

**Does investing abroad affect performance at home?  
Comparing Italian multinational and national enterprises.**

Giorgio Barba Navaretti  
*Università di Milano and Centro Studi Luca D'Agliano*

Davide Castellani\*  
*Università di Urbino*

First Draft  
September 2002

**Abstract**

Foreign activities of MNEs have important effects on home economies. The debate is ambiguous: concerns that foreign investments may deplete domestic economies are often coupled with the pride for doing good business in foreign countries. This paper addresses these concerns by measuring performances at home (output, employment and TFP growth) of a sample of Italian firms which have invested abroad. The novelty of the paper is that we address the question of ‘what would have happened the firm had not invested?’. Investing firms are compared to a counterfactual of firms which have not invested abroad, constructed using propensity score matching, and we find that the formers outperform national firms with similar characteristics. This result supports a positive causal effect of investment abroad on performance at home.

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

**JEL**: F23, D21, C14

Paper prepared for the fourth conference of the TMR Network on ‘Foreign Direct Investment and the Multinational Corporation: New Theories and Evidence’, funded by the European Commission under contract FMRX-CT98-0215 to be held in Hydra, 20 & 21 September 2002

**\*Corresponding Author:**

ISE-Università di Urbino, Via Saffi, 2 – 61029 Urbino, Italy. Tel. +39 (0)722 305560.

Email: castellani@econ.uniurb.it

## Table of contents

1. Introduction	2
2. The home country effects of FDIs: which channels?	4
3. The home country effects of FDIs: empirical evidence	7
4. The evaluation problem: propensity score matching and difference-in-difference estimators of average treatment effect	8
5. Data and construction of the counterfactual	11
6. The effects of investing abroad: results	16
7. Conclusions	19
8. References	21

### 1. Introduction

The activities of Multinationals (MNEs) have effects on home economies. The laymen perceptions of these effects are mixed. They share national pride when their MNEs do well in Fortunes' ranking of the largest firms in the world, but they worry when they see their companies closing down domestic plants and opening up new ones in cheap labour countries. The issue is indeed complex and there is very little empirical evidence supporting either the pessimist or the optimist. This paper will try to fill this gap by looking at the performance of a sample of Italian firms and by comparing firms that do invest abroad to firms that do not invest abroad .

How does investing abroad affect the home activities of the investing firms? *First*, it has effects on the *size of their domestic activities*. Domestic employment and domestic output may expand or contract depending on whether foreign activities complement or substitute domestic ones. *Second*, it has effects on *the way things are done at home*. The skill or the capital intensity of domestic activities may again increase or decline depending on the relative factor intensity of the different activities carried out by the firm and on the factor endowments of the home and foreign countries. Also, domestic productivity may rise or decline, depending on whether foreign activities strengthen or deplete domestic ones.

Earlier works have examined the effects on 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) and productivity (Braconier, Eckholm, Midelfart Knarvik 2001, Van Pottelsberghe de la Potterie and Lichtenberg, 2001) of outward FDIs<sup>1</sup>. They generally find little evidence that outward investments deplete home activities.

This paper introduces two innovations in the empirical analysis of these issues. *First*, it focuses on firms that change status from national to multinational by investing abroad for the first time, so as to single out the effects of the investment, by comparing firms' performance before and after the investment. *Second*, it compares the performance of these firms investing abroad (henceforth MNEs), to the performance of a counterfactual of national firms (henceforth NEs) that do not invest abroad. In fact, the home effects of MNEs are not just relevant per se, but with respect to what would have happened had these firms not invested abroad. Think, for example at firms in traditional sectors like textile, facing competition from imports from cheap labour countries. For these firms, transferring stages of production to cheap labour countries could be the only strategy for survival. Even though home employment declines, it would have declined even more if these firms had not invested. Albeit what would have happened had firms not invested abroad cannot be observed, their hypothetical behaviour can be proxied by the behaviour of a sample of other firms which have not invested.

This paper applies propensity score matching to construct an appropriate counterfactual of NEs and uses a difference-in-difference estimator (DID) to compare the performance of MNEs and of NEs. The performance measures analysed are growth in output, employment and productivity.

Along with two companion papers focussing on labour demands (Barba Navaretti, Bruno, Castellani and Falzoni, 2002) and on productivity trajectories (Castellani, 2002a), this is the first paper that uses counterfactual analysis to examine the home effects of outward investments. Up to now, this type of approach has been used to analyse the related issue of the impact of exporting on firms' performance (Bernard and Jensen, 1999, Clerides, Lach and Tybout, 1998, Aw, Chung and Roberts, 2000, Castellani, 2001, Delgado et al., 2002, Girma, Greenaway and Kneller 2002, Kraay, 1999).

---

<sup>1</sup> An exhaustive survey of this literature can be found in Barba Navaretti and Falzoni, 2003

The paper finds that the home performance of Italian firms that invest abroad for the first time during the period analysed improves after the investment; it also finds that the post-investment rate of growth of output, employment and productivity is higher than the one observed over the same period for the counterfactual of non-investing firms. Thus, the evidence supports the optimistic view that foreign investments do strengthen and do not deplete economic activities at home.

The next section outlines the main channels through which foreign investments may influence performance at home. Section three revises the available evidence on these effects. Section 4 discusses the methodology used to construct the counterfactual of NEs and the DID estimators. Section 5 reports the data used and the main results of the empirical analysis. Section 6 concludes.

## **2. The home country effects of FDIs: which channels?**

Investing abroad has effects on the *level of domestic activities* and on the *way things are done at home*<sup>2</sup>

*Effects on the level of domestic activities: output and trade.* The effects of FDIs on domestic output, whether foreign output substitutes for or complements domestic output depends upon the nature of the investment. *Vertical investments* relocate stages of production previously carried out at home and reduce the value added of domestic production. They also have effects on trade in intermediates, in that they generate exports and imports of semi-finished products between the home country and foreign production bases. Exports of finished products from the home country decline when upstream stages are transferred abroad and exports are carried out directly from the assembly plant. *Horizontal investments* reduce domestic plants' exports and therefore output, when home and domestic products are substitute, although repatriated profits can be viewed as payments for headquarters' services and firm specific knowledge. In contrast, if home and domestic products are complements, foreign affiliates may boost domestic plants exports and outputs. Domestic output may also rise because foreign

---

<sup>2</sup> This section is partly drawn from Barba Navaretti and Falzoni, 2003

activities make domestic production more efficient (see below) and MNEs gain market shares

*Effects on the level of domestic activities: employment.* Strictly speaking, employment is an input, but from the point of view of policy makers employment creation is considered a key element of economic performance. Moreover, the loss of domestic jobs is the main concern raised by outward FDI. Changes in domestic employment obviously match changes in domestic output. *Vertical investments* are generally cost saving and often undertaken to reduce labour costs at home. The transfer of value added abroad always impinges a reduction in domestic employment. As for *horizontal investments* the relationship of substitution and complementarity between domestic and foreign output will be mirrored in a relationship of substitution and complementarity between foreign and domestic employment. Also, increases in domestic output following a gain in market shares will generate increases in domestic employment. Outward FDI, though, may also affect the *labour intensity* of the activities carried out at home, for given levels of output. Labour intensity may vary in both directions. It may decline because only capital intensive stages of production are kept at home, or because the MNE acquires new technologies and know-how abroad, improving in this way the efficiency of the domestic production process<sup>3</sup>. It may increase because foreign investments must be supported by headquarter services and larger headquarter staff<sup>4</sup> or because domestic labour becomes more productive compared to the other domestic inputs as foreign employment increases.

*Effects on the mode of production: productivity.* How do foreign subsidiaries influence the efficiency of the parent company? We may isolate at least three reasons why opening and running foreign subsidiaries affects 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 transmission and diffusion of technological and managerial knowledge. These sources of productivity change may work in both directions: for example, home productivity

---

<sup>3</sup> The decline in labour intensity for given output, may then generate gains in competitiveness, and an expansion of domestic output and employment.

<sup>4</sup> We are not considering headquarter services as output

increases if the exploitation of firm-level economies of scale dominates over the increase in unit costs due to the reduction of the scale of production in the home plant; operating costs decline if the beneficial effect of cheaper foreign labour is not jeopardised by the loss of vital jobs and skills at home; technology and competitiveness improves, if foreign knowledge is acquired through spillovers, but the opposite occurs if proprietary knowledge of the firm is dissipated through foreign production.

*Counterfactual analysis.* The home country effects of foreign investments should be related to a benchmark: what would have happened if firms had not invested abroad. We therefore need to compare the performance of investing firms to a counterfactual of non investing firms. Translating Clerides, Lach and Tybout (1998) analysis of exporting firms to the one of investing firms, in Figure 1 we draw hypothetical trajectories for employment, output and TFP for three types of firms: those who are Always Multinationals (AMNEs), as they have at least one foreign subsidiary in the period observed; those who never have a foreign subsidiary in the period observed (NEs) and those that open their first foreign subsidiary in the period observed and therefore switch from being national into being multinational firms (MNEs) at time  $t$ . The average performance in levels of AMNEs can be assumed to always lie above the one of NEs. A recent work by Barba Navaretti and Falzoni (2003) based on the sample of Italian firms analysed in this work finds robust evidence that Multinationals have employment, output and productivity premiums over national firms. Focus now on firms changing status, defined as MNEs. If there is self selection, switching firms are more productive and larger than other national firms before investing. If then performance improves because of the investment, the performance path of switching firms gets steeper in the aftermath of the investment, or anyway relatively steeper than for the other two groups of firms, and then it converges to the MNEs' trajectory. Most of the benefits of the new investment are likely to be reaped in its aftermath and we have no a priori on the relative rate of growth of MNEs *vis a vis* national firms in the longer run. This is why we focus on MNEs, i.e. firms changing status. In the empirical analysis that follows we compare the slope of the performance path (measuring the rate of growth of employment, output and productivity) of MNEs before and after the investment and the slope of the performance path of MNEs to the one of NEs. As discussed below, the

difficulty for the empirical analysis is to single out the effect of the investment and not to confuse it with the fact that firms with better performance self select into investing abroad.

Figure 1 here

### **3. The home country effects of FDIs: empirical evidence**

The empirical research on the home country effects of outward FDI has primarily addressed the issue of whether employment or production abroad complements or substitutes employment in parent companies. The approaches followed in the empirical analysis are essentially two. In the first approach, the focus is on how the multinational firm set employment in different international locations in response to changes in relative wages. In particular, the research interest is in examining whether parent's employment is affected differently by wage changes in low-wage countries compared with wage changes in other high-wage regions (Brainard and Riker, 1997a, 1997b, Braconier and Eckholm, 2000, Konigs and Murphy, 2001, Bruno and Falzoni, 2000). Overall, the existing empirical evidence seems not to support the fear that MNEs are exporting domestic jobs, particularly to low-wage countries. In the second approach, the relationship between employment in the parent and foreign production is examined testing how labour intensity of parent production changes in response to an increase in foreign production (Blomstrom, Fors and Lipsey, 1997, Lipsey, 1999, Bassino, 1998).

A recent wave of empirical research have been focussing on the impact of foreign investments on productivity and technology at home. Braconier, Ekholm and Midelfart Knarvik (2001) use Swedish data to assess the impact of foreign R&D spillovers channelled through outward and inward FDI. Their idea, which builds upon the pioneering work on trade induced R&D spillovers by Coe and Helpman (1995), is that the larger the inward and outward activities of multinationals and the larger the R&D stock of the partner country the larger the spillovers from foreign R&D to domestic operations. They find mixed evidence on outward investment induced R&D spillovers and in particular, that the type of activity – R&D or assembly – carried out in foreign affiliates matters significantly. Van Pottelsberghe de la Potterie and Lichtenberg, 2001 use a similar methodology, but they analyse aggregate inward and outward FDI flows

for 13 Oecd countries between 1971 and 1990. Their findings are that a country's productivity is increased by outward investments when it invests in R&D intensive countries. Inward investments, on the contrary, channel no spillovers to the host economy. Finally, Branstetter (2000) takes a more focussed approach and examines if the patenting activities of a sample of Japanese firms are influenced by their foreign operations in the US. The idea here is that R&D spillovers do not necessarily affect the productivity of the investing firm, but they more directly impinge on innovative activity and indeed he finds evidence of positive spillovers.

All the works discussed up to now relate foreign activities to output, employment, skill mix and productivity changes at home, focussing just on MNEs. This type of evidence provides just part of the picture. Firms investing abroad and becoming MNEs face the option of not doing so. A rich literature have grown in recent years investigating if exporting firms have higher and faster performance (productivity, employment and output growth) than firms which only operate in national markets (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). Drawing on the methodology developed in some of these studies, in some earlier works we investigate the impact of the creation of foreign subsidiaries on parent company's productivity trajectory (Castellani, 2002a, Barba Navaretti, Castellani and Zanfei, 2002) or labour demand (Barba Navaretti, Bruno Castellani and Falzoni, 2002) of Italian firms. Using GMM-IV estimations to control for the endogeneity of the investment decision, these studies seem to support both a positive productivity and employment effect of investing abroad. In this paper we follow an alternative empirical strategy to address the problem of endogeneity of the investment decision, and of finding the appropriate counterfactual sample.

#### **4. The evaluation problem: propensity score matching and difference-in-difference estimators of average treatment effect**

Our aim is to evaluate the causal effect of becoming a multinational firm on economic performance at home,  $\gamma$  (where  $\gamma$  denotes the rate of growth of

employment, output or total factor productivity (TFP))<sup>5</sup>. To gather this effect we need also to understand what would have happened to the firm's economic performance had it not invested abroad. Let  $MNE_{it}$  be an indicator taking value equal to one if firm  $i$  becomes a multinational at time  $t$  (i.e. between  $t-1$  and  $t$ ). Let also  $y_{i,t+1}^1$  be firm  $i$ 's post-investment performance and  $y_{i,t+1}^0$  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  $y_{i,t+1}^1 - y_{i,t+1}^0$ . More formally, this average effect can be expressed as follows<sup>6</sup>:

$$E(y_{i,t+1}^1 - y_{i,t+1}^0 | MNE_{it} = 1) - E(y_{i,t+1}^1 | MNE_{it} = 1) + E(y_{i,t+1}^0 | MNE_{it} = 1)$$

The key problem is that the last term is unobservable, i.e. we do not know what would have been the average performance of MNEs 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, firms choose endogenously whether to invest or not. For example, self selection of most productive firms in the export market is widely documented (Bernard and Jensen, 1999; Clerides et. al., 1998 among others), as well as a technological advantage is highlighted from theory as the main driver of foreign direct investments (Dunning, 1993, Markusen, 1995 for reviews). A path followed in the literature to overcome self-selection is to use the Instrumental Variable (IV) estimator<sup>7</sup>. This estimator has however the drawback that the choice of instruments

---

<sup>5</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>6</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.

<sup>7</sup> For example, in Castellani (2002a), Barba Navaretti, Castellani and Zanfei (2002), Barba Navaretti, Castellani, Bruno and Falzoni (2002) a dynamic panel GMM-IV estimator is implemented to test the impact of foreign investments on productivity and employment.

is not straightforward, in particular in cross-sections, and results might be sensitive to the choice of the instrument set<sup>8</sup>.

An alternative approach, which we follow here, is the method of matching, which aims at re-establish the conditions of a natural experiment with non-experimental data. Economic applications of matching estimators have been growing in recent years and they have been used for various tasks like the evaluation of policy intervention on the labour market (Heckman et al. 1997, Blundell et al. 2002), the impact of constitutions on the size of governments (Persson and Tabellini, 2002), the effect of dollarization on country's economic growth (Edwards and Magendzo, 2001, 2002). Particularly relevant to our paper are Girma, Greenaway and Kneller (2002) and Girma and Gorg (2002) who evaluate the effects of exporting and of acquisitions on firms' performances and returns to scale.

The idea is to construct an appropriate counterfactual pairing each investing firm with one with similar characteristics from a sample of non-investing ones. Here we use the *nearest neighbour* matching, based on the *propensity score* method<sup>9</sup>, which computes the probability of investing (the propensity score) conditional on a number of observables. This is done by estimating a probit model of the decision to become MNE that can be represented as follows:

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

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

It is then possible to pair each investor with the non-investing firm with the closest propensity score. It is subsequently possible to compare average performances in the group of investing firms and in the counterfactual by using a nearest neighbour matching estimator (NN) given by the following equation:

$$\hat{y}_{NN} = \frac{1}{N^I} \sum_{i \in I} y_{i,t}^I - \frac{1}{N^C} \sum_{j \in C} y_{j,t}^C$$

<sup>8</sup> The Heckman two-step estimator is another robust alternative to the IV, but it requires more assumptions about the structure of the model.

<sup>9</sup> The key assumption needed to perform matching based on the propensity score is that the difference in performance between investors and the control group is captured by a vector of observables, so that the only difference in performance can be attributed to investment. Then, a good selection on observables is critical for the success of matching.

where  $N^I$  is the number of investing firms,  $C$  is the set of controls matched and  $\alpha_j$  denotes the number of investors matched to control  $j$ . Since we constrained the sum of weights ( $\alpha_j$ ) to equal  $N^I$ , it is straightforward to see that in this case  $\alpha_{NN}$  is given by the comparison of the mean performances of the group of investing firms and of the weighted mean of control group.

Blundell and Costa Dias (1999 and 2002) suggest that a difference-in-difference estimator (DID) can improve the quality of evaluation results significantly. In essence, DID compares pre and post investment performances, and measures the excess performance growth for investors ( $\alpha^I$ ) compared with the non-investing firms ( $\alpha^0$ ), thus it controls for unobserved determinants of the choice of investing abroad.

Formally,

$$\alpha_{DID} = (\alpha^I \bar{y}_{t+1}^I - \alpha^I \bar{y}_{t-1}^I) - (\alpha^0 \bar{y}_{t+1}^0 - \alpha^0 \bar{y}_{t-1}^0),$$

where upper bars denote averages in each group performances before (t-1) and after (t+1) the investment year. The idea of DID is not significantly different from a first-difference estimator in linear panel data. It aims at eliminating unobserved heterogeneity which might not be captured by matching and can affect post investment performance. The interpretation of DID is still in terms of the differential performance in the group of investing firms relative to the non-investing ones, once ex-ante differences in performance are accounted for.

## 5. Data and construction of the counterfactual

We gathered our data from a dataset built at the Centro Studi Luca d'Agliano, in collaboration with the Politecnico di Milano, containing information on a sample of Italian firms with more than 20 employees from 1993 to 1998. For each firm we have data on balance sheet and other economic data from the Aida directory and for firms with foreign investments we have information on their foreign subsidiaries (gathered from the Reprint Databank)<sup>10</sup>. We consider the creation of foreign subsidiaries between 1995 and 1997. The original sample contained 3,029 firms, out of which 430

---

<sup>10</sup> Reprint is a dataset on Italian multinationals and foreign firms operating in Italy maintained by the Politecnico di Milano, while Aida is commercial product of Bureau Van Dijk.

were preliminary dropped since no data on employment, output or TFP were available in the observed period. We ended up with an unbalanced sample of 2,599 firms, where the actual number of observations varies in the three years between 1995 and 1997, due to missing values. Table 1 summarizes the composition of the sample by investing status: 253 firms have invested abroad over the period, half of them were already multinationals (AMNE in Figure 1), while 129 switched from NEs to MNEs in the period observed. These 129 switching firms are our sample of MNEs. These firms become multinational either in 1995 (i.e. at the end of 1994 they had no foreign subsidiaries and at the end of 1995 they have at least one), in 1996 or 1997. We observe their economic performance from 1993 to 1998. Figure 2 helps understanding the time structure of the data. We normalise the data so as to assume that the investments are all taking place in the same hypothetical period, between  $t-1$  and  $t$ . Between  $t-2$  and  $t-1$  we observe the pre-investment performance and between  $t$  and  $t+1$  the post investment performance. Overall, we have a control group of 4,377 observations. Notice that a single national firm can be in the control group in more than one year, provided that it does not invest abroad and that data are not missing.

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

$t$	NE at $t-1$		MNE at $t-1$ <sup>†</sup>	Total
	NE at $t$ <sup>*</sup>	MNE at $t$ <sup>**</sup>		
	(1)	(2)	(3)	(4)
1995	1,196	33	319	1,548
1996	1,318	48	317	1,747
1997	1,863	48	416	2,327
Total	4,377	129	1,052	5,622

\* Control group; \*\* Investing firms

<sup>†</sup> The number of MNE in  $t$  does not need to be equal to the number of MNE at  $t-1$  (Column 3) plus the number of NE switching to MNE at  $t$  (Column 2) due to either firms which disinvest or to missing values.

Following the approach previously described, we need to construct a control group based on propensity score matching. We specified the following Probit model to be estimated over the 1995-1997 period for the sample of firms which had no foreign subsidiaries at  $t-1$ :

$$P(MNE_{it} = 1 | \log TFP_{i,t-1}, \log L_{i,t-1}, \log Y_{i,t-1}, Z_i)$$

where  $TFP_{i,t-1}$ ,  $L_{i,t-1}$  and  $Y_{i,t-1}$  are total factor productivity, employment and output of firm  $i$  at  $t-1$ ,  $Z_i$  is a vector of sector, province and time dummies. Results are reported

in Table 1. We tried variants of this specification which yielded slightly different control groups. In particular, in Probit A. we excluded output and in Probit C. we selected only observations for which data on performances both before and after investment year was available<sup>11</sup>. This was to check that the results were not affected by missing values in post or pre-investment performances which unbalance the control group relative to the group of investors.

**Table 1 – Probit selection equation**

	Probit A.	Probit B.	Probit C.
Log(TFP) <sub>i,t-1</sub>	.600** (.108)	.386** (.153)	.147 (.380)
Log(L) <sub>i,t-1</sub>	.353** (.041)	.181** (.088)	.312* (.172)
Log(Y) <sub>i,t-1</sub>		.198** (.090)	.243** (.194)
Constant	-1.675* (.879)	-3.204** (.899)	-1.78* (.1.015)
Time dummies	Yes	Yes	Yes
Sector dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	Yes
N.obs	3,916	3,916	2,026
Pseudo R2	.168	.172	.217
Log Likelihood	-471.74	-469.22	-263.52
Propensity Score			
Mean	.032	.032	.039
Std. Dev	.051	.052	.068
Median	.015	.014	.014
Max	.734	.768	.884

Probit A.: all firms having no subsidiaries in t-1, year 1995-1997

Probit B.: all firms having no subsidiaries in t-1, year 1995-1997 (introduces log(sales))

Probit C.: Probit B. selecting only firms for which  $y_{i,t+1}$  and  $y_{i,t-1}$  is available

To control for the quality of matching, in Table 2 we report some descriptive statistics for investing firms, the pre- matching counterfactual and the post matching one. Columns (1) and (2) report the means of some characteristics of the sample firms (TFP, employees and sales, in logs). Not surprisingly, differences between investing

<sup>11</sup> The problem is that matching is based on information at t-1, while the causal effect of investing is estimated comparing means of performances in the investing and in the control group based on information on growth rates between t and t+1 and between t-1 and t-2. Missing values in the growth rates in any of the two groups cause means to be calculated on a subset of the matched observations.

firms and the control group are marked. Investing firms are larger (twice the size in terms of sales and 20% in terms of employees) and more productive (TFP is about 25% higher). As we illustrated in the previous section these difference suggest self-selection of investing firms, which in turn is likely to bias the evaluation of the causal impact of the decision to invest on economic performance. Note that, as expected, differences in the characteristics of the two groups disappear after matching (Columns (3) to (8))<sup>12</sup>.

---

<sup>12</sup> Matching is performed in Stata 7 using the `psmatch` command developed by Sianesi (2001).

Table 2 – Descriptive statistics

	Selection on Probit A.			Selection on Probit B.			Selection on Probit C.					
	Unmatched control	Unmatched Investors	Test for Difference in Means	Matched control	Matched Investors	Test for Difference in Means	Matched control	Matched Investors	Test for Difference in Means	Matched Control	Matched Investors	Test for Difference in Means
	(1)	(2)	(1)-(2) <sup>†</sup>	(3)	(4)	(3)-(4) <sup>†</sup>	(5)	(6)	(5)-(6) <sup>†</sup>	(7)	(8)	(7)-(8) <sup>†</sup>
Number of obs.	4,377	129		122	122		121	121		71	71	
TFPi,t-1	1.048	1.380	<b>-.341**</b> (.108)	1.344	1.369	-.025 (.109)	1.361	1.361	.006 (.101)	1.276	1.205	.070 (.081)
Employees i,t-1	135	337	<b>-202**</b> (86.1)	284	337	-53 (104.5)	317	339	-21.6 (107.1)	235	250	-15.3 (63.0)
Sales	39,678 4,411	140,147 129	<b>-100,469**</b> (31,366.7)	128,305 122	141,428 122	-13,122 (42,900.3)	145,229 121	139,689 121	5539.5 (42582.4)	102,785 71	106,850 71	-4,065.4 (25,934.4)

<sup>†</sup> Std. Error in brackets below estimates (asterisks indicate p-values. \*: p < .1; \*\*: p < .05)

## 6. The effects of investing abroad: results

We now use the matched sample to estimate the causal impact of the creation of foreign subsidiaries on firms' performances. We use both the standard nearest neighbour matching estimator (NN) and the difference-in-difference (DID) estimator on the matched sample described in section 3. Our outcome variables are three indicators of firms' economic performances: TFP growth, 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 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 the channels through which these effects occur.

The economic performance of investing firms is not significantly different from the unmatched sample of non-investing firms (column 1 and 2 of Table 3). On the contrary, matching estimators provide some evidence that investing abroad causes an increase in economic performance. In particular, DID estimates suggest that investing firms have better performance than firms with similar characteristics but did not invest abroad. TFP growth is between 5.3 and 7 % higher (according to specification used for the selection Probit), employment growth between 8.4-10% higher and sales growth by 10-16% higher<sup>13</sup>. Overall, these results support the need for an accurate choice of the counterfactual group, in order to take into account the self-selection problems that occurs with non-experimental data, and confirm that matching estimators can improve accuracy of the evaluation.

It is worth mentioning that standard NN yields lower causal effect of investing on performances than DID and, in many cases it turns out non significantly different from zero. This result is consistent with the view that DID can improve upon standard

---

<sup>13</sup> These results are also rather robust to the different specifications of the Probit.

matching estimators as it controls for unobserved heterogeneity in performances of investing firms as opposed to non-investing ones (Blundell and Costa Dias, 1999, 2002).

Table 3 – Testing for the effect of investing on the growth rate of TFP, employment and output

		Unmatched				Selection on Probit A.				Selection on Probit B.				Selection on Probit C.			
		control (1) <sup>†</sup>	Unmatched Investors (2) <sup>†</sup>	(2)-(1) <sup>††</sup>	a-b <sup>††</sup> DID	Matched control (3) <sup>†</sup>	Matched Investors (4) <sup>†</sup>	(4)-(3) <sup>††</sup> NN	a-b <sup>††</sup> DID	Matched control (5) <sup>†</sup>	Matched Investors (6) <sup>†</sup>	(6)-(5) <sup>††</sup> NN	a-b <sup>††</sup> DID	Matched Control (7) <sup>†</sup>	Matched Investors (8) <sup>†</sup>	(8)-(7) <sup>††</sup> NN	a-b <sup>††</sup> DID
? Log(tfp) <sub>i,t+1</sub>	a.	.002 4,936	.021 123	.019 (.018)	.015 (.027)	-.023 102	.020 106	<b>.044*</b> (.026)	<b>.073**</b> (.030)	.010 105	.021 105	.011 (.025)	<b>.065*</b> (.037)	-.012 71	.026 71	.039 (.030)	.053 (.036)
? Log(tfp) <sub>i,t-1</sub>	b.	-.007 2,775	-.003 98	.003 (.011)		.025 82	-.003 94	-.029 (.016)		.044 79	-.009 92	<b>-.053**</b> (.026)		.008 71	-.005 71	-.013 (.018)	
? log(empl) <sub>i,t+1</sub>	a.	.025 4,949	.023 123	-.002 (.015)	.012 (.024)	.010 102	.027 106	.016 (.036)	<b>.092**</b> (.049)	-.005 105	.027 105	.032 (.029)	<b>.084**</b> (.040)	-.003 71	.019 71	.022 (.022)	<b>.104**</b> (.046)
? log(empl) <sub>i,t-1</sub>	b.	.079 2,797	.065 98	.014 (.018)		.130 82	.055 94	<b>-.075**</b> (.033)		.106 79	.055 92	<b>-.050*</b> (.028)		.124 71	.043 71	<b>-.081**</b> (.040)	
? log(sales) <sub>i,t+1</sub>	a.	.008 4,970	.038 123	.030 (.030)	.018 (.037)	-.024 102	.052 106	.077 (.052)	<b>.160**</b> (.065)	-.017 105	.047 105	.065 (.046)	<b>.110*</b> (.060)	-.036 71	.066 71	<b>.102**</b> (.051)	<b>.156**</b> (.069)
? Log(sales) <sub>i,t-1</sub>	b.	.042 2,800	.053 99	.011 (.022)		.134 82	.051 95	<b>-.083**</b> (.039)		.094 79	.048 93	-.045 (.037)		.098 71	.045 71	-.053 (.045)	

<sup>†</sup> Mean and number of observations

<sup>††</sup> Mean and Std. Error (asterisks indicate p-values. \*: p < .1; \*\*: p < .05)

NN: standard nearest neighbour matching estimator; DID: difference-in-difference estimator

a.: post-treatment (investment) performance; b.: pre-treatment (investment) performance

## 7. Conclusions

Most of the literature focuses on the impact of MNEs in host economies. However, the activities of MNEs have also important effects in home economies. The debate is ambiguous: concerns that foreign investments may deplete domestic economies are often coupled with the pride for doing good business in foreign countries. This ambiguity derives from a poor understanding of the problem and from the lack of data sets allowing for targeted empirical analysis. This paper can address these concerns by comparing the home performance of a sample of Italian firms which have invested abroad to the one of a counterfactual of firms which have not invested abroad. This type of analysis is possible thanks to a new data set on Italy which combines information on multinationals and national firms. The time frame of the data set also makes it possible to compare performances before and after the investment.

The paper examines firms that invest abroad for the first time during the period analysed and thus change status from national to multinational firms. It finds that performance improves in the aftermath of the investment. It also compares these firms to national firms that do not invest abroad and finds that the formers outperform the latters. This result is robust for three different indicators of performance: output, employment and TFP growth

These findings imply that foreign investments are often strategic moves undertaken to strengthen the overall activities. Also the home activities of firms investing abroad are better off after the investment, at least in comparison to what they would have been had the firm not invested. Actions aimed at discouraging foreign investments and the creation of foreign employments are short sighted and they risk at weakening the domestic economy rather than strengthening it.

Figure 1 – Performance trajectories

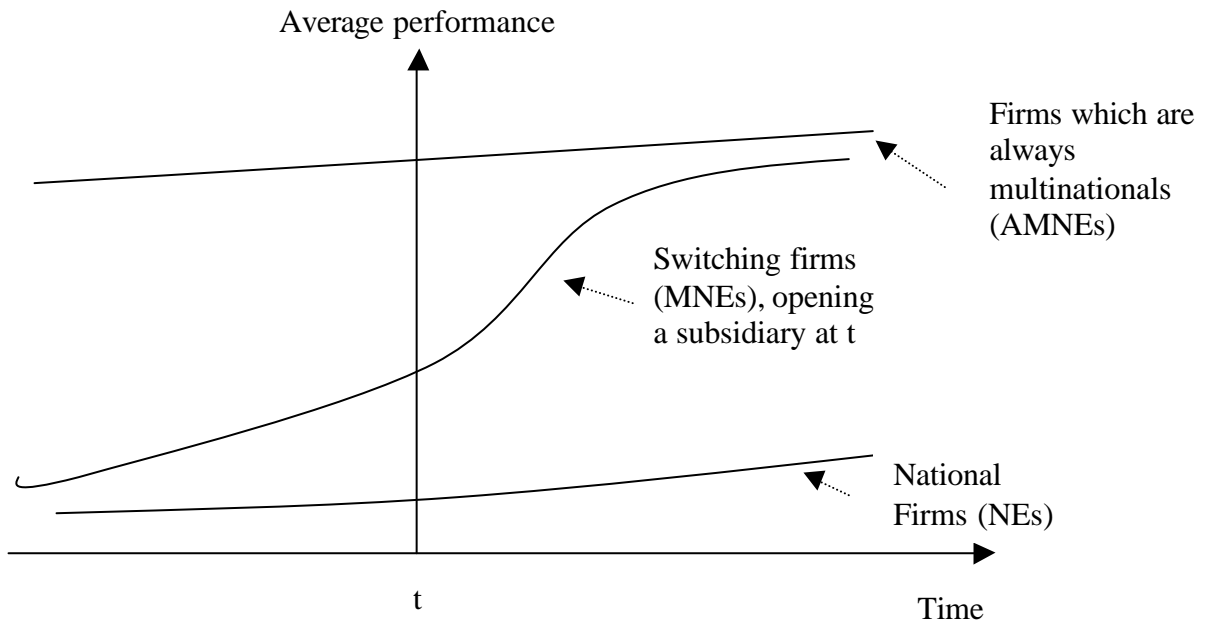
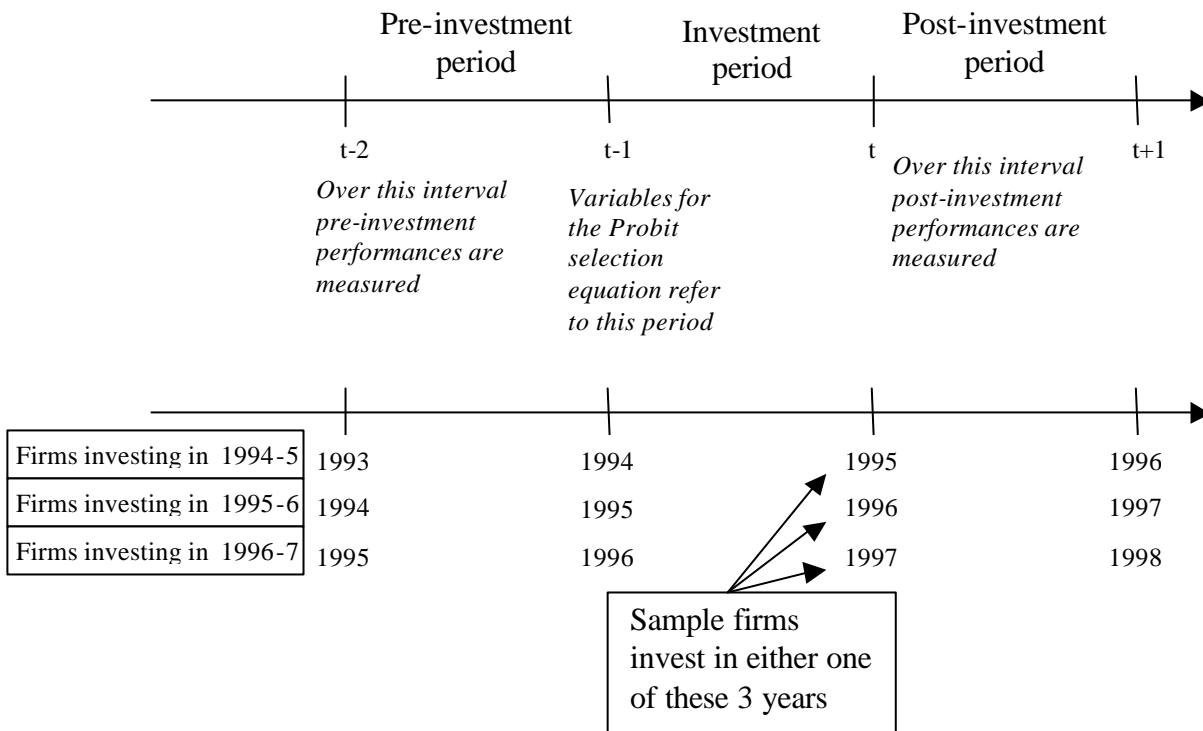


Figure 2 – The time structure of the data



## References

- Aw B., Chung S., Roberts M. (2000) Productivity and the Decision to Export: Micro Evidence from Taiwan and South Korea, *World Bank Economic Review*, 14, 1, 65-90.
- Barba Navaretti G. Bruno G., Castellani D. and Falzoni A. (2002) "Does Investing Abroad Create or Destroy Jobs at Home? The case of Italian Multinationals", Paper presented at the CEPR/LdA Workshop on "Labour Market Effects of European Foreign Investment", Turin, 10/11 May 2002.
- Barba Navaretti G., Castellani D., Zanfei A. (2002) Foreign Investments and Productivity. A Comparative Analysis of Italy, France and Spain, mimeo.
- Barba Navaretti G., Falzoni A. (2003) "Home country effects of Foreign Direct Investment", *mimeo*.
- Bernard A., Jensen B. (1999a) "Exceptional Exporter Performance: Cause, Effect or Both?", *Journal of International Economics*, 47, 1-25.
- Blomstrom M., Fors G., Lipsey R. (1997) 'Foreign direct investment and employment: Home country experience in the United States and Sweden'. *The Economic Journal* 107, 1787-1797.
- Blundell R., Costa Dias M. (2000) "Evaluation Methods for Non-Experimental Data", *Fiscal Studies*, 21, 4, 427-468.
- Blundell R., Costa Dias M. (2002) "Alternative Approached to Evaluation in Empirical Microeconomics", Cemmap Working Paper CWP 10/02.
- Blundell R., Costa Dias M., Meghir C., Van Reenen J. (2001) "Evaluating the Employment Impact of a Mandatory Job Search Assistance Program", IFS Working Paper 01/20.
- Braconier H., Ekholm K., Midelfart Knarvik K. (2001) "In Search of FDI-Transmitted R&D Spillovers: A Study Based on Swedish Data", *Weltwirtschaftliches Archiv*, 137, 4,
- Braconier H., Ekholm K., (2000) 'Swedish multinationals and competition from high- and low-wage locations'. *Review of International Economics* 8, 448-461.
- Braconier H., Ekholm K., (2002) "Competition for Multinational Activity in Europe: The Role Played by Wages and Market Size", mimeo.
- Brainard L., Riker D. (1997a) 'Are US multinationals exporting US jobs?. NBER Working Paper No. 5958.
- Brainard L., Riker D. (1997b) 'US multinationals and competition from low-wage countries'. NBER Working Paper No. 5959.
- Branstetter L. (2000) "Is Foreign Direct Investment a Channel of Knowledge Spillovers? Evidence from Japan's FDI in the United States" *NBER Working Paper* No.8015, November

- Bruno G., Falzoni A. (2000), "Multinational corporations, wages and employment: Do adjustment costs matter?", CEPR Discussion Paper No. 2471.
- Castellani D (2002a) "Firms' technological trajectories and the creation of foreign subsidiaries", *International Review of Applied Economics*, 16, 3.
- Castellani D. (2002b) "Export behavior and productivity growth: evidence from Italian manufacturing firms", *Welwirtschaftliches Archiv*, 138, 4
- Clerides S.K., Lach S., Tybout J.R (1998) "Is Learning by Exporting Important? Micro-Dynamic evidence from Colombia, Mexico, and Morocco", *Quarterly Journal of Economics*, August, 903-48.
- Coe D., Helpman E. (1995), "International R&D Spillovers", *European Economic Review* 39, pp. 859-887
- Delgado M., Farinas J., Ruano S. (2002) "Firm productivity and export markets: a non-parametric approach", *Journal of international Economics*, 57, 397-422.
- Dunning J. (1993) *Multinational Enterprises and the Global Economy*, Addison Wesley, Wokingham, England.
- Edwards S., Magendzo I. (2002) A currency of one's own. An empirical investigation on dollarization and independent currency unions", mimeo.
- Girma S., Gorg H. (2002) "Foreign Ownership, Returns to Scale and Productivity: Evidence from UK Manufacturing Establishments", Paper presented at the CEPR/LdA Workshop on "Labour Market Effects of European Foreign Investment", Turin, 10/11 May 2002.
- Girma S., Greenaway D., Kneller R. (2002) "Does exporting lead to better performance? A microeconomic analysis of matched firms?", mimeo.
- Heckman J., Ichimura H., Todd P. (1997) "Matching as an Econometric Evaluation Estimator: Evidence from Evaluating a Job Training Program, *Review of Economic Studies*, 64, 605-654.
- Konings J., Murphy A. (2001), "Do multinational enterprises substitute parent jobs for foreign ones? Evidence from European firm-level panel data", CEPR Discussion Paper No. 2972.
- Kraay A. (1999) "Exports and Economic Performance: Evidence from a Panel of Chinese Enterprises", *Revue d'Economie du Developpement*, 1-2/1999, pp. 183-207.
- Lipsey R.E. (1999) 'Foreign production by US firms and parent firm employment'. NBER Working Paper No. 7357.
- Markusen J. (1995) "The boundaries of multinational firms and the theory of international trade", *Journal of Economic Perspectives*, 92, 169-189.
- Persson T., Tabellini G. (2002) "Do constitutions cause large governments? Quasi-experimental evidence, *European Economic Review*, 46, 908-918.
- Sianesi B. (2001) "Implementing Propensity Score Matching Estimators with Stata" UK Stata Users Group, VII Meeting, London, May 2001.

van Pottelsberghe de la Potterie B., Lichtenberg F. (2001) “Does Foreign Direct Investment Transfer Technology Across Borders?”, *Review of Economics and Statistics*, forthcoming.

Wooldridge J. (2002) *Econometric Analysis of Cross Section and Panel Data*, MIT Press.