Attracting foreign investments or promoting domestic multinationals?
Evidence from productivity spillovers in Italy

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Abstract

The main rational for attracting foreign multinationals is that they bring in the host country a bundle of intangible assets which increase the average productivity in the country, both through a composition effect and through spillovers to national firms. In this paper we argue that domestic multinationals can also be a good source of both direct and indirect effects on the home country. Using data on firms active in Italy in 1993-2000, this paper examines differences in productivity and innovative behaviour of multinationals (both foreign and domestic-owned) and national firms, as well as productivity spillovers to domestic firms. It is shown that parent companies of domestic multinationals are more productive than foreign-owned firms in Italy, exhibit a higher propensity to carry out innovative activities, and determine positive externalities to domestic firms.

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1. Introduction

The last decades have witnessed an important change in governments' attitude towards multinational firms. While in the '60s and the '70s countries tended to discourage inward investments based on a presumption that foreign multinationals would deplete local economies, over the last 25 years, many (developed and developing) countries have thereafter eliminated their restrictions to inward FDIs (Unctad, 1999, Unctad 2005). More importantly, it is all the more frequent that (national and regional) governments support investment promotion agencies and grant special tax concessions and financial incentives to foreign multinationals (Hanson, 2001). This different attitude is largely the result of a changing view of the role played by MNFs in knowledge creation and dissemination. Multinationals are less and less seen as 'quasi-colonial' institutions that exploit technological advantages on a global scale, by monopolizing markets and appropriating rents in host economies (Hymer, 1960, Vernon 1966). Instead, the role of MNFs as key players in the global generation, adoption and diffusion of technology is increasingly recognised. In fact, there is growing evidence that firms belonging to multinational groups are larger, concentrate mainly in high-tech industries, exhibit higher productivity and pay higher wages, and have a higher propensity for innovation, for carrying out R&D. This has a *direct effect* on the countries where they operate: average productivity and innovation in a given country increase as the share of activities due to multinationals in the economy rises. This has to do with the fact that multinational firms bring in a bundle of assets which might not be available locally, such as technologies, market and employment opportunities, capital, and management skills (Barba Navaretti and Venables, 2004). This kind of direct effect might be relevant *per se*, justifying, for example, a significant increase in public incentives to attract foreign multinationals which we have witnessed in the last decades both in developed and developing countries (Hanson, 2001). A further reason for welcoming inward investments is that they may have also an *indirect effect* on host economies by generating pecuniary and knowledge spillovers which will eventually translate into increases in productivity of domestic companies. While the evidence on intra-industry spillovers is still rather limited (Gorg and Strobl 2001, Castellani and Zanfei 2006), there is a growing number of studies highlighting the actual importance of vertical externalities accruing

to domestic firms active in upstream and downstream industries (Smarzynska Javorcik 2004, Alfaro and Rodriguez-Clare 2004).

However, by emphasising the potential benefits of foreign presence, the existing literature ends up disregarding that domestic owned multinationals may also have positive direct and indirect effects on the rest of the economy. Considering the effects of both foreign and domestic multinationals in a given economy may be extremely important for a number of reasons. First, it helps appreciate that it is multinationality, rather than foreignness that matters for the generation and diffusion of knowledge and hence for the creation of technological opportunities in a given economy. Both domestic and foreign multinationals have ex ante advantages leading them to carry out activities with higher value added and better performances than uni-national firms, and they both have access to foreign assets which might increase their competiveness. As such, foreign multinationals can contribute to the growth of the host economy, but also domestic multinationals expanding their activities in the same economy (which is their country of origin) may have a significant impact on it. Second, comparing foreign and domestic multinationals highlights that the former do not necessarily determine more growth opportunities than the latter. Differences in the impact of these two categories of (foreign and domestic) multinationals depend on a variety of factors which can only partially be investigated in the empirical analysis. We shall particularly focus on the role played by cultural proximity and embeddedness which favours domestic multinationals in their interactions with local firms. Moreover we shall emphasise the different position that these firms occupy in the multinational organisation they belong to: foreign affiliates in the case of inward investors vs. parent companies in the case of domestic owned firms with value added activities abroad. By occupying such different positions, they will play distinctive roles in the generation of knowledge and have uneven access to external sources of competitive assets. Third, to the extent that foreign and domestic multinationals have a different impact on a given economy, one may wonder whether attracting foreign investment is really more effective than promoting the expansion of domestic owned multinationals. Moreover, one will need to discuss to what extent policies aimed at attracting foreign firms are alternative to the ones aimed at promoting the expansion of domestic multinationals.

Using firm level data on ownership structure and performance of Italian firms over the 1993-2000 period, we shall investigate differences in the direct and indirect

effects of increases of activity carried out in a given economy by foreign affiliates of foreign owned firms, on the one hand, and by parent companies of domestic owned multinationals on the other hand. Results suggest that indeed parent companies of Italian multinationals outperform, both in terms of productivity and in terms of propensity to innovate affiliates of foreign multinationals in Italy. This leads us to question whether the expansion of foreign multinationals actually determine larger productivity spillovers for Italian firms. Our econometric evidence shows that domestic-owned firms benefit from the expansion of Italian multinationals in their home country, and this effect is in most cases larger than the one determined by affiliates of foreign multinationals expanding their activities in Italy.

2. Foreign and domestic multinationals as sources of spillovers

The literature on multinational firms and productivity spillovers has largely addressed the impact of foreign firms in host countries[1]. One of the main reasons for this focus is that foreign affiliates of multinational firms bring in host countries a bundle of tangible and intangible assets which can contribute directly and through spillovers to innovation and productivity in the host country. Empirical evidence has been finding that foreign affiliates of multinationals tend to outperform domestic firms, supporting the idea that expanding the activity of foreign-owned firms (i.e. attracting inward FDIs) will raise the average productivity and innovation in the economy, while less robust evidence has been provided on the spillover effect of foreign multinationals on host country firms (see Castellani and Zanfei, 2006 for a review). However, a growing literature has also been discussing the role of multinationality as opposed to foreignness in explaining differences in productivity and innovation. In particular, domestic multinationals share many characteristics of foreign-owned firms in a given country and can be at least as productive, innovative and prone to invest in R&D (Criscuolo and Martin, 2003; Pfaffermayr and Bellak,

[1] Notable exceptions are the works by Vahter and Masso (2005) using firm-level data on Estonia, Bitzer and Gorg (2005), Braconier et al. (2001) and van Pottelsberghe de la Potterie and Lichtenberg (2001) using sectoral and aggregated data from a panel of countries. While these studies do address the issue of the effects of outward investments on home countries, they adopt a different point of view. In fact they do not consider the effect of an expansion in the activities that domestic multinationals carry out in their home countries, which is the focus of the present paper. As we shall argue later in the text, we believe that the latter is more appropriate to capture similarities and difference in the effects of foreign and domestic firms in a given country.

2001; Ietto-Gillies and Frenz, 2004, Castellani and Zanfei 2005). From this perspective, one could view domestic firms going abroad as generating direct effects on their (home) country which may add (or substitute for) the direct effects of foreign firms on the same (recipient) economy.. When addressing direct effects from domestic multinationals to other domestic firms, one needs to take into account that in this case, the focus of the analysis is on parent companies (PC), rather than on foreign affiliates (FA)[2]. The different position a firm occupies in the organisational structure of multinational groups may *per se* affect the amount of knowledge it gains access to. It is well known that the core activities and capabilities, such as R&D, strategic management and finance, are largely concentrated in PCs. These are the main sources of proprietary advantages of multinational firms and only part of these technological, managerial and organizational capabilities are transferred to FAs abroad in order to allow them to overcome the cost of doing business abroad and to face competition of other local and multinational firms in host countries. In principle, one may thus expect domestic PCs to be more knowledge intensive than FAs. The dominant role of PCs in this respect is partially compensated by the fact that FAs can indeed accumulate further knowledge and capabilities through local R&D activities, learning and though external linkages with host country counterparts. Overall, the relative position between PCs and FAs cannot be expected to change significantly, though: in spite of the growing role of the latter in technological accumulation and knowledge absorption, the former are likely to keep a stronger grasp on technology. In fact, domestic PCs can also absorb external knowledge available locally, and it will eventually gain access to foreign knowledge through their foreign subsidiaries' reverse technology transfer.

The larger amount of knowledge PCs are endowed with and can gain access to, relative to FAs, thus suggests that domestic multinationals might have a more substantial direct effect on the economy. That is, the expansion of the share of a country's activity represented by domestic multinationals can be expected, inter alia,

[2] To a closer look, domestic owned multinationals may also affect their home economy through the activity of their national affiliates. However, these may be thought of as an intermediate category of firms between parent companies and foreign affiliates in terms of their role in the generation, adoption and diffusion of knowledge (See Castellani and Zanfei, 2006 ch.4, for a thorough discussion of this issue). Hence national affiliates were excluded from the present analysis to allow for a sharper comparison across domestic and foreign multinationals.

to increase its overall productivity by a factor that is even higher than the increase determined by an equivalent expansion of the foreign share of the same economy.

Moreover, to the extent that domestic multinationals exhibit better economic and innovative performances than foreign firms active in the same country, this will also translate into a higher potential for technology transfer to local firms. Hence there is a potential for higher indirect effects as well. How effective will technology transfer be *vis a vis* local counterparts? Conflicting forces might determine the overall extent of knowledge transfer of domestic multinationals (see Castellani and Zanfei 2006 for more extensive discussion on these forces). On the one hand, they can be expected to be more rooted in the home economy. Domestic multinationals do not need to overcome cultural and linguistic barriers, which on the contrary can hinder the relationships of foreign-owned firms with the domestic economy. This "cultural proximity" effect, which is a function of the higher degree of embeddeness of domestic multinationals in the local context, can be expected to increase the effectiveness of some key channels through which externalities accrue to local firms. First, it will reduce the costs of backward and forward linkage creation and of voluntary technology transfer to local suppliers, due to such factors as lower language barriers and similarities in corporate culture. Second, imitation and involuntary information leakages will also be facilitated for the same reasons, hence increasing knowledge flows between domestic multinationals and other local firms. Third, better knowledge of labour market institutions may induce higher mobility of human capital from domestic multinationals to other companies, than is the case with foreign multinationals. By contrast, in many instances foreign multinationals are perceived as 'invaders' by other domestic firms and this could make cooperation and knowledge transfer more difficult. The perception that foreign firms are more 'footloose' than domestic ones, or in other words, that they can move their establishments abroad when it becomes less convenient to produce in a given host country, may nourish the fear that it is too risky to rely on these firms for long term plans. For instance, this can happen to firms which have to adopt a new client-specific organisational routine or to institutions which have to commit to set up specific infrastructures, such as specific training services, building point to point railways connections, or a pipeline to serve a

plant. This sort of mistrust can thus reduce the potential externalities from foreign firms and increase the relative advantage of domestic multinationals [3].

On the other hand, competition effects may play a different role in the case of foreign *versus* domestic multinationals. Domestic multinationals are competing with domestic exporters in the international market. Think of two Italian shoemakers, one which delocalizes some stages of production abroad, and the other which controls only national plants. Say that they both sell in the U.S. market. In our view the first is a (domestic) multinational firm and the second is an exporter. However, in the U.S. market their products will be both perceived as Made in Italy and the two firms will be competing very hard to differentiate and gain international market shares, presumably at the expenses of the other Italian competitor. In the light of such a tough competition we can expect that the two firms will place a considerable effort in preventing information leakages which could advantage their competitor. This conscious effort to prevent knowledge transfer to face competitive pressure is even more urgent by the fact that imitation is made easier due to the cultural proximity factors which we mentioned earlier. FAs are less likely to consider local exporters as direct competitors outside the host country: provided that they both are active in the same foreign markets, their product will be perceived as more different (and eventually trade barriers might have different intensity) given their country of origin is not the same.

3. Sample and data

Data for the empirical investigation of direct and indirect effects of foreign and domestic multinationals in Italy come from the Cis-Elios dataset, which results from the intersection of two different sources: the Second Community Innovation Survey (CIS II) and ELIOS (European Linkages and Ownership Structure). The former is a survey based on a common questionnaire administered by Eurostat to firms from all

[3] This does not impede that foreign multinationals obtain that local governments make substantial efforts to improve infrastructures, as a condition for localising value added activities. This might well be the case when individual multinationals are able to offer a unique bundle of assets which is completely out of reach for any national firm. This is for instance the experience documented in the case of Intel's investment which has taken place in Costa Rica in 1996-97 (World Bank 2005). What is being suggested here is that whenever domestic and foreign firms of comparable strengths and bargaining power are active in a given market, it is likely that the former exert a higher and more effective pressure on local institutions to improve infrastructures, hence generating greater externalities for other firms as well.

European countries, which aims at assessing various aspects of firms' innovative behaviour and performances. In this paper we use micro data for Italy from the survey carried out in 1997 and covering innovation occurring in 1994-1996. Innovation data were complemented with ownership, multinationality and economic performance data from ELIOS dataset developed by the University of Urbino, Italy, which combines information from Dun & Bradstreet's Who Owns Whom and Bureau Van Dijck's Amadeus. The sample resulting from this matching comprises 667 firms with manufacturing plants in Italy[4]. Exploiting information on the ultimate owner, available from ELIOS, we broke down the sample distinguishing between Italian affiliates of foreign multinationals (193), and domestic-owned firms (474). The information on subsidiaries controlled abroad, available from ELIOS, allowed us to further identify parent companies of Italian multinationals (213), among which we can distinguish 121 firms whose affiliates abroad carry out non-manufacturing activities (mainly in retail and distribution sectors), which we define MNF1, and 92 which appear to have at least one foreign affiliate in the manufacturing industry (MNF2). The information on export status available from CIS, allows us to identify, within the 261 uninational firms, 224 firms serving the international market through exports (EXP). For each firm we have data on innovative behaviour (from the Second Community Innovation Survey, CISII) for the year 1996, while output, capital, labour and material inputs are drawn from the ELIOS dataset and observed over the 1993-2000 period. Table 1 provides an overview of the distribution of our sample by sectors, and internationalisation status. Statistical tests show that the sectoral distribution is not significantly different from the distribution of the universe of Italian firms with more than 50 employees.

4. Evaluating direct effects of domestic and foreign multinationals

Our empirical analysis will follow two steps. First we shall assess the extent of the direct contribution of multinational firms to the productivity and innovation in Italy. Second, we shall evaluate spillovers from both types of multinationals. In this section we illustrate the results of the first analytical step. To this end, one can notice from Table 1 that foreign multinational firms are relatively more concentrated in science based industries. In fact, while on average only 28.9% of firms in our sample

[4] The overall sample resulting from the intersection includes 1,114 firms, but for the purpose of this study, we required firms to have a complete time series on economic and financial data from 1993 to 2000 and this left us with a considerably lower number of firms.

are foreign-owned, the share reaches 42.8% in science based industries. Slightly above average is also the presence of MNF2 in these sectors. Conversely, the largest share of MNF1 is in industries with specialised suppliers (such as the machine tools industry), while exporters are relatively more frequent in scale intensive and supplier dominated industries, where the largest share of non internationalised firms is also observed. This supports the idea that sectoral characteristics, such as the importance of trade costs, plant-level economies of scale and intangible capital, contribute to shaping the pattern of internationalisation. This has implications in terms of the direct effects the multinationals can have on the local economy. In particular, data presented in Table 1 boradly suggest an increase in the share of foreign (and, to a lesser extent, domestic) multinationals is likely to the change in the structural composition of the economy, increasing the relative weight of more technology-intensive industries.

Besides the direct effect through the sectoral composition, multinationals are likely to increase the overall performance within industries, due to their inherently higher productivity and propensity to innovate. We investigate this issue by comparing the average TFP and propensity to carry out innovative activities of foreign affiliates relative to Italian-owned firms, after controlling for sector, size and geographic location. In the first column of Table 2, we report conditional differences in the average TFP, as well as in a number of characteristics of the innovative behaviour (such as the propensity to introduce process and product innovation, to carry out R&D, to establish technological collaboration with counterparts outside or inside Italy and, within this category, we distinguish the propensity to cooperate with competitors, clients, suppliers and Universities). We have computed TFP as the residual of Cobb-Douglas production functions estimated for each 2-digit industry[5], using three different methods. In particular, we have estimated a gross-output production function, using labour (measured by the number of employees) capital (book value of fixed asset net of depreciation) and materials as inputs, using the Levinshon and Petrin (2003) semi-parametric method (LP), a within-group estimator for panel data fixed-effect models (FE), and OLS. In the case of LP, we also present a specification with value added as a measure of output. In Table A.1 the input elasticities and the associated returns to scale are presented.

[5] Eventually, we aggregated some two digit industries in order to obtain samples with a sufficient number of observations. The list of sectors is presented in Table A.1.

Results reported in Table 2 are the estimated coefficient of β and γ from the following equation:

$$y_{it} = c + \beta\ FOR_i + \gamma\ MNF2 + \theta' X_{it} + \varepsilon_{it},$$

where FOR and MNF2 are binary indicators as taking value 1 if firm i of a foreign-owned firm or an Italian multinational, controlling affiliates in manufacturing industries abroad, respectively. Baseline category are domestic non-MNF2 firms. The vector X contains sector, geographic area, size dummies and, for TFP premium estimates, time dummies. Table 2 suggests that, accounting for differences in size, location and sectoral distribution, foreign-owned firms are more productive than domestic-owned firms (at least when TFP is derived from LP estimates), and they display significantly higher propensity to introduce product innovation and engage in technological cooperation with counterparts outside Italy. However, domestic MNF2 appear to have an even higher TFP and propensity to innovate than Italian affiliates of foreign multinationals. In fact the difference between β and γ is always negative and, in most cases, statistically significant, reflecting the extent to which domestic multinationals outperform the foreign ones. It is worth mentioning the high gap in the propensity to carry out R&D and to establish technological cooperation with counterparts in Italy, and with suppliers and Universities in particular.

In Table 3 and Figure 1 we extend this perspective, by introducing various types of firms and illustrating the relationship between the degree of internationalisation, productivity and innovation[6]. In particular, in Table 3 we report the γ1, γ2, γ3 and β as estimated from the following equation:

$$y_{it} = c + \gamma_1 NONX + \gamma_2 MNF1 + \gamma_3 MNF2 + \beta\ FOR_i + \theta' X_{it} + \varepsilon_{it}$$

where NONX, MNF1, MNF2 and FOR are binary indicators taking value 1 when firm *i* is non internationalised, domestic multinationals (controlling either only non-manufacturing activities abroad, MNF1 or having production plants, MNF2) or foreign-owned respectively. The baseline category are domestic exporting (non-multinational) firms. As above, the vector X contains sector, geographic area, size dummies and, for TFP premium estimates, time dummies. Results are consistent with the idea that MNF2 and NONX are, respectively, the most and the least productive and innovative firms. MNF1 and FOR appear to be more productive than EXP, but do

[6] A similar analysis has been conducted, without considering foreign-owned firms, in a previous work on Italy (Castellani and Zanfei, 2007) and in studies on Germany (Arnold and Hussinger, 2005), Ireland (Girma, Gorg and Strobl, 2004), and the UK (Girma, Kneller and Pisu, 2003)

not show a higher propensity to innovate. This ranking of firms in terms of productivity can be appreciated also in Figure 1, where the cumulative distribution of the residual from a regression of in TFP (LP_VA) on a set of sector, area, size and time dummies is plotted for the five types of firms in our sample. NONX are clearly stochastically dominated by internationalised firms, and the distribution of MNF2 lies at the right of all the other firms (except for the tail, where it crosses with MNF1. Foreign-owned firms are in between MNF1 and EXP, but for higher values the difference between the two distribution shrinks. MNF1s have a similar distribution as FOR up to the median, but the tail of their distribution is thicker (probably also due to some outliers).

In sum, we have provided some evidence consistent with the idea that the expansion of foreign multinationals in Italy may increase the average productivity of the country, by means both of a sectoral shift and a within sector effect. However, our results also point out that, after controlling for sector, size and location, Italian multinationals are more productive than foreign ones, exhibit a significantly higher propensity to innovate and are more embedded in a network of technological collaborations with national counterparts. This places them in a privileged position to determine spillovers to the rest of the economy. We will investigate this indirect effect in the next section.

4. Spillovers from foreign and domestic multinationals. Econometric specification and results

As it is customary in the literature on productivity spillovers from multinational firms, we specify an augmented production function, which will be estimated on a sample of domestic-owned firms.

$$\log(Y_{ijt}) = \alpha_j \log(K_{it}) + \beta_j \log(L_{it}) + \gamma_j \log(M_{it}) + \log(A_{ijt})$$

The subscript *j* on the parameters associated with each physical input (capital, labour and materials) indicates that we estimate the production functions sector by sector, allowing the input elasticities to vary across 14 2-digit sectors[7].

[7] Allowing for sector-specific production function is important not only for an unbiased estimation of TFP, but also because estimating an economy-wide production function could bias the estimated external effect from foreign presence. In particular, imposing common input elasticities for all firms will result in an overestimation of productivity for firms in sectors which have higher returns to inputs.

The residual from this production function, log(A_{ijt}) (i.e. firm *i* TFP) is modelled as a function of a set of measures capturing the extent of economic activities in the sector (*j*) where firm *i* operates, and should capture within-industry externalities[8]. We allow externalities from domestic and foreign multinational firms, by introducing the following variables $F_{ijt} = \sum_{l \neq i \in j} FOR_l * Z_{ljt}$, $MN1_{ijt} = \sum_{l \neq i \in j} MNF1_l * Z_{ljt}$ and $MN2_{ijt} = \sum_{l \neq i \in j} MNF2_l * Z_{ljt}$[9], where FOR, MNF1 and MNF2 are time invariant dummies defined as above and Z is measure of firms' economic activity, which in our case is either the number of employees, or the amount to fixed capital. The log of TFP in domestic-owned firms, obtained as described in the previous section, is then regressed on these three measures of externality, controlling for the overall activity in the sector $T_{ijt} = \sum_{l \neq i \in j} Z_{ljt}$ and firm-specific fixed effects (using a standard within-group estimator). In Table 4 we report results using TFP obtained from LP_Y, but the interested reader will find evidence from other TFP measures in Table A.2 and A.3. Standard errors have been clustered by sector.

Results from column (1) and (5) support positive external effects from both MNF1 and MNF2, even though they are rather imprecisely measured. Foreign-owned firms do not seem to cause any positive externalities when assessed through fixed capital, but a larger effect (though still not significant) is gathered using employment as measure of economic activity. Since we do not find any significant difference in the effect of MN1 and MN2, in the following we will consider only one measure of externality from domestic MNFs, introducing log(MN), where MN=MN1+MN2, which would capture the effect of Italian multinationals on domestic firms' productivity. In columns (2) and (6) this variable turns out positive and very

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For example, if in a given sector the "true" return is higher than one estimated on the whole economy, an increase in input use in that sector will determine a growth in output higher than one would expect from the estimated (economy-wide) production function, and this difference will then wrongly be considered productivity gain. To the extent that foreign presence is positively correlated with sectoral returns to scale (i.e. multinationals are attracted to higher return to scale industries) the estimated external effect will likely be biased upward. See Castellani and Zanfei (2006, Ch.5) for more discussion on this issue.

[8] It is worth noting that by doing so, we should be looking at horizontal spillovers, and do not capture any inter-industry (or vertical) spillovers. However, due to data availability, we are forced to use rather aggregated sectors. Thus we would rather not emphasize to the distinction between vertical and horizontal spillovers, as our measure may be capturing a mix of both them.

[9] Notice that to avoid any possible endogeneity (especially for large firms in smaller sectors), the measures of sectoral activity are built from all firms different from firm i.

significant, suggesting important external effects from the expansion of domestic multinationals on other firms in their home market. This result is confirmed using employment and capital as a measure of sectoral activity, and different measures of productivity (Table A.2 and A.3). The effect of an expansion of foreign multinationals on host country firms' productivity is more ambiguous. While there would not seem to be any effect in terms of investments in fixed capital, an increase in employment in affiliates of foreign multinationals, would benefit domestic firms' productivity, and the effect would be as large as in the case of domestic multinationals. These results do not change if we control for exporters' activity in the sector (columns (3) and (7)), which do not appear to cause any significant external effect, or if we restrict the sample to domestic non-multinational firms (i.e. NONX and EXP firms). Further robustness checks are presented in Table A.4, where we show, results using non clustered standard errors and allow for persistent TFP. First, comparing column (1) and (6) with column (2) and (7) respectively, one can appreciate that non-clustered standard errors are actually smaller than the ones used in the paper, thus we are comforted in the interpretation of the results presented earlier. Second, in Table A.4 we allow for persistence in TFP, by using a standard WG, but allowing correlation of the AR1-type in the disturbances. Results do not change much, but in the case of the externality measured by the number of employees, the magnitude of the external effect is substantially reduced (though still positive and significant). Finally, we test for spillovers in a dynamic specification, using the GMM-DIF and GMM-SYS estimators proposed by Arellano and Bond (1991) and Blundell and Bond (1998). Results suggest that TFP is indeed rather persistent, and controlling for this dynamics, positive externalities vanish. If any, in the dynamic specification, foreign multinationals appear to cause some positive spillovers. However, these results are not as robust to the change of the set of instruments, as one would wish, so we are inclined to interpret those findings with caution.

In sum, our results are consistent with the idea that an expansion of domestic multinationals have positive effects on the Italian economy. This would yield an important policy message: do not invest resources in attracting foreign multinationals, but rather promote the growth of domestic multinationals. However, this message would probably be misleading for at least two reasons. First, also foreign

multinationals have some positive external effect, and have positive direct effects facilitating a structural change of the economy, towards the more advanced industries. Second, when addressing the issue of the home effects of Italian multinationals one should address also the role of an increase in foreign activities on productivity in non-internationalised firms at home, and not only the effect of an increase in home activities of domestic multinationals. In fact, an increase in foreign activities may well deplete the home economy by moving production and employment abroad, causing a negative externality for the rest of the economy. However, other works in this line of analysis provide some evidence that firms investing abroad increase their productivity and output at home and do not decrease employment (or at least they do so less than non internationalised firms). This has been shown, for example, in the cases of Italy and France (Barba Navaretti, Castellani, and Disdier, 2006), US (Desai et al 2005), and Korea (De Baere, Lee and Lee, 2006).

5. Concluding remarks

In this paper we have identified parent companies of domestic MNFs as a source of externality and compared their impact to the effect of foreign affiliates (FAs) in host countries. Results from a sample of firms active in Italy over the 1993-2000 period suggest that this distinction does matter for policy towards multinationals. In fact, a crucial lesson to be derived is that promoting domestic multinationals may be as conducive to productivity growth as it is attracting foreign investors, and even more so. This does not imply that inward investments should not be encouraged (also considering that the foreign owned component of the Italian economy is rather low, relative to other industrialised countries). One possible direction for policy intervention is to promote domestic multinationals not only by means of incentives to invest abroad, but also (and particularly) by means of measures aimed at increasing their activities at home. Examples of these policies could go under the label of "investment climate enhancing" including improvement of labour force quality and skills, simplifying bureaucracy, modernizing infrastructures and brewing networks of reliable suppliers. Combining incentives to invest abroad (e.g. by means of tax exemptions on foreign income) with improvements in the investment climate, and extending these measures well beyond mere enclaves where foreign investors are attracted, would have at least two key implications. First, this policy orientation would

create higher incentives for both foreign and domestic multinationals, thus directly and indirectly favouring productivity through both channels of inward investments and local activity of domestic multinationals. Second, making it more attractive for domestic (as well as foreign) multinationals to invest at home is likely to favour positive interactions between activities at home and abroad. In fact, foreign activities of domestic multinationals can be expected to require complementary headquarter services and production of intangibles at home which might get lost or reduced if the local investment climate is not appropriate.

Table 1 – Distribution of the sample firms, by internationalisation status and sector

	N. of firms	Pavitt sector				
		Science Based	Scale Intensive	Specialized Suppliers	Supplier Dominated	Total
Non-exporting firms (DOM)	37	*2.6%*	*3.0%*	*3.8%*	*14.3%*	*5.5%*
Exporters (EXP)	224	*28.3%*	*37.9%*	*21.2%*	*40.1%*	*33.6%*
Multinational firms 1 (MNF1)	121	*11.2%*	*16.7%*	*26.9%*	*21.8%*	*18.1%*
Multinational firms 2 (MNF2)	92	*15.1%*	*12.5%*	*18.3%*	*11.6%*	*13.8%*
Total domestic-owned (DOM)	474	57.2%	70.1%	70.2%	87.8%	71.1%
Fomestic-owned firms (FOR)	193	42.8%	29.9%	29.8%	12.2%	28.9%
Total	667	100.0%	100.0%	100.0%	100.0%	100.0%
N. of firms		152	264	104	147	

Table 2 – Multinational firms, productivity and innovation in Italy: a test for difference in mean

			FOR (β)		MNF2 (γ)				
Method	Period	Dep. Var.	Coeff.	Std. Err.	Coeff.	Std. Err.	N	β - γ	p-value§
		Tfp premium							
Ols	93-00	Tfp (LP_VA)	0.056***	(0.013)	0.142***	(0.019)	5336	-0.087	[0.000]
Ols	93-00	Tfp (LP_Y)	0.022**	(0.009)	0.033**	(0.013)	5336	-0.011	[0.472]
Ols	93-00	Tfp (FE_Y)	-0.000	(0.008)	0.090***	(0.011)	5336	-0.090	[0.000]
Ols	93-00	Tfp (OLS_Y)	0.010	(0.007)	0.030***	(0.009)	5336	-0.020	[0.041]
		Difference in the probability of							
Probit	1996	Process inno.	-0.012	(0.045)	0.097*	(0.054)	667	-0.109	[0.082]
Probit	1996	Product inno.	0.079*	(0.044)	0.133**	(0.052)	667	-0.053	[0.349]
Probit	1996	R&D	0.025	(0.041)	0.148***	(0.043)	667	-0.122	[0.026]
Probit	1996	Tech. coop. abroad	0.059*	(0.033)	0.126**	(0.051)	667	-0.067	[0.198]
Probit	1996	Tech. coop. in Italy	-0.005	(0.035)	0.138**	(0.055)	667	-0.143	[0.006]
Probit	1996	*…within the group*	-0.013	(0.017)	0.073**	(0.036)	589	-0.086	[0.002]
Probit	1996	*…with competitors*	-0.005	(0.003)	0.001	(0.004)	325	-0.006	[0.060]
Probit	1996	*…with clients*	0.012	(0.018)	0.025	(0.027)	589	-0.013	[0.649]
Probit	1996	*…with consultants*	0.031	(0.025)	0.072*	(0.039)	667	-0.041	[0.284]
Probit	1996	*…with suppliers*	-0.003	(0.016)	0.072**	(0.034)	623	-0.075	[0.005]
Probit	1996	*…with Universities*	-0.029	(0.019)	0.059*	(0.036)	583	-0.089	[0.002]

Notes: β and γ are estimated from the following equation: $y_{it} = c + \beta\ FOR_i + \gamma\ MNF2 + \theta' X_{it} + \varepsilon_{it}$, where FOR and MNF2 are binary indicators taking value 1 when firm *i* is foreign-owned or domestic multinational (controlling manufacturing activities abroad) respectively. Baseline category are domestic non-MNF2 firms. The vector X contains sector, geographic area, size dummies and, for TFP premium estimates, time dummies.

§ Chi-squared test of H_0: β - γ = 0

Table 3 – Internationalisation, productivity and innovation in Italy: a test for difference in mean

	DOM (γ_1)		MNF2 (γ_3)		MNF1 (γ_3)		FOR (β)		
	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	Coeff.	Std. Err.	N
Tfp premium									
Tfp (LP_VA)	-0.150***	(0.028)	0.165***	(0.020)	0.094***	(0.018)	0.075***	(0.015)	5336
Tfp (LP_Y)	0.024	(0.025)	0.037***	(0.014)	0.006	(0.011)	0.026***	(0.010)	5336
Tfp (FE_Y)	0.047**	(0.020)	0.112***	(0.012)	0.050***	(0.010)	0.020**	(0.009)	5336
Tfp (OLS_Y)	0.005	(0.017)	0.040***	(0.010)	0.028***	(0.009)	0.020***	(0.008)	5336
Difference in the probability of									
Process inno.	-0.281***	(0.095)	0.078	(0.059)	0.004	(0.056)	-0.036	(0.051)	667
Product inno.	-0.413***	(0.091)	0.115**	(0.057)	0.025	(0.056)	0.055	(0.049)	667
R&D	-0.364***	(0.096)	0.129***	(0.048)	0.007	(0.051)	-0.004	(0.047)	667
Tech. coop. abroad	-0.027	(0.075)	0.111*	(0.058)	-0.049	(0.041)	-0.025	(0.038)	667
Tech. coop. in Italy	-0.105***	(0.036)	0.098*	(0.052)	-0.028	(0.036)	0.037	(0.036)	667
…with competitors	--	--	-0.001	(0.002)	--	--	-0.009	(0.006)	282
…with clients	0.017	(0.047)	0.007	(0.022)	-0.033**	(0.013)	-0.001	(0.017)	589
…with suppliers	-0.028**	(0.012)	0.044	(0.031)	-0.024*	(0.013)	-0.015	(0.015)	623
…with Universities	-0.026	(0.038)	0.067	(0.042)	0.017	(0.031)	-0.025	(0.022)	583

Notes: γ_1, γ_2, γ_3 and β are estimated from the following equation: $y_{it} = c + \gamma_1 DOM + \gamma_2 MNF1 + \gamma_3 MNF2 + \beta\, FOR_i + \theta' X_{it} + \varepsilon_{it}$, where DOM, MNF1, MNF2 and FOR are binary indicators taking value 1 when firm *i* is non internationalised, domestic multinationals (controlling either only non-manufacturing activities abroad, MNF1 or having production plants, MNF2) or foreign-owned respectively. Baseline category are domestic exporting (non-multinational) firms. The vector X contains sector, geographic area, size dummies and, for TFP premium estimates, time dummies. LP, FE and OLS denote the estimation method used to recover production function parameters used to compute TFP: Levinshon and Petrin method, fixed effects and OLS respectively. The suffix Y and VA indicate whether revenue of values added was used as a measure of output.

Figure 1 – Internationalisation and productivity in Italy: comparing cumulative distributions

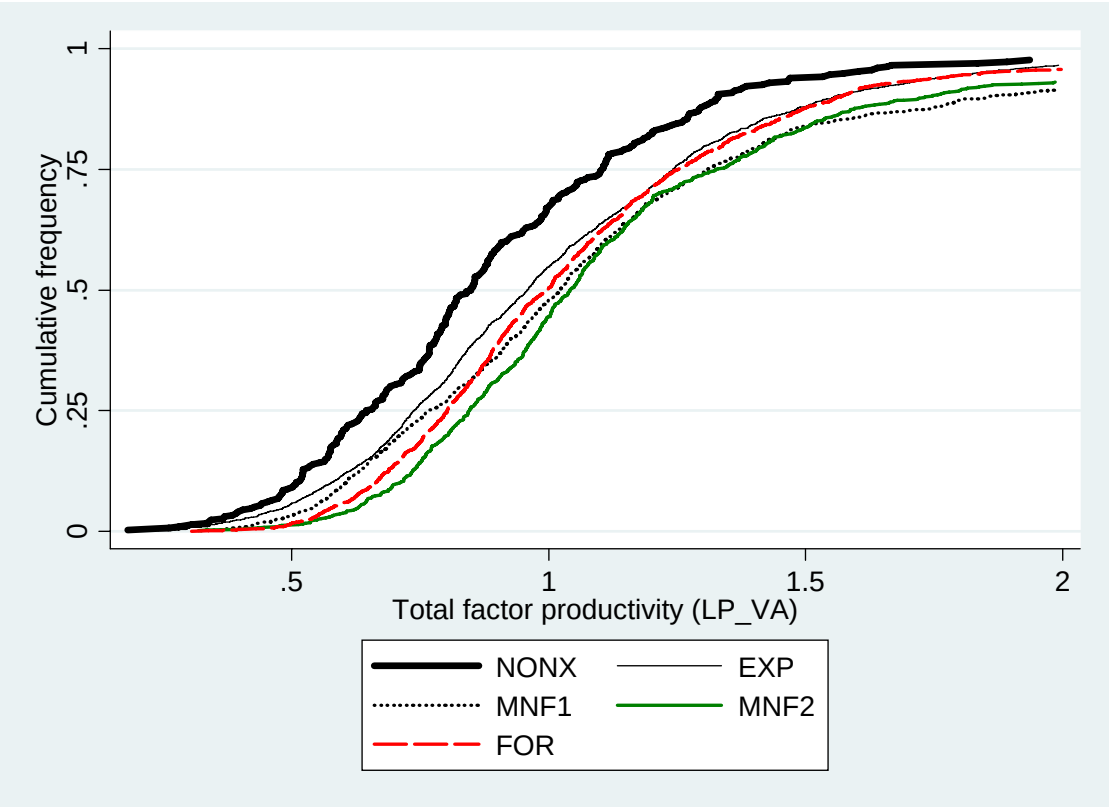

Table 4 - Productivity spillovers from multinational firms in Italy, 1993-2000: Fixed-effects estimation

	Sectoral activity measured by fixed capital				Sectoral activity measured by number of employees			
Sample	All domestic firms	All domestic firms	All domestic firms	Domestic non-MNFs	All domestic firms	All domestic firms	All domestic firms	Domestic non-MNFs
$Log(F_{jt})$	-0.007	0.025	0.024	0.027	0.102	0.130**	0.131**	0.140**
	(0.027)	(0.017)	(0.014)	(0.020)	(0.066)	(0.054)	(0.055)	(0.047)
$Log(MN1_{jt})$	0.063*				0.122*			
	(0.034)				(0.065)			
$Log(MN2_{jt})$	0.069				0.060			
	(0.041)				(0.070)			
$Log(MN_{jt})$		0.193***	0.192***	0.195**		0.173**	0.187**	0.260**
		(0.045)	(0.043)	(0.081)		(0.079)	(0.069)	(0.089)
$Log(EX_{jt})$			-0.009	-0.021			0.041	0.056
			(0.050)	(0.066)			(0.075)	(0.070)
$Log(T_{jt})$	-0.167*	-0.293***	-0.290***	-0.308**	-0.338**	-0.376**	-0.400**	-0.454**
	(0.082)	(0.078)	(0.078)	(0.119)	(0.128)	(0.139)	(0.136)	(0.162)
Time dummies	yes	yes	yes	yes	yes	yes	yes	yes
R-squared	.067	.075	.074	.061	.069	.069	.069	.059
N. obs.	3792	3792	3792	2088	3792	3792	3792	2088
N. of firms	474	474	474	261	474	474	474	261

(Log of) TFP has been obtained as the residual of a revenue based Cobb-Douglas production function, estimated by the Levinshon and Petrin (2003) method. Standard errors clustered by sector are in brackets below estimates. Asterisks denote p-values: * p<0.1, ** p<0.05, *** p<0.01.

Table A1 – Coefficients of Cobb-Douglas production function used to compute TFP estimated using different methods

Nace codes	Sector description	Levinshon-Petrin (Value added)			Levinshon-Petrin (Revenue)			
		Labour	Capital	RTS	Labour	Capital	Materials	RTS
15-16	Food, beverages and tabacco	0.598	0.250	0.849	0.256	0.085	0.463	0.805
17	Textiles	0.462	0.411	0.873	0.257	0.104	0.505	0.866
18-19	Apparel and leather	0.370	0.278	0.649	0.179	0.150	0.660	0.989
20-21-22	Wood, paper and publishing	0.612	0.061	0.674	0.337	0.093	0.384	0.814
23-24	Chemical and petrochemicals	0.663	0.117	0.780	0.310	0.166	0.765	1.241
25	Rubber and plastic products	0.433	0.132	0.564	0.215	0.035	0.939	1.189
26	Other non-metallic mineral products	0.630	0.226	0.856	0.403	0.163	0.541	1.108
27	Basic metals	0.522	0.112	0.634	0.233	0.000	0.501	0.734
28	Fabricated metal products	0.579	0.215	0.793	0.270	0.081	0.719	1.070
29	Machinery and equipment n.e.c.	0.539	0.082	0.622	0.280	0.000	0.837	1.117
30-31	Electrical machinery and office equipment	0.646	0.123	0.769	0.356	0.130	0.319	0.805
32-33	Communication eq. and medical instruments	0.588	0.064	0.652	0.355	0.431	0.057	0.842
34-35	Motor vehicles and other transport eq.	0.602	0.299	0.900	0.325	0.060	0.461	0.846
36	Furniture; manufacturing n.e.c.	0.491	0.303	0.794	0.239	0.196	0.556	0.991

Nace codes	Sector description	Fixed-effect (Revenue)				OLS (Revenue)			
		Lab.	Cap.	Mat.	RTS	Lab.	Cap.	Mat.	RTS
15-16	Food, beverages and tabacco	0.180	0.031	0.485	0.696	0.242	0.074	0.708	1.023
17	Textiles	0.430	0.032	0.435	0.896	0.313	0.165	0.415	0.893
18-19	Apparel and leather	0.080	0.025	0.622	0.727	0.301	0.116	0.512	0.929
20-21-22	Wood, paper and publishing	0.250	0.052	0.362	0.664	0.328	0.208	0.391	0.926
23-24	Chemical and petrochemicals	0.178	0.018	0.639	0.835	0.320	0.076	0.620	1.016
25	Rubber and plastic products	0.197	0.033	0.552	0.783	0.238	0.089	0.661	0.987
26	Other non-metallic mineral products	0.308	0.050	0.428	0.786	0.400	0.067	0.530	0.997
27	Basic metals	0.228	0.031	0.493	0.752	0.214	0.049	0.701	0.964
28	Fabricated metal products	0.354	0.059	0.473	0.885	0.295	0.121	0.530	0.946
29	Machinery and equipment n.e.c.	0.370	0.031	0.569	0.970	0.328	0.062	0.574	0.964
30-31	Electrical machinery and office eq.	0.277	0.049	0.574	0.900	0.375	0.054	0.547	0.976
32-33	Communication eq. and medical instr.	0.451	0.031	0.453	0.935	0.431	0.170	0.323	0.924
34-35	Motor vehicles and other transport eq.	0.317	0.127	0.446	0.890	0.343	0.039	0.598	0.980
36	Furniture; manufacturing n.e.c.	0.304	-0.042	0.568	0.830	0.346	0.158	0.440	0.944

Table A.2 – Robustness checks: TFP computed using alternative methods for estimating Cobb-Douglas production functions and externalities proxied by fixed capital

	Levinshon-Petrin (Value added)			Fixed-effect (Revenue)			OLS (Revenue)		
Sample	All domestic	All domestic	All domestic	All domestic	All domestic	All domestic	All domestic	All domestic	All domestic
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Log(F_{jt})$	0.040	0.075**	0.075*	-0.003	0.012	0.015	0.016	0.040**	0.040**
	(0.033)	(0.034)	(0.036)	(0.013)	(0.011)	(0.012)	(0.019)	(0.017)	(0.018)
$Log(MN1_{jt})$	0.046			0.036			0.038		
	(0.046)			(0.024)			(0.027)		
$Log(MN2_{jt})$	0.098*			0.065*			0.072*		
	(0.051)			(0.036)			(0.040)		
$Log(MN_{jt})$		0.240***	0.239***		0.126***	0.130***		0.166***	0.167***
		(0.068)	(0.070)		(0.040)	(0.039)		(0.035)	(0.037)
$Log(EX_{jt})$			-0.001			0.023			0.002
			(0.046)			(0.035)			(0.031)
$Log(T_{jt})$	-0.237*	-0.397***	-0.396***	-0.141**	-0.197***	-0.205***	-0.136*	-0.238***	-0.238***
	(0.118)	(0.112)	(0.114)	(0.060)	(0.054)	(0.056)	(0.074)	(0.052)	(0.057)
Time dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
R-squared	.132	.137	.137	.108	.111	.111	.087	.095	.095
N. obs.	3792	3792	3792	3792	3792	3792	3792	3792	3792
N. of firms	474	474	474	474	474	474	474	474	474

Standard errors clustered by sector are in brackets below estimates. Asterisks denote p-values: * p<0.1, ** p<0.05, *** p<0.01.

Table A.3 – Robustness checks: TFP computed using alternative methods for estimating Cobb-Douglas production functions and sectoral activity measured by employment

	Levinshon-Petrin (Value added)			Fixed-effect (Revenue)			OLS (Revenue)		
Sample	All domestic	All domestic	All domestic	All domestic	All domestic	All domestic	All domestic	All domestic	All domestic
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Log(F_{jt})$	0.265***	0.287***	0.288***	0.073	0.081	0.083	0.084	0.087	0.087
	(0.083)	(0.090)	(0.088)	(0.054)	(0.053)	(0.051)	(0.061)	(0.053)	(0.054)
$Log(MN1_{jt})$	0.130*			0.071			0.091*		
	(0.071)			(0.049)			(0.049)		
$Log(MN2_{jt})$	0.169**			0.028			0.059		
	(0.067)			(0.057)			(0.062)		
$Log(MN_{jt})$		0.292**	0.322**		0.080	0.114**		0.115*	0.119*
		(0.107)	(0.121)		(0.054)	(0.040)		(0.058)	(0.057)
$Log(EX_{jt})$			0.091			0.100			0.012
			(0.114)			(0.058)			(0.070)
$Log(T_{jt})$	-0.503***	-0.560***	-0.614***	-0.226**	-0.228*	-0.287**	-0.209*	-0.200	-0.207
	(0.127)	(0.166)	(0.176)	(0.078)	(0.106)	(0.096)	(0.109)	(0.117)	(0.124)
Time dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
R-squared	.136	.137	.137	.109	.108	.11	.087	.086	.086
N. obs.	3792	3792	3792	3792	3792	3792	3792	3792	3792
N. of firms	474	474	474	474	474	474	474	474	474

Standard errors clustered by sector are in brackets below estimates. Asterisks denote p-values: * p<0.1, ** p<0.05, *** p<0.01.

Table A.4 – Robustness checks: allowing for persistent TFP

	Sectoral activity measured by fixed capital					Sectoral activity measured by number of employees				
	WG	WG (no cluster)	WG-AR	GMM-DIF	GMM-SYS	WG	WG (no cluster)	WG-AR	GMM-DIF	GMM-SYS
Log(TFP)i,t-1				0.457***	0.820***				0.571***	0.855***
				(0.144)	(0.088)				(0.153)	(0.077)
Log(F_{jt})	0.075*	0.075***	0.092***	0.080**	0.020	0.288***	0.288***	0.160***	0.151	0.060
	(0.036)	(0.022)	(0.026)	(0.032)	(0.015)	(0.088)	(0.054)	(0.059)	(0.098)	(0.038)
Log(MN_{jt})	0.239***	0.239***	0.236***	-0.001	-0.026	0.322**	0.322***	0.192**	0.043	0.002
	(0.070)	(0.045)	(0.074)	(0.095)	(0.037)	(0.121)	(0.066)	(0.086)	(0.130)	(0.039)
Log(EX_{jt})	-0.001	-0.001	0.028	-0.089	0.006	0.091	0.091	0.009	-0.054	0.066
	(0.046)	(0.040)	(0.048)	(0.062)	(0.015)	(0.114)	(0.061)	(0.072)	(0.112)	(0.041)
Log(T_{jt})	-0.396***	-0.396***	-0.318***	-0.009	-0.014	-0.614***	-0.614***	-0.351**	-0.155	-0.110
	(0.114)	(0.073)	(0.104)	(0.151)	(0.060)	(0.176)	(0.112)	(0.146)	(0.240)	(0.096)
R-squared	.137	.0133	.00926			.137	.0136	.0072		
N. obs	3792	3792	3318	2844	3318	3792	3792	3318	2844	3318
N. firms	474	474	474	474	474	474	474	474	474	474
N. instruments				25	31				25	31
Sargan test				20.6	32				22.4	35.9
d.f.				16	24				16	24
p-value				[0.194]	[0.126]				[0.131]	[0.056]
AR1				-3.85	-5.84				-4.14	-6.1
p-value				[0.000]	[0.000]				[0.000]	[0.000]
AR2				0.0635	0.742				0.354	0.766
p-value				[0.949]	[0.458]				[0.723]	[0.444]

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