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at Home by Investing Abroad?**

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# Do Italian firms improve their performance at home by investing abroad?

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## Abstract

Foreign activities of MNEs have important effects on home economies. The debate is ambiguous: concerns that foreign investments deplete domestic economies are often coupled with the pride for doing good business in foreign countries. This paper addresses this question by defining the appropriate counterfactual: what would have happened to investing firms if they had not invested abroad. It applies propensity score matching to derive these hypothetical performance trajectories from a sample of national firms which never invested abroad. For a sample of Italian firms, it finds that investments improves growth of total factor productivity and output. It also finds no significant effects on employment. These results support the view that foreign investments strengthen rather than depleting home activities.

**Key words:** multinational firms, productivity, propensity score matching

**JEL:** F23, D21, C14

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## **1. Introduction**

The effects at home of the foreign outsourcing of economic activities is a widely debated issue. This paper contributes to this debate by assessing how the home activities of manufacturing firms in Italy change following the setting up of foreign subsidiaries abroad .

The debate on outsourcing in the US and in the UK has mostly focussed on services. In contrast, continental European countries are concerned with the loss of manufacturing jobs, particularly in traditional industries. Evocatively this process has been dubbed ‘delocalisation’, to represent a loss of economic activities and an impoverishment of the domestic economies. Accordingly, policymakers in several European countries and in the European Union have responded to public concerns by introducing measures hindering this process.

However, public opinion and policy responses are often formed on a superficial understanding of outsourcing. Indeed, the issue is not simple. Theoretically the transfer of national resources from home to foreign countries taking place with outward investments may be predicted to have both positive and negative consequences on home activities. Empirically this process is hard to gauge. The firm level data available have generally information on one aspect of outsourcing, foreign direct investment, and they do not capture part of process which takes place through non equity agreements between firms in different countries. Also, they combine investments aimed at transferring part of the production process abroad and those simply aiming at entering a foreign market, which do not involve outsourcing in a strict sense. Broader measures of

outsourcing are based on input output data, but they are generally observable at the industry level only. Studies based on this data suffer from an aggregation bias and they often cannot isolate the effect of outsourcing from other factors affecting performance.

This paper too only deals with foreign direct investment and therefore provides a partial assessment of the problem. However, FDI is an extremely important component of the outsourcing process and its effects provide important insights on the broader picture.

Compared to earlier works on FDI this paper has two innovative features.

*First*, it focuses on firms that change status from national to multinational by investing abroad for the first time. It is therefore possible to single out the effects of the investment by comparing firms' performance before and after the investment. Indeed, discrete changes in the home activities of firms – in terms of size and input mix - take place when new investments are carried out. That Multinationals (MNE) perform better than national firms is now a well established fact in the literature, the issue is understanding whether this difference in performance can be attributed simply to the MNE status. This can be done more accurately by restricting our analysis to firms changing status.

*Second*, it uses propensity score matching to construct an appropriate counterfactual of national firms and uses a difference-in-difference estimator (DID) to compare the performance of the two types of firms. Constructing an appropriate counterfactual is essential. The effects of outward investments on home activities are not just relevant per se, but with respect to what would have happened if firms had not invested abroad. For example, even though home employment is observed to decline, it would perhaps

declined even more if these firms had not invested. Albeit this cannot be observed, their hypothetical behaviour can be proxied by the behaviour of a sample of other firms which have not invested.

We find that the home performance of Italian firms that invest abroad for the first time during the period analysed improves after the investment. The post-investment rate of growth of output and productivity is higher than the one observed over the same period for the counterfactual of non-investing firms. Also, there is no significant evidence of a slowing down of the rate of employment growth. Thus, the evidence supports the view that foreign investments do strengthen and do not deplete economic activities at home.

This result is in line with those of Egger and Pfaffermayr 2003, that 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. 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, Blomstrom, 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 focus either at the sectoral/regional level or, when addressing the question at the firm-level, focus on the activities of MNEs and thus fail to take into account the appropriate *counterfactual* to this problem.

As for outsourcing, Gorg, Hamley and Strobl 2004 to our knowledge is the only paper based on firm level data for a sample of Irish enterprises. Outsourcing is measured by the share of imported inputs at the firm level. The paper finds that under many circumstances the effect of outsourcing is positive, particularly for large firms and firms based in broader international exports (as they are foreign owned or they are exporters). Finally, also works on outsourcing based on industry data do not find negative effects, both for the outsourcing of services and material inputs (Amiti and Wei, 2004)

The next section outlines the main analytical issues and outlines the empirical strategies followed. Section three discusses the methodology used to construct difference in difference estimators. Section 4 describes the sample, and section 5 the construction of the counterfactual. Section 6 estimates the effects of investing abroad and section 7 concludes.

## **2. Analysing the performance of investing firms: the issue**

### *Analytical issues*

The key effect we are interested in is contribution to home real income. Do firms improve performance at home by investing abroad? Theoretical predictions are not clear cut. There are three main reasons why opening and running foreign subsidiaries affect domestic productivity: the exploitation of firm-level and plant-level scale economies; the change in the composition of inputs used in production; the opening of new channels of international sourcing of technological and managerial knowledge. These sources of productivity change may work in both directions, depending on the features

of the investment. The scale of home activities could decline or increase; technologies could be acquired in foreign markets or get depleted to foreign competitors; home activities could get strengthened or impoverished by changes in their factor use (see Barba Navaretti, Venables et al., 2004 for a thorough discussion of this issue).

Besides for performance, the size of economic activity at home per se (independently from its effects on productivity) is a major concern when firms invest abroad. Does outsourcing deliver declines in employment and output? Once more, theory provides good rationales for both options. It all depends on whether firms substitute domestic labour and output with foreign activities or whether expanding foreign activities complement domestic ones. For example, if by transferring part of their production abroad firms reduce unit costs and get more competitive, they could gain market shares and finally increase output in the remaining home plants.

In other words neither the findings of a positive or of a negative outcome of outward investment are inconsistent with theory. For this reason the issue essentially boils down to an empirical one.

### *The empirical setting*

An empirical test of the effects of foreign investments on performance at home 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 (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.

To address these problems empirically, it is possible to draw on the now well established literature investigating the effects of exporting on firms' performance (Bernard and Jensen, 1999, Clerides, Lach and Tybout, 1998, Aw, Chung and Roberts, 2000, Castellani, 2002b, Delgado et al., 2002, Girma et al. 2002, Kraay, 1999). The exporter faces the same problem of a firm investing abroad. Consequently, the analysis of the effects of these two decisions raises similar methodological problems.

To illustrate the kind of exercise we carry out in this paper, it is useful to discuss Figure 1 which is derived from Clerides, Lach and Tybout (1998) and adapted 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 (NATIONAL) and those that open their first foreign subsidiary in the period observed and therefore switch from being national into being MNEs (SWs) at time  $t$ .

Compare the trajectory of MNEs and NATIONALS. We assume that MNEs perform better than NATIONALS. This assumption reflects what emerges from all available studies: on average MNEs at home always perform better than NATIONALS (Barba Navaretti, Venables et al. 2003, Castellani and Zanfei, 2003; Criscuolo and Martin, 2002; Girma, Kneller and Pisu, 2003, Doms and Jensen, 1998; Frenz et al., 2002, Pfaffermayr and Bellak, 2002, Bellman and Jungnickel, 2002, De Backer and Sleuwaegen, 2003). However, the trajectory of MNEs could lie above the one of NATIONALS both because they were the best performing firms even before becoming multinationals, or because performances improved as a result of international production

More can be learned if we now focus on SWs, those which invest for the first time at  $t_0$ . If the investment has a positive effect on productivity their trajectory becomes steeper at  $t_0$  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 SWs 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. Good candidates for the counterfactual are NATIONAL firms, so we could compare the performance trajectory of SWs, with the one of NATIONALS. However, we still have a problem. The trajectory of the appropriate counterfactual should differ from the one of SWs just because of the different investment decision. But firms are heterogeneous,

even within the same industry, and SWs could be different from NATIONALs even before the investment. The assumption of most of the literature is that operating in a foreign environment involves additional costs and risks and then only firms possessing some intangible capital giving them a competitive edge over national firms are able to overcome such disadvantage and invest abroad (Dunning, 1993; Markusen, 1995). Because of this self-selection the average NATIONAL is not a good benchmark: it is *ex-ante* different from the SW, and this difference may affect *ex-post* performance. Accordingly, we draw the performance trajectory of SWs before the investment above the one of NATIONALs. If we want to isolate the effect of investing, we need to build a counterfactual made of NATIONALs which are as similar as possible to firms which have invested.

To do so, in what follows we 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. We will then be able to compare post-investment performances in the two groups. We will use standard matching estimators which essentially compare the post  $t$  slope of the thick line to the one of the dotted line and difference-in-difference estimators, which compare the change in the slope of the thick line and of the dotted line before and after  $t$ .

### **3. The evaluation problem: propensity score matching and difference-in-difference estimators**

As illustrated in section 2, our aim is to evaluate the effect of becoming a multinational firm on economic performance at home,  $\Delta y$  (where  $\Delta y$  denotes the rate

of growth of employment, output or total factor productivity (TFP))<sup>1</sup>. To gather this effect we need to understand what would have happened to the firm's economic performance had it not invested abroad. Let  $SW_{it}$  be an indicator taking 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  $\Delta y_{i,t+1}^1$  be firm  $i$ 's post-investment performance and  $\Delta y_{i,t+1}^0$  the hypothetical performance achieved at  $t+1$  had  $i$  not invested abroad. The effect of investing abroad on economic performances for firm  $i$  would then be measured by  $\Delta y_{i,t+1}^1 - \Delta y_{i,t+1}^0$ . More formally, this average effect can be expressed as follows<sup>2</sup>:

$$\hat{\alpha} = E(\Delta y_{i,t+1}^1 - \Delta y_{i,t+1}^0 \mid SW_{it} = 1) = E(\Delta y_{i,t+1}^1 \mid SW_{it} = 1) - E(\Delta y_{i,t+1}^0 \mid SW_{it} = 1) \quad (1)$$

The key problem is that the last term is unobservable, i.e. we do not know what would have been the average performance of SWs if they had not invested. We need to find an appropriate measure for the last term in our sample or, in other words, we need to construct an appropriate counterfactual, based on the right control group. If we were to run a natural experiment, we could randomly draw a sample of firms from a population and let one half to invest and the other not to invest. This latter group would be the appropriate control group. Unfortunately, as argued in section 2, firms choose endogenously whether to invest or not.

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<sup>1</sup> This is usually defined the 'outcome' in the evaluation literature. See Blundell and Costa Dias (1999, 2002), and Wooldridge (2002, Ch. 18) for reviews.

<sup>2</sup> 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.

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. 2002). This methodology has also been used to evaluate the effects of exporting and of acquisitions on firms' performances and returns to scale by Girma, Greenaway and Kneller (2002), Girma, Kneller and Pisu (2002b), Wagner (2002) and Girma and Gorg (2002). 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 idea is to construct an appropriate counterfactual by matching each investing firm with one with similar characteristics drawn from a sample of non-investing ones. Here we use the *nearest neighbour* matching, based on the *propensity score* method, which computes the probability of investing (the propensity score) conditional on a number of observables. 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 probit 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 (*propensity score*) for each firm and pair each investor with its *nearest neighbour*, i.e. the non-investing firm with the closest propensity score. In other words, we build a sample where for each investing firm there is a firm 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:

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

where  $\Delta\bar{y}_{t+1}^1$  is the mean performance growth of investing firms after switching and  $\Delta\bar{y}_{t+1}^0$  is a weighted mean of performance growth the control group over the same period<sup>3</sup>. 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.

Besides for the SM estimator we also use the difference-in-difference estimator (DID). Whereas the SM estimators compares post-investment performance growth for the two groups of firms, the DID estimator compares the difference between pre and post-investment performance growth in both groups. Formally, DID, is given by:

$$\hat{\alpha}_{DID} = (\Delta\bar{y}_{t+1}^1 - \Delta\bar{y}_{t-1}^1) - (\Delta\bar{y}_{t+1}^0 - \Delta\bar{y}_{t-1}^0), \quad (3)$$

where upper bars denote averages in each group performances before (t-1) and after (t+1) the investment year. In substance, the DID measures the differential performance in the group of investing firms relative to the non-investing ones, once ex-ante differences in performance are accounted for. It eliminates time invariant unobserved heterogeneity which might not be captured by matching.

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<sup>3</sup> In the nearest neighbour matching used in this paper, weighting is simply used to account for the fact that one control can be matched to more than one switching firm. Given the extremely low number of such multiple matching (six) we prefer to run unweighted means which facilitate the implementation of DID in a regression framework. However, weighted results for standard matching estimators are identical to unweighted ones.

#### 4. Data and description of the sample

The dataset we use combines the Reprint data base of the Politecnico of Milan (which contains information on Italian multinationals and foreign firms operating in Italy) with the Aida data base of Bureau Van Dijck (which has information on balance sheet and other economic data of Italian firms). The two data bases have been merged by the Centro Studi Luca d'Agliano. The panel used in this paper includes Italian firms with more than 20 employees with observations between 1993 and 1998. The panel includes the three types of firms discussed in the earlier section. *SWs*, which set up their first foreign subsidiary in the period observed, *MNEs* which have at least one foreign subsidiary at the beginning of the period and *NATIONALs* which do not have foreign subsidiaries at the beginning of the period and never invest in the period observed<sup>4</sup>. The starting sample included 3,029 firms, but the number of firms for which we can construct a balanced panel is finally 1,587 because of missing values<sup>5</sup>. Table 1 summarises the composition of the sample by investing status for each year. 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 period. The second one reports firms that invested abroad that year and therefore switched status. The third one, just includes

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<sup>4</sup> The reprint data base contains a representative sample of Italian foreign investors. National firms, which are not reported in the Reprint data base, are drawn at random from the Aida data base

<sup>5</sup> In particular, firms with less than 4 out of 6 years of data on employment, output and TFP were excluded. Occasional missing values occurring in the series for the remaining 1,587 firms were estimated using linear interpolation.

national firms. Thus, every year  $t$  a number of SWs transit from being NATIONAL in  $t-1$  into being MNEs in  $t+1$ <sup>6</sup>.

SWs are 193 all together. However, as we need to compare pre and post investment performances we are forced to drop firms which invest in 1993 and 1994. In fact, we can observe pre-investment performance growth only starting with firms switching in 1995. Thus, the number of switching firms analysed falls to 119. These firms become multinationals either in 1995, in 1996 or 1997. We observe their economic performance from 1993 to 1998. In Figure 2 we report the time structure of the investment pattern of SWs

## 5. Construction of the counterfactual

The counterfactual will be derived from the sub-sample of NATIONALs that do not invest over the 1995-1997 period by way of the propensity score matching technique. We start by running a Probit regression to derive the probability of investing as a function of observable firm-specific characteristics:

$$P(SW_{it} = 1 | Z_{i,t-1}, E_{i,t-1}, F_{i,t-1}, S_i, P_i, yr95, yr96) \quad (5)$$

where  $Z_{i,t-1}$  is a vector of firms' attributes such as size, age, share of intangible assets on total assets,  $E_{i,t-1}$  is a vector of efficiency and profitability measures such as TFP, operating margin per employee and ROI,  $F_{i,t-1}$  is a vector of financial variables such as the ratio of debt to total assets and the share of cash flow in total capital, while  $S_i$  and  $P_i$  are sector and province dummies, while  $yr95$  and  $yr96$  are two time dummies. The

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<sup>6</sup> Reprint allows to recover disinvestments only every two years (1995 and 1997), so in 1995 and 1997  $MNE_t = MNE_{t-1} + SW_{t-1} - EXIT$ , where EXIT denote firms which were multinationals in  $t-2$  and have no foreign subsidiaries in  $t$ . Similarly, in 1995 and 1997,  $NATIONAL_t = NATIONAL_{t-1} - SW_{t-1} + EXIT$ .

results of the estimation of (5) are reported in table 2 and support the hypothesis that size, productivity and profitability 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.

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 province dummies) given our data constraint, and reached a satisfactory result in terms of explained variance, as indicated by a Pseudo- $R^2$  of 22.7%, 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 SWs to those of NATIONALs before the matching and to those of the matched sample of NATIONALs, the counterfactual. SWs and NATIONALs are quite different firms. The first two columns of Table 3 report the mean values of characteristics of the two groups of firms and the third column reports the p-value for the test of equality of means in the two groups. Switching firms are larger (employment and turnover are four times larger, while total assets are more than 7 times higher in switching firms), more productive (TFP is 20% higher) and profitable

(operating profit per employee is twice as high), pay higher wages, and are less vertically integrated (value added per unit of output is 1.7% lower).

Propensity score matching mitigates such differences substantially. As shown in the last three columns of table 3, there are no significant differences in the means between SWs and matched firms. It is noticeable that differences disappear not only in variables used as regressors in (5) (TFP, employment, profits per employee, share of R&D to total assets, age, share of debt to total assets, cash flow to tangible capital), but also other variables such as wages, value added per unit of output, total, tangible, intangible and current assets, profits<sup>7</sup>.

## **6. The effects of investing abroad: results**

We now use the matched sample to estimate the impact of the creation of foreign subsidiaries on firms' performances. We use both the standard matching estimator (SM) and the difference-in-difference (DID) estimator. Our outcome variables are three indicators of firms' economic performances: TFP growth<sup>8</sup>, employment growth and output (measured by total sales) growth. There are obvious relations among these three 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

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<sup>7</sup> As a more formal test for the matching satisfying the balancing property, we followed Sianesi (2004) and ran the selection probit on the matched sample. As expected, we found that Pseudo R<sup>2</sup> drops significantly (from .22 in the whole sample to .07 in the matched sample) and no regressor is significant, neither individually nor jointly.

<sup>8</sup> TFP growth is obtained as the residual of a Cobb-Douglas gross output production function estimated from a random effect model with an AR(1) disturbance term. Elasticities to capital, labour and materials have been allowed to vary across 2-digit industries.

increase in TFP on output growth (through an increase of international competitiveness or employment (through factor mix reallocation), which we leave for further investigation. Here we just concentrate on a robust estimation of the partial effect of investing abroad on the three indicators, without discussing their interlinkages and the channels through which these effects occur.

In table 4 we report estimates of the effect of investing abroad, using both DID and SM (from equations 4 and 5). We compute bootstrapped standard errors to adjust for additional sources of variability introduced by the estimation of the propensity score as well as the matching process and we control for other post-investment sources of variation in performances, such as the contemporaneous growth rate in the stock of capital, the operating profit per employee, the average wage, the share of intangible on total assets and of cash flow on tangible assets. The effect of investing slightly drops when we introduce such controls, and the SM estimate of the effect on TFP growth turns out to be non-significantly different from zero. However, DID estimators are robust to the introduction of controls and suggest that switching firms experience a 8.8% higher growth rate in output and a 4.9% higher growth rate in TFP<sup>9</sup>. We find no significant effect on the rate of employment growth after accounting for pre-investment performance (DID) and controlling for other sources of variation .

## 7. Conclusions

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<sup>9</sup> It is worth mentioning that standard NN yields lower causal effect of investing on performances than DID. This result is comforting as DID improves upon standard matching estimators as it controls for unobserved heterogeneity in performances of treated firms as opposed to non-treated ones (Blundell and Costa Dias, 1999, 2002).

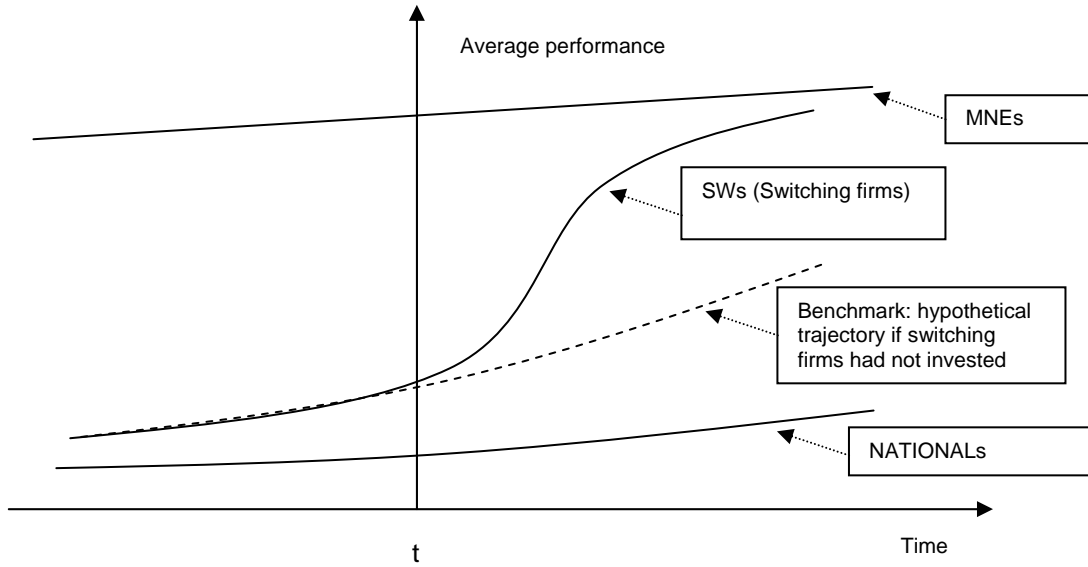
This paper examines the effects of foreign investment on the home activities of MNEs in Italian manufacturing.

Contrary to widespread concerns on international outsourcing we find that investing abroad significantly enhances performance at home. The rate of growth of total factor productivity and of output is significantly higher for investing firms and it accelerates after the investment takes place. This result is robust to the inclusion of different controls. We also find that investing has no significant effect on employment growth.

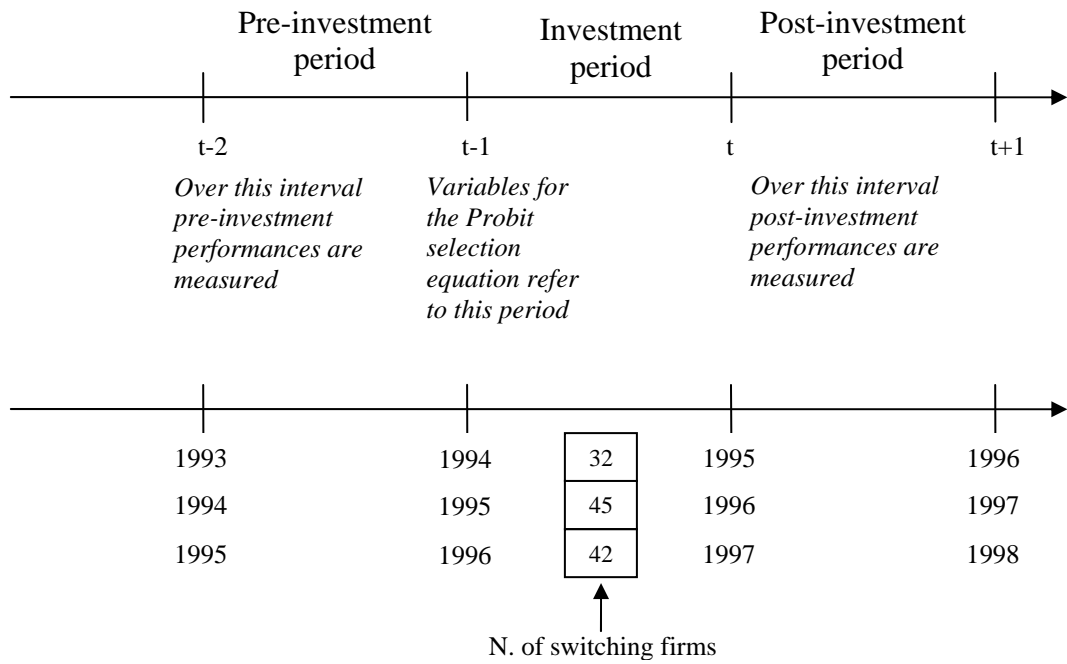
In this perspective actions aimed at discouraging foreign investments and the creation of foreign employments seem short sighted and they risk at weakening the domestic economy rather than strengthening it.

As a note of caution we should stress that our analysis provides a limited picture of the outsourcing process. First, our sample includes all types of investments. We cannot distinguish between vertical investments aimed at fragmenting production internationally (which is what is normally meant by outsourcing) and horizontal investments aimed at entering foreign markets, and which do not necessarily involve the transfer abroad of activities previously carried out at home. Second, we cannot control whether firms in our sample outsource internationally their activities through other channels than FDI, for example by undertaking arms-length agreements with firms based in foreign countries.

**Figure 1 – Performance trajectories in home plants**



**Figure 2 – The time structure of investment patterns**



**Table 1 – Number of firms in the sample, by size class and investing status**

Year	1993	1994	1995	1996	1997
Multinational in year t (beginning of period)	279	321	330	362	371
Switch in year t	42	32	32	45	42
National in year t	1,266	1,234	1,225	1,180	1,174

**Table 2 – Probit for the probability of switching**

Variable	Coeff.	Std. Error
(Log) TFP <sub>i, t-1</sub>	.411**	(.197)
(Log) N. employees <sub>i, t-1</sub>	.509**	(.058)
Profits per employee <sub>i, t-1</sub>	.007**	(.002)
ROI <sub>i, t-1</sub>	.799	(.919)
(Log) Age <sub>i, t-1</sub>	.129	(.084)
Capitalized R&D/Total assets <sub>i, t-1</sub>	4.130	(3.349)
Debt/Total assets <sub>i, t-1</sub>	.397	(.326)
Cash flow/fixed capital <sub>I, t-1</sub>	-.197**	(.056)
Sector dummies		Yes
Province dummies		Yes
Year dummies		Yes
N. observations		2,960
Pseudo R-squared		.227

\*\* : p<.05; \* : p<.10

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

	Unmatched sample			Matched sample		
	Switching	Control	Test for the equality of means (p-value)	Switching	Control	Test for the equality of means (p-value)
N. of observations	119	3,415		109	103	
Turnover <sup>§</sup>	145,726	37,579	3.082**	110,086	144,669	-.773
N. employees	347	92	2.709**	263	256	.099
TFP	1.214	.997	4.503**	1.176	1.196	-.347
Pre-tax P/L <sup>§</sup>	6,187	1,185	3.363**	4,610	3,642	.461
Operating P/L <sup>§</sup>	8,676	1,932	3.186**	6,270	7,419	-.529
Operating profit per employee	38.4	21.9	3.42**	35.7	39.4	-.471
Average wage <sup>§</sup>	60.8	57.8	2.059**	60.4	61.0	-.297
Value added per unit of output <sup>§</sup>	27.4%	29.1%	-1.59*	27.6	28.5	-.547
Age	24	23	1.291	24	23	.243
Total assets <sup>§</sup>	213,303	29,476	1.819**	116,474	103,328	.351
Tangible assets <sup>§</sup>	23,004	6,583	2.925**	19,277	21,726	-.456
Intangible assets <sup>§</sup>	3,314	750	1.636**	1,671	4,003	-.986
Share of intang. assets on total <sup>§</sup>	2.1%	1.6%	.824	1.6%	2.4%	-1.246
Capitalized R&D investments <sup>§</sup>	274.0	29.4	1.116	286.5	153.8	.548
R&D on total assets	0.2%	0.1%	.986	0.3%	0.4%	-.535
Current assets <sup>§</sup>	169,619	19,778	1.687**	84,684	61,515	.808
Share of debt on total assets	67.6%	67%	.401	67.6%	67.8%	-.087
Interests paid on total debt <sup>§</sup>	6.1%	5.8%	.92	6%	6.2%	-.358
Cash flow on tangible capital	.521	.727	-1.335	.468	.611	-1.027

<sup>§</sup> Variables which were not included in the *probit* used to compute the propensity score

**Table 4 – The effect of investing abroad on firms’ performances, 1993-1998**

Dep. Variable	Turnover Growth			
Estimator	SM	DID	SM	DID
	Unconditional difference	Unconditional difference	Conditional difference	Conditional difference
Effect of investing ( $\alpha$ )	.056** (.029)	.110** (.039)	.044* (.028)	.087** (.039)
Constant	Yes	Yes	Yes	Yes
Control variables*	No	No	Yes	Yes
Observations	212	422	212	422
R-squared	.018	.029	.224	.187

Dep. Variable	TFP Growth			
Estimator	SM	DID	SM	DID
	Unconditional difference	Unconditional difference	Conditional difference	Conditional difference
Effect of investing ( $\alpha$ )	.036** (.014)	.075** (.024)	.015 (.010)	.049** (.017)
Constant	Yes	Yes	Yes	Yes
Control variables*	No	No	Yes	Yes
Observations	212	422	212	422
R-squared	.018	.029	.528	.466

Dep. Variable	Employment growth			
Estimator	SM	DID	SM	DID
	Unconditional difference	Unconditional difference	Conditional difference	Conditional difference
Effect of investing ( $\alpha$ )	.036* (.021)	.022 (.031)	.005 (.014)	-.032 (.026)
Constant	Yes	Yes	Yes	Yes
Control variables*	No	No	Yes	Yes
Observations	212	422	212	422
R-squared	.013	.049	.585	.461

\* Control variables include: growth rate in share in intangible assets, capital stock, profits per employee, wage, share of cash flow in total capital and turnover (only for TFP and employment growth). Asterisks denote significance level at 5% (\*\*) and 10% (\*), based on bootstrapped standard errors (500 repetitions).

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