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The performance of multinationals and domestic firms in the Italian logistics sector, an empirical comparison

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1. Introduction

Firms significantly differ (within industries) in terms of behaviour and performance. The studies comparing the activities of national firms, foreign subsidiaries and headquarters of multinationals (MNE) based in the same country, find that national firms generally perform worse than both domestic and foreign owned MNEs (Doms, Jensen, 1998 provide evidence on the US; Criscuolo, Martin, 2003 and Girma et al., 2003 on the UK, Castellani, Zanfei, 2006 and Barba Navaretti and Castellani, 2004 on Italy).

The empirical literature on firms' heterogeneity has, however, so far mainly focused on the manufacturing sector, while no evidence has been provided about the service sector. The present paper partially fills this gap by focusing on the logistics service sector in Italy, which, in the last decade, has registered an increasing number of inward and outward foreign direct investments (FDI). Specifically, the growth rate of utilities (energy, air, water) and transport, logistics and communications in the country has tripled in the last years (UNCTAD, 2006) and outward FDI in the logistics sector equals to 26% of the service total. Besides, large foreign logistics suppliers dominate the Italian market, i.e. TPG-TNT and Deutsche Post, which own about the 8% of the market share; Saima Avandero, Geodis-Zust Ambrosetti and Shenker which own 1.5-3.5% of the market share (Federtrasporto-Nomisma, 2006).

The aim of the paper is to investigate how logistics firms¹ located in Italy differ according to their international involvement in the year 2005. We control for Italian MNEs (from now onwards IMNE) and foreign MNEs (FMNE) located in Italy in 2005 and compare IMNE with national firms (NAT) and FMNE with domestic firms (DOMESTIC). NAT firms are those companies which have never invested abroad while the group DOMESTIC comprises all Italian owned firms, that is NAT plus IMNE. Specifically, the following firms' characteristics are analysed: (i) turnover (ii) jobs in

¹ For a description of the sub-sectors belonging to logistics see Appendix.

number of employees; (iii) value added; (iv) productivity; (v) fixed assets; (iv) location / region; and (v) sector. OLS and a discrete choice (logit) models are employed to compare the characteristics of the following sets of firms: DOMESTIC (NAT +IMNE) versus FMNE and NAT versus IMNE. The data on foreign MNEs and Italian MNE in the logistics sector come from the LogINT (Logistics and Internationalisation) database, developed by the Laboratory of Economics, Logistics and Territory of DiAP-Politecnico di Milano. Data on the Italian logistics firms (NAT) come from Amadeus database, developed by Bureau Van Dijk.

The empirical analysis shows that foreign MNEs perform better than DOMESTIC firms: they are larger in terms of turnover and number of employees and have a higher productivity; operate in the more valued added logistics subsector and are mainly located in the northwest of Italy, the area where the bulk of manufacturing firms is concentrated. On the other hand, the differences between IMNE and NAT are less pronounced.

The paper is organized into five sections. The introduction is followed by a literature review on firms' heterogeneity. Data and descriptive statistics are presented in section three. The econometric analysis is described and discussed in section four. Conclusions follow.

2. Literature review and hypotheses

The international literature on the location of foreign firms in a country has focused on their impact on the host economies (Lipsey, 2002; Barba Navaretti and Venables, 2004; Castellani and Zanfei, 2006). In addition to extra output and employment, the typical foreign MNE is larger, employs more skilled labour, pays higher wages, is an important provider of training activities, has a greater technological knowledge and higher productivity than a domestic plant. Besides, inward investors bring new management practices and higher standards which domestic firms may observe and imitate. The presence in a host country of foreign affiliates may foster the involuntary technology transfer towards indigenous firms through imitation and demonstration (Blomström and Kokko, 1998), human capital mobility, demand for local inputs and the creation of spin-offs. The linkages with the local firms (Rodriguez-Clare, 1996) and the knowledge spillovers (Krugman, 1991) within the local context have been considered among the main ways in which the benefits from inward foreign direct investment (FDI) develop.

Furthermore, the location of foreign affiliates in a host economy may also have negative effects for the domestic firms when both groups compete either in product or in factor markets. Foreign firms may, for instance, push local firms out of the market by take over their market share (market stealing effect) (Aitken and Harrison, 1999) and determine a labour hoarding effect because they tend to pay more for labour of a given quality product than local firms (Lipsey and Sjolholm, 2005). Nevertheless, the empirical evidence of the actual impact of MNEs on host economies is still mixed and there seems to be a growing consensus among scholars that substantial diversities exist in the extent to which different MNEs contribute to the global generation and transfer of innovation (Castellani and Zanfei, 2006).

Besides, as stressed by the literature (among the others, Dunning, 1993; Blomstrom et al., 1994; Armstrong and Taylor, 2000; Lipsey, 2002; Barba Navaretti and Venables, 2004; Castellani and Zanfei, 2005, 2006), the impact of FDI on the host economy is closely related to the development of the host country and its interaction with foreign activities. Blomstrom *et al.* (1994) in their study on a sample of developing countries, find that FDI are positively related to growth just for the higher income ones. Besides, the effects of foreign investments may vary according to the characteristics of foreign and domestic firms and the types of linkages that emerge between inward investors and

local firms. As Castellani and Zanfei (2005) pointed out, on one side, foreign firms should have something to transfer and be willing to transfer it to domestic firms, they should be well established in the foreign country and cooperate with local firms; on the other side, domestic firms should be able to interact with foreign firms and have the capacity to absorb spillovers from FDI. Several studies have found, for instance, that technological capability of the local firms may be an obstacle for spillovers; besides, the indirect gains from MNEs depend to a large extent on the efforts of local firms to invest in learning and R&D activities (for a detailed review see Barba Navaretti and Venables, 2004). Specifically, the economic impact of multinationals on the host economy depends on the intra-industry heterogeneity of firm, particularly the difference between national and international operations (Castellani and Zanfei, 2006).

In order to be able to measure the impact of foreign MNEs on the host economies, it is necessary to investigate the characteristics of domestic and foreign firms located in a country; in other words, investigate firms' heterogeneity. The branch of the literature focusing on this topic analyses how and why firms differ in productivity and innovative performance, and examines the implications of this diversity within industries (see, among the others, Castellani and Zanfei, 2006).

The studies carried out so far, refer to the manufacturing sector, while little evidence is provided for services and specifically for the logistics sector, which is the object of the present paper.

The only paper to our knowledge, comparing the performance of foreign logistics MNEs and domestic firms, by means of a descriptive analysis, has been written by Maggi and Mariotti (2008).

The authors refer to the Italian case for the year 2004 and find that foreign MNEs show a productivity, measured as value added per worker, that is higher than the Italian firms' average.

Higher performance is related to MNE's larger size (measured both in numbers of employees and turnover), which allows firms to gather, more easily, economies of scale and scope and to acquire and develop advanced technological tools and human resources. Italian logistics firms are, on the other hand, smaller in size, especially if they work in the transport by road sub-sector. According to the Italian Statistical Institute (ISTAT), 60% of the logistics firms are single-person companies and 16.2% has two employees (ISTAT, 2007). The small and very small size, therefore, limits their ability to invest and become competitive.

The heterogeneity of domestic (small and very small) firms and foreign MNEs (larger and in general more innovative) in size – both measured in numbers of employees and turnover, the poor supply of integrated logistics and the related increasing demand of value added logistics services in the country, lead foreign investors to privilege the most value added sectors, such as “multimodal transport operators”, “freight integrators” and “couriers” (Maggi and Mariotti, 2008). Within a global scenario, where products and services flow internationally every day and commercial borders have overtaken national borders, there is an increasing need of integrated logistics able to support the international supply chain (Vastag *et al.*, 1994).

Foreign MNEs prefer to be located in the core area of the country, because they adopt the so-called “follow the customer” strategy (Vastag *et al.*, 1994; Jayarama *et al.*, 1999; Danielis, 2002; Rhim *et al.*, 2003;). Both Cantwell and Iammarino (2003) and Castellani and Zanfei (2007) find that that the relationship between local and global dimensions within a firms is a crucial issue and influences on performance of firms. Meaning that international firms (global dimension) can benefit from being located in certain agglomerations. As argued by Balcer and Evangelista (2005), localization in a territory and a particular district has an influence on performance and hence on the difference between firms within sectors. Thus, this is linked to the expectation that foreign MNEs are located in the most developed/competitive areas, for Italy they are the Northeast and Northwest.

On the basis of the literature review on firms' heterogeneity both in manufacturing and logistics services, the present paper aims to test the following hypotheses for the four sets of firms:

H1a: FMNE perform better in productivity, turnover and number of employees than DOMESTIC firms within the Italian logistics sector.

H1b: IMNEs perform better in productivity, turnover and number of employees than NAT firms within the Italian logistics sector.

H2: FMNE and IMNE are mainly located in the core areas of Italy.

H3: Within the logistics sector, FMNE and IMNE are most likely to be in the higher value added sub-sectors.

3. Data and descriptive statistics

The dataset we used to carry out the analysis at the firm level combines two different databases: (i) LogINT (Logistics and Internationalisation) database, developed by the Laboratory of Economics, Logistics and Territory (LabELT) of DiAP – Politechnic of Milan registers inward and outward logistics FDI's which have taken place in Italy since the 2000, and is updated every year; (ii) Amadeus database, developed by Bureau Van Dijk, which registers the top MNEs in Europe. Amadeus is a Pan-European financial database (7 million companies), contains financial information on the European companies and is updated very frequently. Amadeus comprises information on all the Italian logistics firms.

The research population is composed by 280 foreign MNEs, 172 Italian MNEs, 11,230 NAT firms and 11,402 DOMESTIC firms (IMNE plus NAT) (Table 1). According to LogINT, about 22% of the FMNEs belongs to seven European global players, of which, three global players are of German background and the remaining four global players are French, Dutch, Belgian and British origin (Boscacci *et al.*, 2008).

Table 1: Description of the research population²

Typology	N. ³	%
DOMESTIC	11,402	97.6
FMNE	280	2.4
TOT	11,682	100
NATIONAL	11,230	98.5
IMNE	172	1.5
TOT	11,402	100

Figure 1 shows a significant concentration of the logistics firms, independently by their typology, in the “core area” of the country, mainly in the northwest. This can be explained by the fact that this area hosts more manufactures and other service related businesses than any other macroarea in Italy, therefore the demand for logistics services is higher. Besides, in the north the majority of the national and international flows are concentrated and the main logistics nodes are settled. Specifically, Lombardy region attracts the 41.3% of the foreign MNEs.

² We speak of a sample and research population simultaneously, since the investigated population is the entire group of DOMESTIC (NAT plus IMNE) and FMNE in Italy in the logistics sector in 2005.

³ In order to get a dataset with as little missing values as possible, we checked whether the database had cases with missing values for our focal variables. If that was the case we used the value for 2004 and in a few cases the values from 2003. This improved the number of cases of the entire population. We needed to replace the missing value for a few hundred cases per focal variable.

By contrast, the limited number of manufacturing and service firms in the South of Italy does not represent a pull factor for both domestic and foreign logistics MNEs.

Figure 1: Geographical distribution of the firms – Italian macro areas (percentage)

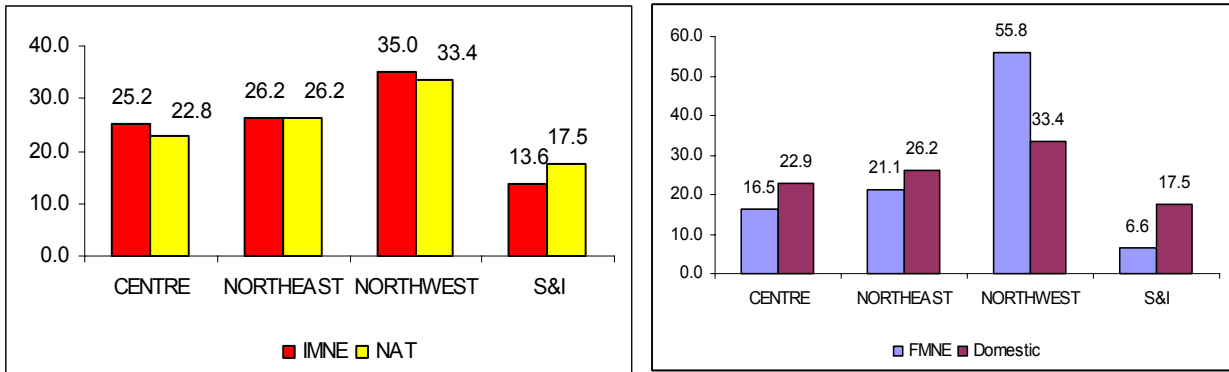


Figure 2: Logistics sub-sectors of the four groups (percentage)

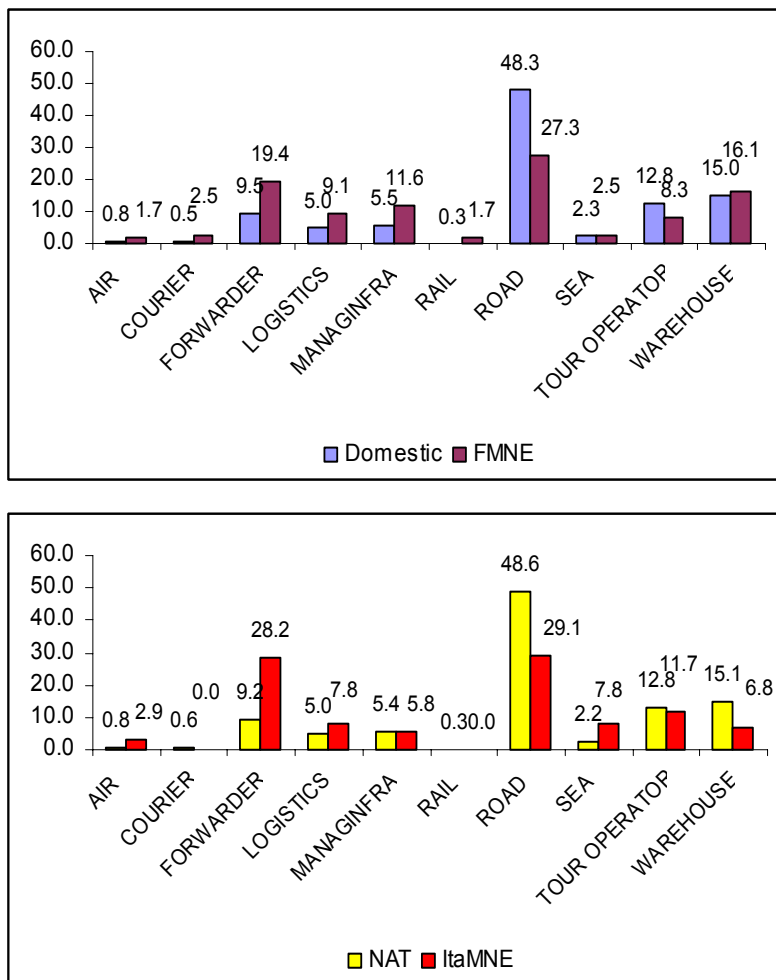


Figure 2 shows the logistics sub-sectors firms belong to⁴. Both foreign and Italian MNEs tend to be concentrated in sub-sectors characterized by higher value added than pure transport, such as ‘logistics’ (including: integrated logistics, courier, international forwarding), while NATs are

⁴ AIR: scheduled air transport and non-scheduled air transport; RAIL: transport via railways; TOUR OPERATOR: activities of travel agencies and tour operators; LOGISTICS: cargo handling and storage, other supporting transport activities; ROAD: other land transport; INFRASTRUCTURE: managing infrastructures; SEA: sea transport.

mostly working in ‘transport by road’, which has a lower value added per firm. This is consistent with our expectations and the literature.

The predominance of the transport by road in Italy is, indeed, due to the prevailing transport-intensive model where the majority of firms are small and medium sized, and not keen to develop know-how, train human resources and apply innovations to offer integrated logistics services.

Figure 3: Turnover in 2000-2005

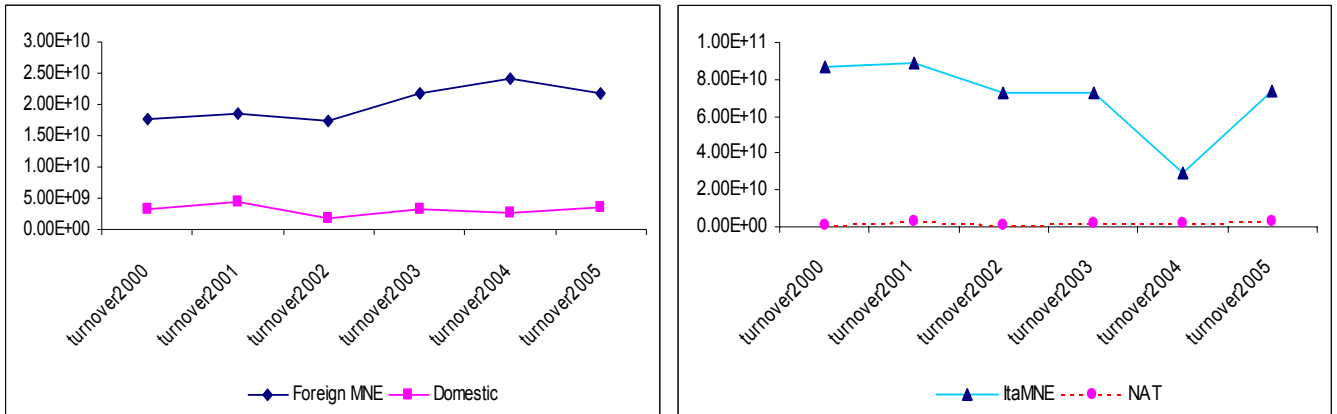


Figure 4: Number of employees in 2000-2005

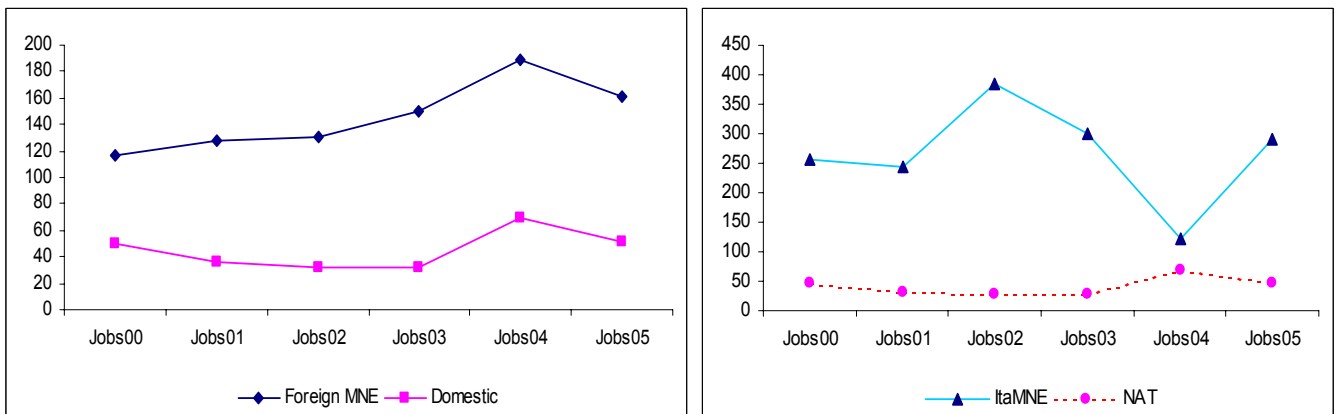
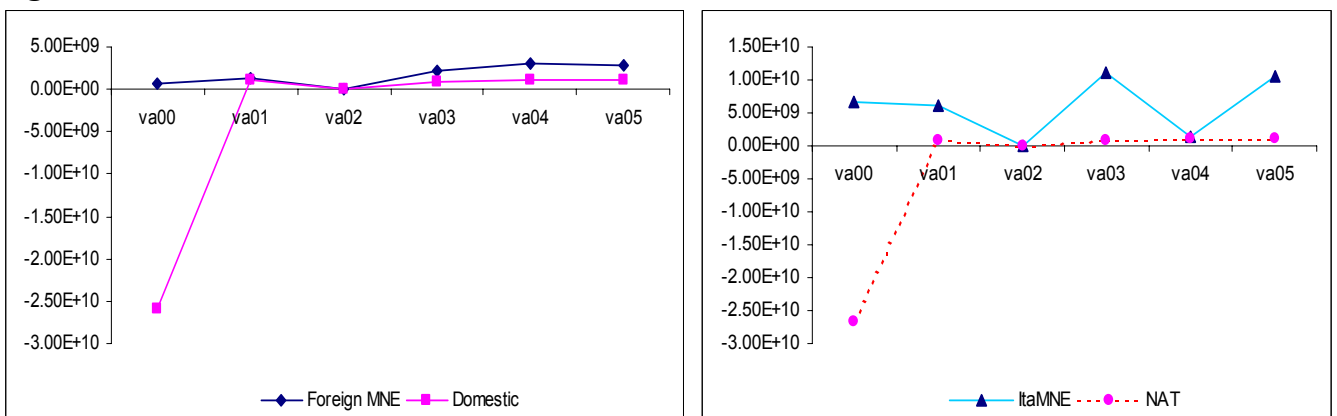


Figure 5: Value-added in 2000-2005



The firms’ turnover in the period 2000-2005 shows a rather steady trend for the four groups of firms (Figure 3). This trend is confirmed by Figure 4 showing that foreign and Italian MNEs are larger in size (measured in numbers of employees) than NAT. The difference between NAT and foreign and

Italian MNEs at this aggregate level is consistent with the literature, especially with the findings from Barba Navaretti and Venables (2004), and it underlines the characteristics of the Italian logistics firms that are small and very small sized. The trend for value added is not as clear as the ones for turnover and employees, however, multinationals firms tend to perform slightly better than national indigenous firms (Figure 5).

The outcomes of the descriptive statistics seem to stress the heterogeneity between multinationals and national firms at this level of aggregation and provide evidence in favour of the four hypotheses, framed in section 2. The descriptives indicate that foreign and Italian MNEs perform better in turnover and number of jobs than DOMESTIC and NAT. Besides, multinationals tend to be located in the core area and are relatively more present in the higher value added segment of the Italian logistics sector.

4. The econometric analysis and the results

In this section we provide more robust evidence on firms' heterogeneity, by means of an econometric analysis. First we apply an OLS estimation, secondly a discrete choice model (logit), which allows to test the probability for a multinational firm (Italian or foreign) to have certain characteristics in comparison to being an indigenous firm (DOMESTIC or NAT). Due to data constraints, the analysis only refers to the year 2005.

The OLS is formulated as follows:

$$\log Pr od^{05} = \alpha + \beta_1 \log T^{05} + \beta_2 \log J^{05} + \beta_3 \log FA^{05} + \varepsilon \quad (1)$$

In equation (1) the dependent variable is firms' productivity, which is computed by dividing the value added by the number of jobs in 2005 ($\log Pr od^{05}$) and the explanatory variables are: firms' turnover ($\log T^{05}$), number of workers ($\log J^{05}$) and fixed assets ($\log FA^{05}$) in 2005. In order to distinguish between DOMESTIC and FMNE and NAT and IMNE two dummy variables have been added, one in each OLS regression, which take the value 1 for FMNE and IMNE, and 0 for DOMESTIC and NAT, respectively. The other two dummies considered are the dummy sector, in which sub-sectors have been aggregated by value-added and the dummy macro-area (see Appendix).

For each of the sample firms we have three measures of performance: productivity, turnover and number of fulltime jobs / employment. We use all of them as a proxy for performance; we are, nevertheless, aware that these are non-perfect proxies for performance, but data restrictions limit us, at the moment, in the measurement possibilities. As showed in the descriptive statistics and underlined by the literature, firm performance is associated with larger firm size, higher turnover and higher value added. In the OLS we omitted the value added due to high correlations with other focal variables.

As presented in table 2, in the OLS model in column (1), concerning DOMESTIC firms and FMNE, there appears to be a significant positive effect of turnover and fixed assets on productivity, while employment has a negative and significant effect. This can be explained by the fact that productivity is measured as value added divided by the number of employees. Besides, being FMNE (dummyFMNE) has a positive and significant impact on productivity, suggesting that foreign MNEs are more productive than domestic firms. Furthermore, the sector and the macro-area dummy variables turned out to be significant, meaning that there are some fixed effects associated with the logistics sub-sectors and the geographical macro-areas that influence productivity.

Specifically, the macro-area dummy suggests that FME tend to be located in the northern area of the country (north west and north east).

In order to investigate the effect of the other performance measures, we run two other OLS taking as dependent variable Turnover and Jobs. The results, presented in columns 1a and 1b, confirm that FMNE tend to have larger turnover and size than DOMESTIC. Besides, the sector and the macro-area dummy variables turned out to be significant.

Table 2: Results of the OLS estimations

Dependent variable	(1) $\log Pr od^{05}$	(2)	(1a) $\log T^{05}$	(2a)	(1b) $\log J^{05}$	(2b)
$\log Pr od^{05}$			0.4536***	0.4393***	-0.7435***	-0.7401***
$\log T^{05}$	0.2478***	0.2488***			0.5876***	0.5808***
$\log J^{05}$	-0.3717***	-0.3736***	0.5377***	0.5177***		
$\log FA^{05}$	0.1357***	0.1369***	0.0415***	0.0409***	0.2207***	0.2179***
_cons	6.3980***	6.3233***		8.2659***	-0.4244*	-0.7921***
Dummy FMNE	0.1276***		0.5253***		0.3152***	
Dummy IMNE		-0.0057		0.8818***		0.1875**
Dummy sector	Yes	Yes	Yes	Yes	Yes	Yes
Dummy macroarea	Yes	Yes	Yes	Yes	Yes	Yes
n. of obs.	7725	7483	7725	7483	7725	7483
F-test	242.21	235.53	474.51	424.12	806.55	740.38
P-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Adj. R-2	0.3332	0.3340	0.4952	0.4750	0.6353	0.6126

*** significant at 1% level, ** at 5% level, * at 10% level

The second group of OLS (2, 2a, 2b), which refers to the comparison between NAT and IMNE, shows, in column 2 that turnover and fixed assets have a positive impact on productivity, while, again, employment is negatively related. In this regression the dummy for Italian MNE does not appear to be significant and has a negative sign. Again, the sector and the macro-area dummy variables are significant, specifically the north west macro area.

In Columns 2a and 2b we run the analysis taking as dependent variable first the turnover and second the number of employees. In both the models IMNE turns out to be positive and significant meaning that IMNE present higher turnover and larger size than NAT firms. The sector and the macro-area dummy variables stay significant.

We can conclude that the econometric results corroborate the descriptive statistics and support hypotheses H1a, H2 and H3 and partially H1b since IMNEs do not seem to perform better in terms of productivity than NAT firms.

In order to better compare the performance and characteristics of DOMESTIC, FMNE, IMNE and NAT firms, we employ a discrete choice model, following Castellani and Zanfei (2006 and 2007). Using discrete choice models enables us to differentiate between FMNEs and DOMESTIC firms and between IMNEs and NATs and measure whether the differences between the characteristics of Italian and Foreign MNEs and NAT significantly differ from 0. This will allow us to carry out a detailed analysis of the differences between firms within the logistics sector and to see how

economic and innovation performance differs according to the ownership position (FMNE, IMNE or NAT). The diagnostics of the data approve the logit model, however, caution needs to be taken when interpreting the results since FMNE and IMNE are relatively ‘small cells’ within the test-sample.

When employing models as such, it is important to address issues of endogeneity. For the models employed above we meet this need by simply making a correlation matrix and omit those explanatory variables with high correlation values. Nevertheless, we cannot deny that endogeneity is an issue that creates problems in econometric and statistical models and is probably causing many discrepancies in literature (Kim and Washington, 2006). Therefore more attention should be given to endogeneity in next step of this investigation especially because we adopt single stage logits, which usually provide the smallest mean square error but biased results in cases of a potentially endogenous variable, suggesting a trade-off between bias and mean square error (Lee *et al*, 2005). In future research, we might control for non-random assignments or estimates that can be biased and, therefore, we should apply a two stage technique to control and test for endogeneity like the Durbin-Wu-Hausman test⁵.

In the current paper, the differences in firm characteristics are modeled by means of a logit model relating the probability to be either a FMNE or DOMESTIC in 2005 and the probability to be either an IMNE or a NAT in 2005 to a set of explanatory variables x_i . The probability of a specific ownership / transnationality of a firm is:

$$F(x'_i \beta) \text{ where } F(.) = \exp(.) / [1 + \exp(.)], \quad (2)$$

and β is the vector of coefficients, for the discrete choice we measure 0 is DOMESTIC and 1 is FMNE in the first model and 0 is NAT and 1 is IMNE in the second model. The random utility components are assumed to be independent identically Gumbel (extreme value) distributed (Greene 2003) in both logits. The explanatory variables are the following: *Turnover*, *Fixed Assets*, *Jobs* (in fulltime employees), *Productivity* (measured in valued added divided by number of full time jobs), *Macroarea* (dummy) and *Subsector* within the logistics sector (dummy), trying to capture the difference in characteristics of the different sets of firms.

We computed a logit as described in formula 2, to see whether the differences between the two couples (FMNE vs. DOMESTIC and IMNE vs. NAT) are significantly different from zero. The results can be found in table 3. The second and fourth columns show the β coefficients estimated by running a binominal logit with the inclusion of control variables for respectively the first and second model. Each indicator (used as a dependent variable) has been regressed against the indicator ownership (binary variable indicating the ownership of the firm being either DOMESTIC (=0) or FMNE (=1) in the first model and the binary variable indicating the ownership of the firm being either NAT (=0) or being IMNE (=1)). A positive sign of the β coefficient indicates the presence of a positive difference in the average values between the two different set of firms.

⁵ When the Hausman test has a value of Prob > Chi2 = 0.00000, we will use fixed effects (Grogger, 1990). This method relies on the availability of additional instrumental variables, which induce variation in the focal explanatory variable, but have no direct effect on the main outcome. The two stage model when correcting for endogeneity will work as follows. Before estimating the second stage of the model, the endogenous variables must be predicted as a function of control variables and the instrumental variables. The instrumental variables will be excluded from the second model. The residuals from the first stage is then added as an explanatory variable to the second stage of the model. Using the residual from the first stage equation captures the unobserved non-random component and allow us to control for the endogeneity effect (Lee et al, 2005). In other words, we propose a two-step estimator, to be obtained by maximizing a logit likelihood after estimating the reduced form parameters by first-stage OLS (compare Grogger, 1990).

The β value, indicates how much the difference is of the specific indicator and the assigned reference group and the third and fifth column indicate whether the difference is significant. On the whole the models have a good fit with an overall percentage of 96.9% for the first model and an overall percentage of 98.6% for the second one.

When comparing DOMESTIC and FMNE it is found that these differ significantly in the characteristics *Turnover*, *Jobs*, *Productivity* and *Fixed assets*. FMNE's have a significant higher turnover (.513) than DOMESTIC, FMNE generate .391 more jobs than DOMESTIC and more productivity (.415) and FMNE have a slighter lower amount of Fixed Assets. These difference are significant at the 1% level and at 5% level for productivity.

When comparing NAT with IMNE in the second logit, one can see that the results are slightly less impressive. Only the difference in *Turnover* is significant, indicating that IMNE have a higher turnover than their national counterparts. The difference in *Jobs* and *Fixed assets* between NAT and IMNE is not significant.

This difference in outcomes from our expectations, specifically for jobs, and from the literature might be explained by the difference in distribution over the subsector between the two groups: more value-added sectors are less labor intensive, on average, and the other way around for less value-added activities. Besides, logistics firms generally tend to outsource services to suppliers and this reduces the number of workers employed at the mother company plant. In addition, the outsourcing of operations is more adopted by foreign MNEs which take the advantage to subcontract activities to local suppliers which better know the territory and, sometimes, the Italian customers. It is, therefore, important to stress that FMNE and IMNE are only small cells, considered in the econometric model.

Combing these outcomes we can say that they are in line with our expectations and literature as concerns the comparison between FMNE and DOMESTIC firms, while little evidence is provided by the logit results on the higher performance of IMNE compared to NAT firms. Thus, we tent to fully accept H1a and accept H1b only as concerns turnover.

The results for *Macroarea*, furthermore, confirm what we were expecting: Italian and foreign MNEs tend to be located in the core area of the country, in both models. Both, multinationals have less chance to be settled in any other area than the northwest (core), even a significant lower chance for FMNE (model 1) for all other locations and for IMNE there is a significant lower chance to be located in northeast than being located in the northwest. This result tends to accept the second hypothesis, that is multinationals firms, being them foreign or Italian, are likely to be located in the core area than indigenous firms.

As concerns the *Subsectors* we expected most FMNEs to be in logistics, since it is the highest value-added subsector. When running the crosstabs, most firms either multinationals or indigenous are in the transport by road subsector, which is therefore used as the reference group. The results indicate, however, that FMNE have a positive and significant higher chance to be in the *subsectors* Courier, Forwarder, Logistics and Managing Infrastructure than being in the subgroup Transport by road. Therefore, FMNE differ significantly from DOMESTIC in the subsectors they operate in. FMNEs are active in higher value added sub-sectors and the higher knowledge intensive sub-sectors.

IMNE and NATs also differ significantly in the characteristic for sub-sectors (see model 2). IMNE have significantly higher chance to work as forwarder and touroperator. However, since no IMNE were active in the transport by sea and transport by rail, we remodeled the dummy sector for model

2, adding the transport by rail and transport by sea to the reference group. The results were pretty robust, only the significance of the differences in characteristics for *subsector* got more pronounced. The international flows of raw material, semi components and final goods between Italy and the other European countries make mainly use of transport by road. Thus, the outcomes of the logit allow us to partially accept the third hypothesis for the IMNE group.

Table 3: Results of the logit-analysis

	1: FMNE versus DOMESTIC		2: IMNE versus NAT	
	FMNE = 3,1 % of research population		IMNE = 1,4% of research population	
	B	sig.	β	sig.
Constant	-15.370		-20.388	
<i>Turnover</i> (in ln in the year 2005)	.513	***	1.016	***
<i>Fixed Assets</i> (in ln in the year 2005)	-.140	***	0.89	
<i>Jobs</i> (in ln, numbers of fulltime employees in 2005)	.391	***	-.077	
<i>Productivity</i> (Value added / number of jobs, in 2005, in ln)	.415	**	-.131	
<i>Subsector</i> (by value added)			Transport by road, rail and sea reference group	
Transport by road reference group				
Air transport	-.258		.952	
Courier	2.126	***	.954	
Forwarder	.951	***	1.094	**
Logistics	1.020	***	3.00	
Managing infrastructure	1.038	***	.434	
Transport by rail	1.022			
Transport by sea	.078			
Touropoperator	.168		.995	**
Warehouse	.313		.648	
<i>Macro-area</i>				
Northwest reference group				
Northeast	-.505	**	.658	**
Center	-.693	***	.233	
South & Islands	-1.164	***	-.128	
	n. of obs : 7725		n. of obs : 7380	
	Overall percentage: 96,9%		Overall percentage: 98,6%	

*** significant at 1% level, ** at 5% level, * at 10% level

5. Conclusions

The results from the descriptive statistics and both the OLS and the logit analyses provide support to most of the hypotheses. Firm heterogeneity within the Italian logistics sector according to the international involvement is found. In general we can conclude that foreign logistics MNEs tend to outperform NATs in the same sector, in terms of turnover, productivity and number of employees, while Italian MNEs only show a larger turnover than NAT firms. Furthermore, both foreign and Italian logistics MNEs favour locations in the core areas (“follow the customer” approach), and have a slight preference to be active in the higher values added sub-sectors.

Knowing firms heterogeneity offers some insights on the feasible impact of foreign logistics MNEs on the host economy. The literature stresses that foreign MNEs bring resources, such as advanced technologies, innovations, and managerial capabilities that might not be present in the host country. Working at global scale, requires, indeed, significant investments in innovation in order to stay competitive. Thus, the location in Italy of foreign logistics MNEs might have a positive impact on the industry itself and the local context because these firms may: (i) increase the number of employees, which can be directly employed by the MNE and by its local suppliers; (ii) promote a more efficient and effective logistics system as a whole; (iii) foster knowledge spillover towards domestic suppliers and competitors, which can give birth to spin-off firms; (iv) develop backward and forward linkages. A region hosting logistics MNEs can therefore, become also attractive for manufacturing firms, which need an efficient and effective logistics system to compete successfully in the global scenario where the production is fragmented in very distant locations (Vastag *et al.*, 1994; Maggi *et al.*, 2008).

Nevertheless, MNEs may also exhibit a negative impact on the host country such as, for instance, the market-stealing effect for domestic logistics firms, which are generally smaller and less competitive and innovative. This effect induces a reduction in the domestic firms’ market share, which, as stated by Federtrasporto-Nomisma (2005), has occurred in Italy in the period 1995-2005. Specifically, the market share of the Italian logistics firms’ has decreased from 50% to 35% for transport by road and from 61% to 24% for air transport (Federtrasporto-Nomisma, 2005). The empirical evidence on the impact of foreign manufacturing MNEs on the host country underlines, nevertheless, that in the medium and long run the presence of foreign MNE fosters the host country’s endogenous development. Therefore, further empirical evidence about the role played by foreign logistics MNEs on the host country economy is advocated.

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Appendix

Table 4: Italian NUTS 2 regions, macro-areas and logistics sub-sectors

Italian NUTS 2 regions	Macro-area	Logistics sub-sectors	NACE Codes
Abruzzo	South and Islands	Land transport; transport via pipelines	60
Basilicata	South and Islands	Transport via railways	60.1
Calabria	South and Islands	Other land transport	60.2
Campania	South and Islands	Transport via pipelines	60.3
Emilia Romagna	Northeast	Water transport	61
Friuli Venezia Giulia	Northeast	Sea and coastal water transport	61.1
Lazio	Centre	Inland water transport	61.2
Liguria	Northwest	Air Transport	62
Lombardia	Northwest	Scheduled air transport	62.1
Marche	Centre	Non-scheduled air transport	62.2
Molise	South and Islands	Supporting and auxiliary transport activities; activities of travel agencies	63
Piemonte	Northwest	Cargo handling and storage	63.1
Puglia	South and Islands	Other supporting transport activities	63.2
Sardegna	South and Islands	Activities of travel agencies and tour operators; tourist assistance activities	63.3
Sicilia	South and Islands	Activities of other transport agencies	63.4
Toscana	Centre	Post and telecommunications	64
Trentino Alto Adige	Northeast	Post and courier activities	64.1
Umbria	Centre		
Valle d' Aosta	Northwest		
Veneto	Northeast		