than 4 out of 7 years of data on employment, output and TFP were excluded. Occasional missing values occurring in the series for the remaining firms were estimated using linear interpolation.

domestic in *t-1* into being MNEs in *t +1*[4]. The overall number of switching firms in our sample is 271, but in order to be able to compare performance up to three years after switching, in the following analysis we will consider only the 217 firms which became multinationals in the period 1994-1998.

5. Results

5.1. Construction of the counterfactual

A careful analysis of the effect of investing abroad requires the construction of an appropriate counterfactual. This counterfactual will be derived from the sub-sample of national firms, which do not invest over the 1994-1998 period. We use the propensity score matching technique. Due to the very high number of national firms, if we were to run logit on the whole sample, we would get a very poor prediction of the probability of switching. Therefore, we choose to randomly select a smaller sample of national firms (25% of the original sample) and then run a logit regression as a function of a number of observable firm-specific characteristics:

$$P(SW_{it} = 1 \mid Z_{i,t-1}, E_{i,t-1}, F_{i,t-1}, S_i, P_i, yr_{1994}, yr_{1995}, yr_{1996}, yr_{1997}, yr_{1998}) \qquad (3)$$

where $Z_{i,t-1}$ is a vector of firms' attributes such as size, age, $E_{i,t-1}$ is a vector of efficiency and profitability measures such as TFP, return on investments and cost of labor per employee, $F_{i,t-1}$ is a vector of financial variables such as the ratio of current assets to current liabilities, while S_i and P_i are sector and regional[5] dummies. $yr_{1994}, yr_{1995}, yr_{1996}, yr_{1997}, yr_{1998}$ are time dummies. For the multiple treatment matching, we run a multinomial logit regression where the outcome takes the values illustrated above. The results of the estimations are reported in table 2. These results support the hypothesis that size and productivity are important determinants of the choice of becoming a multinational firm. In other words, we confirm that multinationals have some *ex ante* advantage over national firms, which allow them to overcome the costs and risks of running business abroad.

[4] Firms, which disinvest during the 1994-2000 period, were excluded from the sample. Therefore, MNE in *t* is always equal to $MNE_{t-1} + SW_{t-1}$. Similarly, $NATIONAL_t = NATIONAL_{t-1} - SW_{t-1}$.
[5] A dummy is included for each French department.

From the binary logit we gather the propensity score of each firm (i.e. the probability of switching), which is used to select the matched control group. Here we chose a matching algorithm which assigns to each switching all national firms whose propensity score is within a radius of 0.75%. In the computation of the effect of investing, the outcome of each counterfactual firm is then weighted by the distance in terms of propensity score to the switching one it controls for[6]. As regards matching firms making their first foreign investment in an LDC (and those investing in DC) to the appropriate counterfactual of national firms, we exploited the fact that multinomial logit provides a propensity score for each choice. Firms switching into LDC and those investing in DC are then matched to national firms separately.

As previously mentioned, matching techniques assume conditional independence that is we need to rule out that the choice of investing abroad is significantly affected by unobservable variables which also determine post investment performance. This is not easy to ensure and test in empirical work, mainly due to data limitation. Here, we tried to control for as many observable firms' characteristics as possible (including a large set of sector and regional dummies) given our data constraint. We reached a satisfactory result in terms of explained variance, as indicated by a pseudo-R^2 of 0.185 for the simple logit and 0.232 for the multinomial logit, which is in line with most existing works using matching techniques.

A good matching should also result in characteristics of the counterfactual as close as possible to those of the investing firms. In formal terms, the matched sample should satisfy the balancing property that is the distribution of the vector of observables should be balanced across switching and control firms. In table 3 we compare the average characteristics of switching firms to those of national firms before the matching and to those of the matched sample of national firms (i.e. the counterfactual). Switching firms and national ones before the matching are quite different. The first two columns of table 3 report the mean values of characteristics of both groups. Switching firms are larger (employment and sales are more than three times larger, while total assets are more than 5 times higher in switching firms), and more productive (TFP is 60% higher), pay higher wages. Propensity score matching mitigates such differences substantially. As shown in the last two columns of table 3, there are

[6] It is worth mentioning that, while the selection logit have been run on the pooled sample of switching and (randomly drawn) national firms over the 1994-1998 period to improve the fit, matching have been performed year-by-year, to ensure that data on switching and control group refer to same years.

less significant differences in the means between switching firms and matched ones[7]. Besides, differences disappear not only in variables used as regressors in the logit (TFP, employment, etc.), but also in other variables not included in the vector used to predict the propensity score. As a more formal test for the matching satisfying the balancing property, we followed Sianesi (2004) and ran the selection logit on the matched sample. Results are presented in table 5 in the appendix. As expected, we found that Pseudo R^2 drops significantly and no regressor is significant.

5.2. The effect of investing abroad

We now use the matched sample to estimate the impact of the creation of foreign subsidiaries on firms' performances. Our outcome variables are five indicators of firms' economic performances: output (measured by total sales) growth; employment growth; TFP growth, obtained as the residual of a Cobb-Douglas net output production function estimated for each 2 digit industry using the semi-parametric technique proposed by Levinshon and Petrin (2004); value added growth and wages growth. There are obvious relations among these indicators, such as for example the effect of an expansion in output on employment growth and on productive efficiency (through economies of scale), or the impact of an increase in TFP on output growth (through an increase of international competitiveness or employment *via* a factor mix reallocation)[8].

Results are presented in table 4. For our five indicators, we report their growth rate the first year following the investment (i.e. in *t+1*), as well as over a two and three years horizon. Results for switching firms versus non switching firms suggest that the former experience a higher growth rate in sales during the three years following the investment. This effect on output also has an impact on employment. Growth rate in employment is indeed positive and significant during the second and the third years. However, we find no significant effect on wages. Finally, switching firms two years after investment, reach a TFP growth up to 4.6% higher than their counterfactual. If we now focus on the effects of switching in cheap labor countries, the positive and significant coefficient on sales remains only for the second year.

[7] The number of switching firms slightly decreases in the matched sample. This is due to the fact in some cases we could not find any control firm within a 0,75% of the propensity score of the switching firm, so we decided to drop such firms, increasing the overall quality of the matching.

[8] Here we just concentrate on a robust estimation of the partial effect of investing abroad on these indicators, without discussing their interlinkages and the channels through which these effects occur.

Firms switching in developing countries have also a higher growth rate in TFP during the first and second years after the investment. Besides, the positive and significant impact on employment disappears. Nonetheless, our results do not support any negative employment effects of foreign investments in developing countries. Finally, a positive employment impact exists for firms investing in developed countries (last part of table 4). The growth rate of employment is 4.8% and 8.3% higher for investing firms two and three years after the investment respectively. Furthermore firms switching in developed countries also experience a 5.8% higher growth rate in value added after the first year and a 7.9% higher growth rate in TFP after two years. Lastly, their growth rate in output is also higher in every year than had they remained national.

In sum, our evidence supports the view that investments abroad strengthen the home activities of investing firms, both for investments in developed and developing countries. There seems, however to be differences in the effects of investing in the two areas. on firms' performance. Firms switching into developed countries experience a significantly higher growth rate in output relative to the trajectory they would have followed had they remained national. This higher output growth remains rather stable over the time horizon that we investigate and, more interestingly, it seems to be associated with a significant effect on employment and productivity starting two years after investment. Conversely, firms investing in developing countries experience an immediate jump in productivity, which eventually determines a higher output growth starting two years after investment.; moreover these firms do not suffer any significant job loss at home, neither just after investment, nor after a few years

6. Conclusion

This paper studies the effects of foreign investments in developing countries on home economies. We compare the home performances of a sample of French firms which have invested abroad for the first time in the period observed to the one of a counterfactual of firms which have not invested abroad. The problem is defining the right counterfactual. For the welfare of the home country what matters is what would have happened to investing firms if they had not invested. By using propensity score matching, we can construct a counterfactual of national firms that never invest abroad which replicates this hypothetical performance. A

note of caution is required. Given this framework our results do not measure the sign of the absolute performance of the firms analysed, in other words wether their absolute performance has improved or worsened. They merely say whether, whatever the sign of the absolute performance, the relative performance is different for investing and non investing firms.

We find that investing abroad significantly enhances performance at home with respect to the alternative of not investing. The rate of growth of output and total factor productivity is significantly higher for investing firms. Once we split the sample of the investing firms into those investing in developed and in developing countries we find no support for the concern of a negative employment effect of foreign investments in developing countries. Moreover, investing in developed countries has a positive and significant effect on employment growth.

These findings imply that foreign investments are often strategic moves undertaken to strengthen home activities. In this perspective, actions aimed at discouraging foreign investments and the creation of foreign employments seem short sighted and they risk at weakening the domestic economy rather than strengthening it.

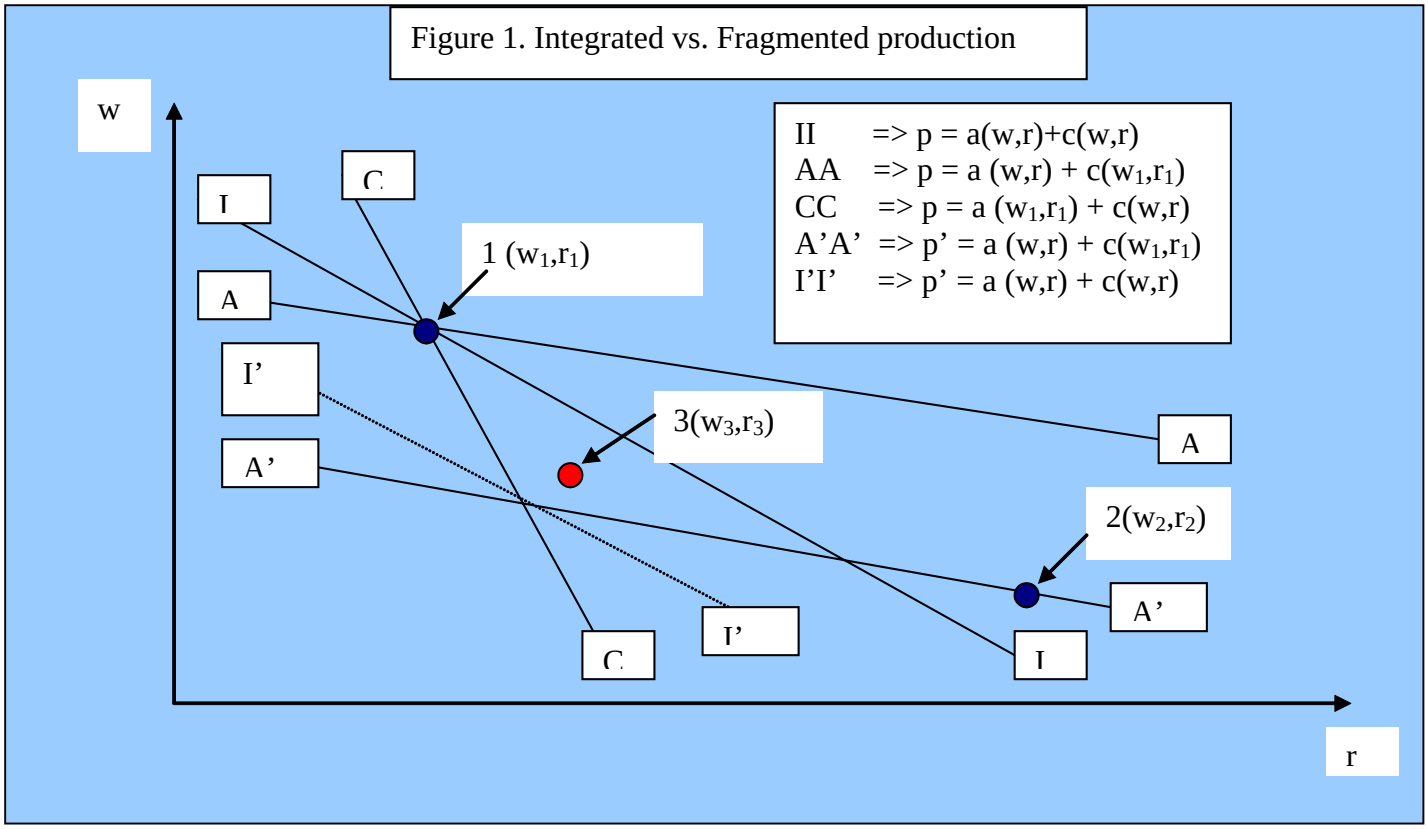

Figure 2 – Performance trajectories in home plants

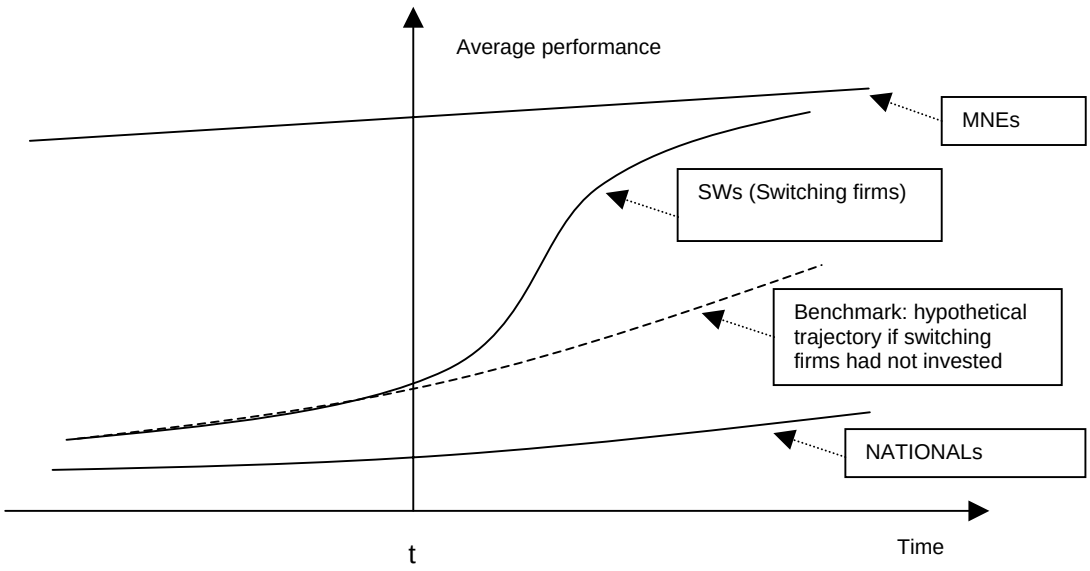

Figure 3 – Multiple treatment and counterfactual

Counterfactual / Treatment	Non switching	Switching in LDC	Switching in DC
Non switching		A	B
Switching in LDC	C		D
Switching in DC	E	F	

Table 1 – Number of French firms in the sample by investing status

Year	1994	1995	1996	1997	1998	1999	2000
Multinational in year *t* (beginning of period)	516	556	602	652	694	733	761
Switch in year *t*	40	46	50	42	39	28	26
Switch in developing countries in year *t*	16	24	16	23	25	15	11
Switch in developed countries in year *t*	24	22	34	19	14	13	15
National in year *t*	25807	25767	25721	25671	25629	25590	25562

Table 2 – Probability of switching for French firms

Model:	Binary logit	Multinomial logit	
Specification:	Switching vs. non switching firms	Switching in developing countries vs. non switching firms	Switching in developed countries vs. non switching firms
Log $TFP_{i, t-1}$	1.59***	1.58***	1.63***
	(0.23)	(0.34)	(0.32)
Return on investments $_{i, t-1}$	-1.09*	-1.06	-1.14
	(0.66)	(0.91)	(0.97)
Log $Age_{i, t-1}$	0.15*	0.34***	-0.01
	(0.08)	(0.12)	(0.11)
Nb. of employees $_{i, t-1}$ <50	-	-	-
Nb. of employees $_{i, t-1} \in$ [50;250[	0.78***	0.87***	0.69***
	(0.18)	(0.26)	(0.25)
Nb. of employees $_{i, t-1} \in$ [250;500[	1.52***	1.58***	1.43***
	(0.27)	(0.38)	(0.36)
Nb. of employees $_{i, t-1} \geq$500	1.50***	1.47***	1.47***
	(0.29)	(0.43)	(0.39)
Log Cost of labour per $employee_{i, t-1}$	0.58	0.47	0.64
	(0.36)	(0.54)	(0.48)
Current assets/Current liabilities $_{i, t-1}$	-0.01	-0.16	0.06
	(0.08)	(0.14)	(0.08)
Sector dummies	Yes	Yes	Yes
Regional dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Nb. observations	29038	34449	
Pseudo R-squared	0.185	0.232	

Notes: Standard errors in parentheses with ***, **, and * respectively denoting significance at the 1%, 5% and 10% levels. Intercept and sector, regional and year dummies not reported.

Table 3 – Switching firms and control groups, various characteristics (means)

	Switching vs. non switching firms			
	Unmatched sample		Matched sample	
	Switching	Control	Switching	Control*
Nb. of observations	217	28821	212	212
Nb. employees	287.12	91.44	243.17	269.46
TFP	1.96	1.19	1.92	1.94
Labour productivity[§]	65.48	44.80	65.10	66.28
Value added[§]	18428.12	4332.59	14769.34	16603.18
Wages[§]	39.36	32.40	39.20	39.38
Sales[§]	82951.59	22321.81	73899.28	74833.20
Operating P/L[§]	3862.33	652.92	3403.96	3127.03
Total assets[§]	63972.70	11690.00	52827.13	46989.36
Current assets[§]	40971.17	8217.85	32942.39	31242.62
Return on investments	0.076	0.065	0.077	0.078
Cash flow[§]	4116.43	902.41	3516.21	4343.48
	Switching in developing countries vs. non switching firms			
	Unmatched sample		Matched sample	
	Switching	Control	Switching	Control*
Nb. of observations	105	34232	103	103
Nb. employees	278.86	87.62	274.88	256.86
TFP	1.90	1.17	1.87	1.85
Labour productivity[§]	59.96	43.99	59.42	58.67
Value added[§]	18253.22	4110.82	17899.79	15910.72
Wages[§]	37.34	31.71	37.42	36.70
Sales[§]	80607.66	20818.96	79870.87	73330.62
Operating P/L[§]	4417.85	661.63	4333.33	3215.51
Total assets[§]	63384.71	10930.53	62067.66	43256.23
Current assets[§]	37367.20	7621.98	36943.84	28231.01
Return on investments	0.071	0.066	0.071	0.076
Cash flow[§]	5202.92	887.48	4988.24	4133.70
	Switching in developed countries vs. non switching firms			
	Unmatched sample		Matched sample	
	Switching	Control	Switching	Control*
Nb. of observations	112	34232	104	104
Nb. employees	294.86	87.62	248.33	309.27
TFP	2.01	1.17	1.93	1.79
Labour productivity[§]	70.66	43.99	68.36	61.64
Value added[§]	18591.98	4110.82	14257.14	17344.42
Wages[§]	41.25	31.71	40.76	38.62
Sales[§]	85149.02	20818.96	73689.78	86376.33
Operating P/L[§]	3341.54	661.63	2475.00	2881.09
Total assets[§]	64523.94	10930.53	49511.18	55858.45
Current assets[§]	44349.88	7621.98	33029.01	39304.39
Return on investments	0.081	0.066	0.081	0.073
Cash flow[§]	3112.71	887.48	2993.61	4172.81

[§] Variables which were not included in the logit used to compute the propensity score

* Weighted number of control firms

Table 4 – Effect of investing abroad on French firms' performances

	Switching *vs*. non switching firms		Switching in developing countries *vs*. non switching firms		Switching in developed countries *vs*. non switching firms	
Variables	**Coeff.**	**Nb. obs.**	**Coeff.**	**Nb. obs.**	**Coeff.**	**Nb. obs.**
Sales						
1 year growth rate in sales	0.036* (0.019)	422	0.035 (0.026)	204	0.045* (0.027)	207
2 years growth rate in sales	0.071*** (0.027)	417	0.084** (0.038)	202	0.085** (0.038)	204
3 years growth rate in sales	0.064* (0.036)	377	0.062 (0.047)	182	0.111* (0.051)	183
Value added						
1 year growth rate in value added	0.032 (0.025)	420	0.050 (0.032)	205	0.058* (0.035)	205
2 years growth rate in value added	0.029 (0.029)	411	0.051 (0.036)	200	0.061 (0.041)	200
3 years growth rate in value added	0.023 (0.035)	368	0.037 (0.046)	177	0.059 (0.047)	179
Employment						
1 year growth rate in employment	0.024 (0.015)	423	0.036 (0.025)	205	0.013 (0.017)	207
2 years growth rate in employment	0.044** (0.022)	417	0.049 (0.031)	202	0.048* (0.027)	205
3 years growth rate in employment	0.058* (0.030)	376	0.050 (0.042)	181	0.083** (0.038)	183
TFP						
1 year growth rate in TFP	0.034 (0.024)	414	0.063** (0.032)	203	0.047 (0.034)	201
2 years growth rate in TFP	0.046* (0.028)	399	0.062* (0.036)	196	0.079* (0.041)	193
3 years growth rate in TFP	0.032 (0.034)	351	0.044 (0.045)	169	0.073 (0.047)	170
Wages						
1 year growth in wages	0.015 (0.012)	423	0.001 (0.017)	205	0.028 (0.018)	207
2 years growth rate in wages	0.019 (0.015)	416	0.020 (0.020)	202	0.031 (0.021)	204
3 years growth rate in wages	0.015 (0.019)	374	0.032 (0.026)	181	0.011 (0.027)	181

Notes: Standard errors in parentheses with ***, **, and * respectively denoting significance at the 1%, 5% and 10% levels. Intercept not reported.

Appendix

Table 5 – Adequacy of the matching

Model:	Simple logit	Simple logit	Simple logit
Specification:	Switching vs. non switching firms	Switching in developing countries vs. non switching firms	Switching in developed countries vs. non switching firms
Log $TFP_{i, t-1}$	0.08	-0.11	0.30
	(0.21)	(0.31)	(0.32)
Return on investments $_{I, t-1}$	-0.20	-0.55	0.39
	(1.04)	(1.66)	(1.51)
Log $Age_{i, t-1}$	-0.03	0.05	0.05
	(0.12)	(0.18)	(0.16)
Nb. of employees $_{i, t-1}$ <50	-	-	-
Nb. of employees $_{i, t-1} \in$ [50;250[	0.20	0.10	-0.10
	(0.24)	(0.35)	(0.35)
Nb. of employees $_{i, t-1} \in$ [250;500[	0.25	0.13	-0.21
	(0.33)	(0.49)	(0.46)
Nb. of employees $_{i, t-1} \geq$500	0.16	0.03	-0.16
	(0.35)	(0.54)	(0.48)
Log Cost of labour per employee $_{i, t-1}$	0.14	0.48	0.19
	(0.36)	(0.55)	(0.53)
Current assets/Current liabilities $_{i, t-1}$	0.04	0.01	-0.03
	(0.11)	(0.17)	(0.16)
Sector dummies	No	No	No
Regional dummies	No	No	No
Year dummies	No	No	No
Nb. observations	424	206	208
Pseudo R-squared	0.003	0.004	0.009

Notes: Standard errors in parentheses with ***, **, and * respectively denoting significance at the 1%, 5% and 10% levels. Intercept not reported.

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