THE IMPACT OF THE ENTRY OF FOREIGN MNES IN SERVICE SECTORS ON THE PRODUCTIVITY OF DOMESTIC MANUFACTURING FIRMS. EVIDENCE ON VERTICAL SPILLOVERS IN ITALY

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Abstract
The issue of horizontal and vertical spillovers by foreign MNEs on domestic manufacturing firm has been largely investigated in recent years. While the literature has mainly focused on horizontal (i.e. intra-industry) spillovers or vertical (inter-industry) spillovers between manufacturing firms, the role of vertical spillovers stemming from MNEs in service sectors has been so far mainly neglected. Nonetheless, foreign direct investments in service sectors are acquiring growing relevance. This paper is one of the first attempts to size the relevance of this phenomenon. Using a database on 77964 manufacturing firms located in Italy, we estimate their Total Factor Productivity, and show that the entry of foreign firms in five different service sectors positively affect the productivity of manufacturing firms. We observe that the latter differently benefit from MNEs' spillovers depending on the technological level of the industry. Finally, we find that spillovers are highly localized, but that results depend on the type of services considered.

Keywords: vertical spillover; productivity; services sector
JEL Codes: F23; L25

1. Introduction

Recent years have witnessed a huge debate on the issue of horizontal and vertical spillovers by foreign multinational enterprises (MNEs) on domestic manufacturing firms. While the literature has mainly focused on horizontal or vertical spillovers between manufacturing firms, the role of vertical spillovers stemming from the presence of foreign MNEs in service sectors to domestic manufacturing firms has been so far mainly neglected. Nonetheless, foreign direct investments in service sectors are a growing phenomenon, especially because privatization and deregulation policies are opening up new opportunities for foreign investors. It is thus interesting to investigate the effects that these changes have on local firms' productivity.

The aim of the present work is to assess the impact of the entry of foreign MNEs in service sectors on local manufacturing firms in Italy.

Specifically, we regress a measure of total factor productivity of local manufacturing firms on the entry of foreign MNEs in service sectors, in the period 1999-2005. Results show that the impact is generally positive and significant across different service sectors (namely, construction, energy, ICT, logistics and consultancy). Disentangling for high- and low-technology manufacturing firms we observe that spillovers are differentiated, with ICT and logistics being more relevant for low-tech firms and consultancy for high-tech ones. Moreover, we use the information on the location of MNEs, in order to asses whether these spillovers are localized. We find that spillovers from logistics and consultancy are highly localized, while this is not the case for the other services.

The reminder of the paper is structured as follows: Section 2 reviews the literature on spillovers, Section 3 describes the data, Section 4 presents the empirical model and discusses the econometric techniques applied, while Section 5 presents the results and concludes.

2. Related Literature

A large body of literature discusses the channels through which spillovers flow from multinational enterprises to domestic firms. They can take place through input-output linkages between domestic and foreign firms (Hirschman, 1958; Rodriguez-Clare, 1996). Nonetheless, the presence of MNEs can affect domestic productivity also through other indirect channels, such as competition, imitation and training (Mansfield and Romeo, 1980; Dunning, 1993; Blomstrom 1998; Fosfuri, Motta and Ronde, 2001). Moving from this theoretical framework, many studies have investigated the impact of foreign MNEs on productivity of domestic firms. While the first attempts in the literature investigated the impact of MNEs on industry level data, it is now increasingly common to inspect this mechanism at the firm level. A large body of literature has investigated the presence of horizontal or vertical spillovers between multinational and domestic firms in manufacturing sectors. Nonetheless, the effect of the entry of MNEs in service sectors has not been investigated with the same emphasis. The first empirical study we are aware of is Arnold, Smarzynska Javorcik and Matoo (2006), where they analyse the productivity effects of service liberalization and MNEs' entry in services upon domestic manufacturing firms. Using firm-level data from the Czech Republic, they show a positive relationship between services sector reform and the performance of domestic firms in downstream manufacturing sectors. They find that allowing foreign MNEs in services sectors may be the key channel through which services liberalization contributes to improved performance of downstream manufacturing sectors. They thus derive the policy implication that reforms of the barriers to foreign investment in service sectors are needed.

The aim of the present analysis is to contribute to this field of literature, by investigating and empirically testing the impact that the entry of foreign MNEs in service sectors has on local manufacturing firms' productivity.

3. The empirical investigation

3.1. Data

The data employed in the econometric analysis come from two different sources. Balance sheet data, necessary to construct a measure of total factor productivity, are derived from AIDA database, that is maintained by Bureau van Dijk Electronic Publishing (BvDEP). We obtain annual information on 79752 manufacturing firms located in Italy for the period 1999-2005.[1]

Data on foreign MNEs in services come from the database REPRINT, that has been developed by Politecnico di Milano and ICE. This database collects information on almost 2000 foreign MNEs, as in 2005 (See Mariotti and Mutinelli, 2007). Specifically, the database provides a census of the foreign MNEs' subsidiaries in service sectors, and can be classified into five broad macro-sectors: construction; ICTs (including postal services, information and telecommunications); logistics (referring to land, sea, air transport and auxiliary services); consultancy (corresponding mainly to R&D and professional activities), and finally, energy (including electricity and water management). The variables considered refer to the number of subsidiaries owned by foreign MNEs cumulated in the period ($MNEserv_{s,t}$). Additionally, as we also aim to investigate the localised nature of spillovers induced by foreign MNEs, we consider their presence in the same region and province where the domestic firm is located ($MNEserv_{s,r,t}$ and $MNEserv_{s,p,t}$). The rationale is that whenever spillovers present a highly localised nature, their impact is stronger on the local companies that are geographically closer.

3.2. The model and the variables

As a first step, we have to obtain a measure of firm's total factor productivity. Following the existing empirical literature, we assume a two factor Cobb-Douglas production function. Therefore, taking logarithms we have:

$$\ln Y_{it} = \alpha_0 + \alpha_l \ln L_{it} + \alpha_k \ln K_{it} + \omega_{it} + \eta_{it} \qquad (1)$$

where Y_{it} is output, L_{it} is labour, and K_{it} is capital for firm *i* observed at time (year) *t*. ω_{it} represents the (unobserved) productivity level and η_{it} is either a measurement error or an unobserved productivity shock (idiosyncratic shock). Olley and Pakes (1996) have demonstrated that OLS estimates are biased. This is due to the endogeneity of input choices, which are determined, at least in part, by the firm's beliefs on ω_{it}. This implies a correlation between inputs and the error term, which biases OLS coefficient estimates. Their solution to this problem is a semi-parametric technique that uses firm's investment decisions as a proxy for unobserved productivity shock. Alternatively, one can apply Levinsohn and Petrin methodology (2003), which refines Olley and Pakes (1996) by suggesting that material inputs may be a better proxy for the firm's reaction to productivity shocks.[2]

We expect that labour and capital intensities will be different across sectors, therefore, in order to allow for different elasticities, we apply the LP methodology on a sectoral base.[3] In this way, we obtain coefficients for capital and labour elasticities which are sector *j* specific. We fit equation (1) and construct the residuals, which are the logarithm of the estimated firm level TFP:

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[1] It might be worth noting that we do not distinguish between domestic and foreign manufacturing firms, as we are interested in the impact that the entry of foreign MNEs in services has on the whole local manufacturing sector. However, as we are considering only vertical spillovers from services to manufacturing, we are not incurring any endogeneity problem: multinationals in services do not appear on the left hand side of our regression.

[2] We implement the LP method in Stata 9.2 using the levpet routine available on the Stata website. For further information on this command see Petrin, Poi, Levinsohn (2004).

[3] Due to data constraint, we had to aggregate the 23 two digit manufacturing classes into 20.

$$\ln TFP_{it} = \ln Y_{it} - \alpha_{lj} \ln L_{it} - \alpha_{kj} \ln K_{it} \qquad (2)$$

Specifically, our data allow us to produce an estimate of total factor productivity (TFP).[4] We can classify our firms at NACE 4-digits level of disaggregation. Although we choose to apply the LP methodology on a 2-digit NACE classification,[5] nonetheless, some sectors needed further aggregation due to their small number of firms[6]. Table 1 reports coefficient estimates for capital and labour. Table 2 reports some descriptive statistics for TFP indexes by industry. We observe that the standard deviation for TFP index is always lower than 1% in the aggregated sectors. This suggests that we are aggregating firms which actually share similar production functions. Looking at the estimated TFP index over the period, we observe a decline in TFP levels, especially in the period 2001-2004. This result is coherent with findings by Altomonte, Barattieri e Rungi (2008) and 2006 OECD Factbook.

Our dependent variable will be regressed on a number of indicators of the entry of foreign MNEs in upstream service sectors.

The presence of foreign MNEs in each sector *s*, at time *t* has been proxied by the total number of foreign units set up over the period considered. Additionally, in order to take into account sectoral interdependencies, we weighted the presence of foreign MNEs with the technical coefficients for upstream industries that can be derived for each manufacturing sector *j* from input-output tables.[7]

Therefore, the proxy for the foreign MNEs-induced spillovers is the following:

$$MNEserv_{s,t} = \alpha_{s,j} \cdot local\_units_{s,t} \qquad (3)$$

Additionally, as we also aim at investigating the localised nature of spillovers stemming from foreign MNEs, the measure of the presence of foreign MNEs in service sector has been also calculated both at the region *r* and province *p* at time *t*.

It is worth observing here that, while the technical coefficients $\alpha_{s,j}$ from the input-output table are fixed over time in our analysis, the number of foreign firms operating in each sector changes. Thus, the variables capturing downstream linkages are time-varying sector-specific variables. Specifically, $MNEserv_{s,t}$ measures spillovers to firms in sector *j* induced by foreign MNEs in services; $MNEserv_{s,r,t}$ and $MNEserv_{s,p,t}$ measure spillovers to firms in sector j from foreign MNEs localised in the same region (NUTS 2) or province (NUTS 3).

We have information on five different service sectors: construction, energy, logistics, ICTs and consultancy. Therefore, in order to identify the impact that the entry of foreign multinational firms in service sectors has on the productivity of manufacturing firms, we refer to the following specification:

$$\Delta TFP_{it} = \alpha_0 + \beta \cdot \Delta MNEserv_{tot,t-1} + \gamma \cdot markup_{i,t} + \delta \cdot W_i + \phi \cdot Z_t + \eta_{i,t} \qquad (6)$$

There is a number of unobservable firm-, sector-, region- and time-specific factors that could affect the correlation between firm productivity and foreign presence in services. Typical examples are the quality of the management, or the infrastructure endowment of the region in which the firm is located. The standard solution to this problem (see Haskel et al. (2002) or Smarzinska (2004)) is to adopt time differencing plus a set of time- industry- and region-dummies. Alternatively, one could include a set of time-dummies and firm fixed effects. We follow this second option as the latter incorporate all sector and location dummies, but additionally allow to take into account each firm specific characteristic that does not change over time,

[4] See next Section for the methodology applied to estimate TFP. See Appendix for details on data employed in TFP estimation.

[5] See Appendix for the full list of manufacturing industries included in the analysis.

[6] Namely, we choose to aggregate food and tobacco industries (15 and 16), paper products and printing and publishing (21 and 22) and manufacturing n.e.c. and recycling (36 and 37). This is not a strong assumption, as the NACE classification itself suggests these aggregations.

[7] We use Input-Output table for 2001.

but may affect TFP[8]. Time dummies are included to control for any time-varying external factor that could affect productivity (e.g. technological changes or business cycle).
Finally, to control for the degree of competition, which may in turn affect firm's productivity we include a proxy for firm's markup, computed as operational turnover minus employment and material costs over operational turnover. This variable is time-varying firm-specific and is therefore not absorbed by firm fixed effects.

4. Results and Conclusions

As a first step in our analysis, we regress TFP variation on the lagged value of overall spillovers stemming from the entry of foreign MNEs in services. We estimate a fixed effects model with firm effects and time dummies. As reported in Table 3, Hausman test suggests that fixed effects should be preferred. We find that the coefficient for the overall spillover variable is positive and significant. Thus, we can affirm that the overall impact of MNEs entry in service sectors on manufacturing firms' productivity is positive and statistically significant. Isolating the different service sectors we observe that they all positively affect the productivity of domestic manufacturing firms. Column (7) shows the impact of the different services when all the variables are included in the analysis. Results are not robust, but the VIF (Variance Inflation Factors) suggests that there is mild collinearity between them.
In order to inspect if the entry of foreign MNEs in service sectors has a different impact for different types of manufacturing firms, we repeat the same exercise on different subsamples of firms. Namely, we distinguish manufacturing firms between high- and low- technology sectors.[9] Results in reported Table 4 and 5 suggest that spillovers are indeed differentiated according to the type of manufacturing firm. Interestingly, we observe that logistics has no longer a significant impact on productivity when considering high-technology firms.
Finally, we test whether spillovers from foreign MNEs are localized, by using the variables computed at the region (NUTS2) and provice (NUTS3) level (results are reported in Table 6 and 7, respectively). Results are generally stable across different specifications. Looking at the magnitude of the coefficients, we observe that they increase moving from the national to the regional and provincial level in the case of logistics and consultancy, thus revealing their highly localised nature. In other words, manufacturing firms reap more gain when there is physical proximity with foreign MNEs. Instead, the behaviour seems to be different when considering foreign MNEs in ICTs, i.e. coefficients are higher for the specification at the national level, while the impact on productivity of domestic manufacturing firms decreases when considering the entry of foreign MNEs in each province or region.

[8] We would *a priori* choose Fixed Effect estimator, as, unlike Random Effect estimator, it does not require orthogonality between the other regressors and the individual effects. Moreover, the choice of Fixed Effects is supported by Hausman test.

[9] See Appendix for the complete classification

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Table 1: Labour and Capital Elasticities Estimates

Sector$_j$	Labour Coefficient (α_l)	Capital Coefficient (α_k)
15-16	0.2948***	0.1432***
17	0.2646***	0.2646***
18	0.2291***	0.1803***
19	0.2797***	0.1324***
20	0.3690***	0.1081***
21-22	0.4152***	-0.0508***
23	0.331***	0.0587
24	0.3667***	0.0913***
25	0.3806***	0.1432***
26	0.3623***	0.1471***
27	0.4199***	0.1605***
28	0.3806***	0.1117***
29	0.2833***	0.1613***
30	0.3758***	0.1245***
31	0.3424***	0.1104***
32	0.2741***	0.1602***
33	0.3307***	0.148***
34	0.354***	0.2966***
35	0.3532***	0.2019***
36-37	0.3291***	0.1001***

Table 2: Summary statistics for TFP index by industry

Sector	Mean	Standard Deviation	Number of Observations	Minimum	Maxiumun
15-16	4.14	0.006	30694	-6.29	10.05
17	4.02	0.006	22999	-5.66	8.75
18	4.74	0.009	13736	-5.18	8.97
19	4.51	0.008	13921	-2.44	8.77
20	3.67	0.009	9610	-5.34	7.63
21-22	4.73	0.006	24342	-4.13	10.12
23	4.80	0.038	1273	-0.39	9.53
24	4.45	0.008	15355	-2.35	13.03
25	3.61	0.005	19697	-5.40	8.69
26	3.69	0.006	21020	-5.93	8.71
27	3.33	0.009	8947	-5.30	8.26
28	3.68	0.003	65144	-6.64	11.71
29	4.23	0.003	53242	-7.09	12.34
30	3.89	0.020	2602	-6.58	9.81
31	4.10	0.007	16489	-4.84	9.41
32	4.39	0.014	5383	-1.42	9.74
33	4.04	0.009	9252	-3.62	7.46
34	2.93	0.013	5354	-4.37	12.18
35	3.69	0.017	4601	-5.95	9.21
36-37	4.19	0.005	29029	-5.92	9.21

Figure 1: TFP index (mean) over the period 1999-2005

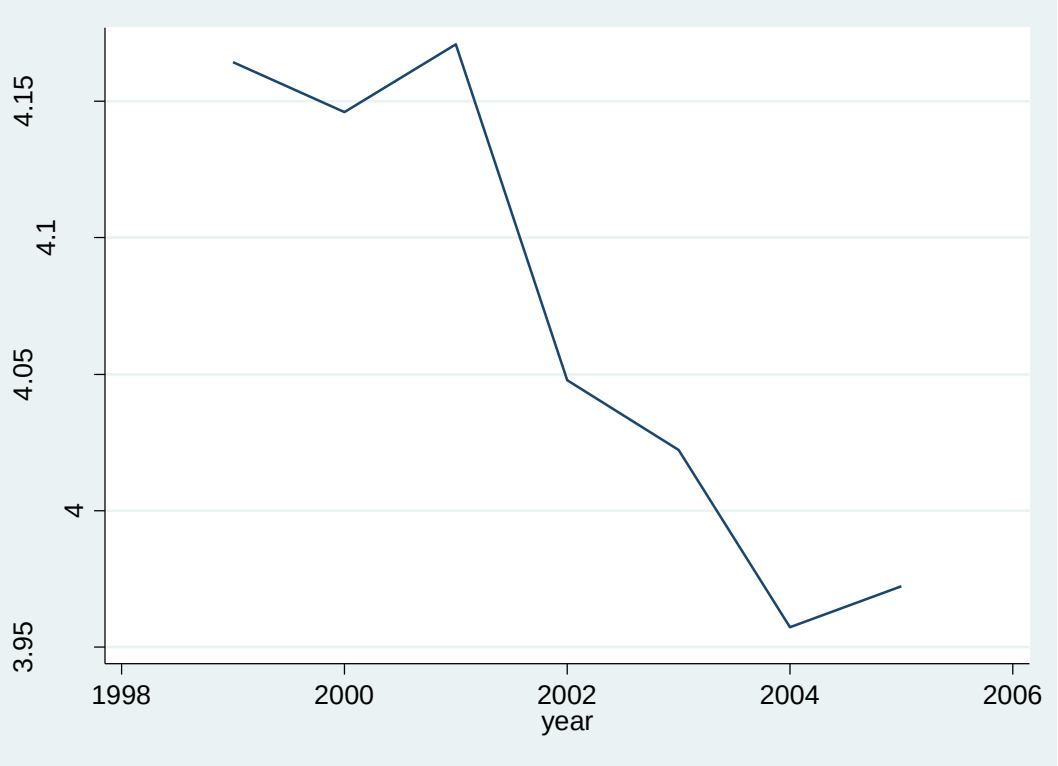

Table 3: Impact of MNEs on overall sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$\Delta\alpha MNE_{total}$	0.002***						
	(0.001)						
$\Delta\alpha MNE_{construction}$		0.001***					0.002***
		(0.001)					(0.001)
$\Delta\alpha MNE_{energy}$			0.024***				0.015***
			(0.005)				(0.005)
$\Delta\alpha MNE_{ICT}$				0.037***			0.021***
				(0.004)			(0.005)
$\Delta\alpha MNE_{Logistics}$					0.001***		-0.004
					(0.001)		(0.001)
$\Delta\alpha MNE_{consultancy}$						0.011***	0.009***
						(0.001)	(0.001)
Markup	0.011***	0.011***	0.011***	0.011***	0.011***	0.011***	0.010***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Constant	0.859***	0.349***	1.036***	0.861***	0.882***	1.023***	0.984***
	(0.008)	(0.001)	(0.010)	(0.007)	(0.008)	(0.007)	(0.011)
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Obs.	295219	295219	295219	295219	295219	295219	295219
Hausman test	45113.58	60983.30	58188.81	412006.77	46984.08	59722.51	60869.79
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
R-squared	0.10	0.10	0.10	0.10	0.10	0.10	0.10

Notes: Panel estimates with firm fixed effects. Robust standard errors in parentheses. * significant at 1%; ** significant at 5%; *** significant at 1%

Table 4: Impact of MNEs on high-technology manufacturing firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$\Delta\alpha MNE_{total}$	0.001***						
	(0.001)						
$\Delta\alpha MNE_{construction}$		0.125***					0.005
		(0.002)					(0.026)
$\Delta\alpha MNE_{energy}$			0.057***				0.046***
			(0.012)				(0.015)
$\Delta\alpha MNE_{ICT}$				0.020***			0.013*
				(0.005)			(0.007)
$\Delta\alpha MNE_{Logistics}$					0.001		0.001
					(0.001)		(0.001)
$\Delta\alpha MNE_{consultancy}$						0.024***	0.012
						(0.007)	(0.014)
Markup	0.014***	0.014***	0.014***	0.014***	0.014***	0.014***	0.014***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Constant	0.847***	0.369***	0.531***	-0.071***	0.626***	0.379	0.371***
	(0.192)	(0.014)	(0.009)	(0.359)	(0.018)	(0.020)	(0.027)
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Obs.	86391	86391	86391	86391	86391	86391	86391
R-squared	0.10	0.10	0.10	0.10	0.10	0.10	0.10

Notes: Panel estimates with firm fixed effects. Robust standard errors in parentheses. * significant at 1%; ** significant at 5%; *** significant at 1%

Table 5: Impact of MNEs on low-technology manufacturing firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$\Delta\alpha MNE_{total}$	0.002***						
	(0.009)						
$\Delta\alpha MNE_{construction}$		0.001***					0.002***
		(0.001)					(0.001)
$\Delta\alpha MNE_{energy}$			0.015***				0.007
			(0.007)				(0.007)
$\Delta\alpha MNE_{ICT}$				0.081***			0.069***
				(0.009)			(0.012)
$\Delta\alpha MNE_{Logistics}$					0.001**		-0.001**
					(0.001)		(0.001)
$\Delta\alpha MNE_{consultancy}$						0.011***	0.004***
						(0.001)	(0.001)
Markup	0.009***	0.009***	0.009***	0.009***	0.009***	0.009***	0.009***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Constant	0.863***	0.358***	1.048***	0.854***	0.883***	0.374***	0.385***
	(0.009)	(0.007)	(0.010)	(0.008)	(0.009)	(0.006)	(0.008)
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Obs.	208809	208809	208809	208809	208809	208809	208809
R-squared	0.10	0.10	0.10	0.10	0.10	0.10	0.10

Notes: Panel estimates with firm fixed effects. Robust standard errors in parentheses. * significant at 1%; ** significant at 5%; *** significant at 1%

Table 6: Impact of MNEs at regional level

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$\Delta\alpha MNE_{total}$	0.010***						
	(0.001)						
$\Delta\alpha MNE_{construction}$		0.018***					0.021***
		(0.002)					(0.002)
$\Delta\alpha MNE_{energy}$			0.056***				0.028*
			(0.016)				(0.017)
$\Delta\alpha MNE_{ICT}$				0.031***			0.023***
				(0.006)			(0.008)
$\Delta\alpha MNE_{Logistics}$					0.005***		0.002
					(0.001)		(0.001)
$\Delta\alpha MNE_{consultancy}$						0.030***	0.024***
						(0.006)	(0.007)
Markup	0.010***	0.010***	0.010***	0.010***	0.010***	0.010***	0.010***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Constant	0.867***	1.057***	0.894***	0.882***	0.879***	0.886***	0.884***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)	(0.007)	(0.008)
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Obs.	295219	295219	295219	295219	295219	295219	295219
R-squared	0.10	0.10	0.10	0.10	0.10	0.10	0.10

Notes: Panel estimates with firm fixed effects. Robust standard errors in parentheses. * significant at 1%; ** significant at 5%; *** significant at 1%

Table 7: Impact of MNEs at provincial level

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$\Delta\alpha MNE_{total}$	0.010***						
	(0.002)						
$\Delta\alpha MNE_{construction}$		0.001					0.015***
		(0.004)					(0.005)
$\Delta\alpha MNE_{energy}$			-0.298***				-0.032***
			(0.053)				(0.061)
$\Delta\alpha MNE_{ICT}$				0.027***			0.019***
				(0.006)			(0.007)
$\Delta\alpha MNE_{Logistics}$					0.012***		-0.005
					(0.004)		(0.005)
$\Delta\alpha MNE_{consultancy}$						0.035***	0.024**
						(0.010)	(0.012)
Markup	0.010***	0.010***	0.010***	0.010***	0.010***	0.010***	0.010***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Constant	0.885***	0.893***	0.886***	0.884***	0.884***	0.889***	0.885***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.006)	(0.007)
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Obs.	295219	295219	295219	295219	295219	295219	295219
R-squared	0.10	0.10	0.10	0.10	0.10	0.10	0.10

Notes: Panel estimates with firm fixed effects. Robust standard errors in parentheses. * significant at 1%; ** significant at 5%; *** significant at 1%

Appendix

Variables Definition

Value added (Y): turnover minus costs for materials, labour and services, deflated with the corresponding two-digit producer price index.
Labour (L): labour costs from balance sheet deflated with GDP deflator.
Fixed Capital (K): book value of total fixed material immobilizations deflated with the corresponding two-digit producer price index.
Intermediate good (M): cost for materials, deflated with the corresponding price index.

Manufacturing industries included in the analysis

Food products and beverages (15); Tobacco products (16); Textiles (17); Wearing apparel; dressing and dyeing of fur (18); Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear (19); Wood and products of wood and cork, except furniture; articles of straw and plaiting materials (20); Pulp, paper and paper products (21); Publishing, printing and reproduction of recorded media (22); Coke, refined petroleum products and nuclear fuel (23); Chemicals and chemical products (24); Rubber and plastic products (25); Other non-metallic mineral products (26); Basic metals (27); Fabricated metal products, except machinery and equipment (28); Machinery and equipment n.e.c. (29); Office machinery and computers (30); Electrical machinery and apparatus n.e.c. (31); Radio, television and communication equipment and apparatus (32); Medical, precision and optical instruments, watches and clocks (33); Motor vehicles, trailers and semi-trailers (34); Other transportation (35); Manufacture of furniture; manufacturing n.e.c. (36); Recycling (37).

Classification of Manufacturing Industries according to Technological Level (NACE codes in parentheses)

High-Technology Industries	Low-Technology industry
Aircrafts and Spacecrafts (353)	Building and repair of ships and boats (351)
Office, accounting and computing machinery (30)	Rubber and plastic products (25)
Radio, TV and communications equipment (32)	Coke, refined petroleum products and nuclear fuel(23)
Medical, precision and optical instruments (33)	Other non-metallic mineral products (26)
Electrical machinery and apparatus n.e.c. (31)	Basic metals and fabricated metal products (27-28)
Motor Vehicles, trailers and semi-trailers (34)	Manufacturing n.e.c., recycling (36-37)
Chemicals (excluding pharmaceuticals) (24)	Wood, pulp, paper prod., printing and publishing (20-22)
Railroad and transport equipment (352, 353, 354)	Food products, beverages and tobacco (15-16)
Machinery and equipments n.e.c. (29)	Textiles, textile products, leather and footwear (17-19)