The Effects of FDI on Corporate Geography

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Abstract

This paper contributes to the empirical literature on the home-country effects of FDI. Instead of comparing FDI firms to non-FDI firms, we look at what happens within FDI firms, focusing on multi-plant firms and comparing headquarters to non-headquarters plants belonging to the same firm. Using firm-level data on Italian industrial firms we find that the latter show a significantly worse performance in terms of employment and investment than the former, among FDI firms. This suggests that the effects of FDI tend to be biased in favour of the headquarters of investing firms within the home-country.

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JEL classification: F20, F23, R30.

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1 Introduction and related literature

The issue of the home-country effects of foreign direct investment (FDI) has attracted extensive attention in recent years, leading to heated debates in the media and in policy circles as well as to increasing academic work. Ideally, one would like to compare the performance of an investing firm after the investment to the performance of the same firm, had it not invested abroad. As the latter is clearly unobservable, the literature has relied on matching and difference-in-difference techniques in order to identify a control group of "similar" firms which have not invested abroad (Egger and Pfaffermayr 2003, Barba Navaretti and Castellani 2004, Barba Navaretti, Castellani and Disdier 2006, Debaere, Lee and Lee 2006). While this approach deals, to a certain extent, with the self-selection bias, it has nonetheless significant drawbacks. First, even if the two groups of firms are found to be similar ex ante, they might show different trends over time, thus invalidating the inference that can be drawn from their comparison. Second, finding a good matching to the largest firms in a given country (e.g. Fiat in Italy) is very hard, if not outright impossible. These firms are therefore usually dropped from the analysis, although their size makes them very likely to carry a potentially large impact on the home country.

This paper takes a different strategy, changing the research question in one crucial dimension. Instead of asking the extremely challenging (and perhaps impossible to answer) question: "What is the effect of FDI on the investing firm, relatively to a possibly identical non-investing firm?", we ask a different question: "What is the effect of FDI on a subset of the investing firm, relatively to the other subsets of the same investing firm?". Multi-plant firms provide a suitable setting for such an analysis. Subsets are plants owned by the same multi-plant firm but located in different geographical areas within the home country. Specifically, we compare the employment and investment performance in the headquarters or in plants located near the headquarters ("headquarters area") versus the corresponding performance in plants located far from the headquarters ("non-headquarters area"). By looking at what happens within the investing firm, one gets rid of the self-selection issue which plagues the existing literature. Plants belonging to the same firm are, by definition,

"exposed" to exactly the same FDI "treatment"; they are also affected by the same firm-specific shocks.

This novel research question is - in our opinion - very relevant under several respects. First, multi-plant firms are not an exception but rather a very common feature of industrial economies. For instance, in the United States multi-plant firms account for 78 per cent of the manufacturing employment and 88 per cent of the output (Bernard and Jensen 2007). Second, there are several reasons to expect differential effects of FDI on headquarters versus the non-headquarters domestic plants. "Horizontal" FDI may increase the need for management and coordination of foreign activities, which are typically carried out in the headquarters. "Vertical" FDI may bring about a specialisation in skill-intensive activities, such as R&D, product innovation and marketing, which are also often undertaken in the headquarters. Third, the distribution of plants owned by firms with headquarters in a different area is far from geographically uniform. For example, the South of Italy hosts a disproportionately higher number of plants owned by firms headquartered in the Central and Northern areas. This feature, coupled with increasing FDI by the latter during the last decade, has indeed already led to concerns about Mezzogiorno's "dependence on external decision centres", which may "translate into a vulnerability if there are shifts in the localisation advantages" (Svimez 2006, p. 51; our translation), i.e. if lower transport costs and better institutions make it more convenient to organize production in foreign countries. By affecting corporate geography, FDI may therefore affect as well the overall geography of economic activity in the home country.

Figure 1 provides a first illustration - based on a sample of Italian industrial FDI firms - of how different employment trends were in the period 2001-06 between headquarters (HQ) and non-headquarters (NOHQ) plants. While employment in the former remained roughly stable, employment in the latter recorded a steep decrease: starting at a slightly higher employment level in 2001, it ended up in 2006 being 10 per cent lower. Figure 2 shows that a similar pattern, although less pronounced, holds for investments as well. These outcomes were not driven by economy-wide factors: in the group of non-FDI firms non-headquarters employment did not fall over the same period, increasing even faster than

headquarters employment. While the trend depicted in figures 1 and 2 could be driven by many other factors, our formal econometric exercise will show that it is robust to the inclusion of several firm and industry characteristics.

Our paper is related to several branches in the literature. The approach based on the application of matching and difference-in-difference methods to assess the effects of FDI on the investing firm has already been mentioned. An alternative approach estimates labour demand functions for the multinational company in the home country and for its foreign affiliates (Brainard and Riker 1997a, 1997b, Braconier and Ekholm 2000). Cross-wage elasticities then indicate the effect of wage changes in a foreign location on the demand for labour in the domestic country or in another foreign location. This literature too, unlike our paper, treats each firm's activity in the home country as a whole, without investigating the rich dynamics within the domestic plants of a multi-plant firm. Our paper is also related to the recent work carried out by Bernard and Jensen (2007). They compare the likelihood of plant closure between single-plant, multi-plant and multinational firms. They find that plants owned by multinational firms are unconditionally less likely to close. However, if one controls for plant and industry characteristics, the opposite result is observed: multinational firms are actually more, and not less, likely to shut down a domestic plant. Multinational firms seem therefore to have greater flexibility in labour market adjustments than non-multinational firms. Our paper adds a further perspective to this issue, by showing that multinational firms have different employment trends, between headquarters and non-headquarters areas, relatively to non-multinational firms. Finally, our paper can be put in connection with recent empirical evidence for the US showing that layoffs and divestitures are more likely to happen, or happen earlier, in divisions further from headquarters (Landier, Nair and Wulf 2009); that paper digs deeper into the mechanisms behind these trends, and finds that they could be due either to information or social factors.

The rest of the paper is organised as follows. Section 2 presents data and the econometric methodology, while the empirical results are reported in Section 3. Section 4 concludes.

2 Data and methodology

Our investigation is based on data drawn from the Bank of Italy's Survey of industrial firms (INVIND; Banca d'Italia 2007), which is run annually from the early '80s on a representative sample of Italian firms. The Survey represents one of the richest sources of information at firm level for Italy, and its use is today quite widespread in the literature (Banca d'Italia 2008).

The sample is composed of firms in the industrial sector net of construction (corresponding to sections C, D and E in the NACE classification) with at least 50 employees, who were interviewed in 2006 and, crucially, who replied to a set of questions on their international activity: "In 2000-2006 did you produce goods and services abroad? (through ownership/control of foreign firms, ownership of local production units without separate legal status)". We also exploit data on the distribution of the workforce and of total fixed investments by geographical area within the home country[1] and information on the place where the headquarter is located. To give a concrete example, the firm "CFZ & Co." is headquartered in the North-West of Italy, with 30 per cent of its total employment in that area; it is also active in the other three geographical areas (North-East, Centre, South) with respectively 22, 43 and 5 per cent of employment.

Data referred to 2006 have been linked to previous surveys for the period 2001-06. We end up with an unbalanced panel of 1,446 firms, accounting for more than 600 thousands employees (table 1); among these firms, 250 have direct investments abroad and 305 have plants in more than one geographical area. This translates into a number of 1,928 firms-areas, including 1,141 single area firms. While the share of multi-area firms is not very high - slightly more than fifth - it doubles when one looks at the number of plants and triples when the number of employees is considered.

Based on the 2001 Census, our sample represents the 12 per cent of the total workforce in the industrial sector (net of construction; table 2). As from Invind we use information on firms with at least 50 employees only, our sample is held to be more representative of

[1] Four geographical areas of Italy: North-West, North-East, Centre, South.

firms of biggest size and of multi-localised firms (Banca d'Italia 2008). The breakdown by geographical area shows that the degree of coverage is higher in the South of Italy.

As anticipated in the introduction, many contributions in the literature dealt with the assessment of the effects of FDI on either domestic employment or investments (or both). Results from these contributions usually suffer from a selection bias as firms investing abroad are likely to be "special" in many regards - as a whole we can say that they are usually those best performing - and hence cannot be fairly compared with those non investing abroad. Here instead we want to assess whether in multi-plant firms the event of investing abroad translates into different behaviours in terms of investing or hiring/firing personnel in NOHQ branches if compared to HQ plants. In this regard the comparison is within firm but across plants.

Our preferred specification is a panel regression where the dependent variable is given by the annual variations of either employment or investments in plants located in each macro-area for every multi-plant firm which is localised in more than one geographical area within the country (henceforth multi-area firm) over the period 2001-06. The specification proposed is the following:

$$\Delta y_{i,j,t} = b_0 + b_1 NOHQ_{i,j} + b_2 FDI_{i,j} + b_3 NOHQ_{i,j} * FDI_{i,j} + b_4 GROUP_{i,j,t} + b_z Z_{i,j,t} + \epsilon_{i,j,t} \quad (1)$$

where i indicates the firm, j the geographical area and t the year. $nohq$ is a dummy, equal to one if the plant is not the headquarter of the firm; fdi is a dummy equal to one if the firm invests abroad; $nohq * fdi$ is the interaction between fdi and $nohq$. Therefore, since we are mainly interested in evaluating the employment and investment performance of non-headquarter plants relatively to the headquarter plants in case of FDI firms, we compare the two groups $NOHQ = 1$ and $FDI = 1$ versus $NOHQ = 0$ and $FDI = 1$. Our coefficient of interest is hence the sum of b1 and b3.[2] Moreover, we included in

[2]Substituting for each of the two groups their respective dummy values, 0 or 1, we have that for the group FDI = 1 and NOHQ = 1, it holds $b0 + b1 + b2 + b3$; for the group FDI = 1 and NOHQ = 0, it holds $b0 + 0 + b2 + 0$. Thus, if we want to measure, among the FDI firms, the differential effect on non-headquarters versus headquarters we should look at the algebraic difference between the two expressions, and thus to b1 + b3.

the regressions a dummy group indicating if the firm belongs to a group. Finally the vector contains additional controls included on the right-hand side. In particular, we controlled for different cases of mergers and acquisition events, for the lagged value of the dependent variable and for the sets of area, industry and time dummies to take into account unobserved area, sector and time specific heterogeneity.

The variation in the dependent variable has been built both on levels and on log-levels. In the former case this allows to account also for modifications of employment and investments at the extensive margins, markedly not excluding cases of opening and closures of all plants in a given area.

As we aim at estimating a coefficient which is representative of a population effect we weight observations, in the logarithmic specification, by firm employment in the area. This also allows mitigating the effect of measurement errors (if any), which are likely to be negatively correlated with the size of the plant itself. All standard errors are clustered by firms to control for standard error bias with aggregate observations (Moulton 1990).

As a robustness check we controlled for several factors. We used a broader definition of "investing abroad" by including also firms declaring to have major technical collaboration agreements with foreign firms. Then, we estimated equation (1) both on the sub-sample of multi-plant firms and on the whole sample, in this second case to gain precision in the estimates of the variables referred to the firm as a whole. Finally, we controlled for the share of skilled workers, the expenditure in R&D as a percentage of firm turnover, the growth rate of salaries and wages. In fact, survey data indicate that firms producing abroad often experience a workforce recomposition towards jobs characterized by a higher skill content (Istat 2008). We hence include these controls to assess whether there is a "genuine" NOHQ effect going beyond the issue of skill recomposition.

3 Results

Table 5 presents the results of a set of regressions run to evaluate the effect of FDI on employment in non-headquarter plants, contrasted with headquarter plants. Columns

(1)-(2) report the specification where the annual variation of employment is measured in logs, columns (3) and (4) in levels. In the former case the dependent variable does not include the changes of employment at the extensive margin, i.e. the shift to zero (or from zero to a positive value) of employment, due to closures or openings of all plants in a given geographical area. A list of our dependent and main explanatory variables with corresponding summary statistics is reported in table 3.

Generally, the signs of coefficients seem to be robust across the different specifications. The coefficient on the variable *fdi* is always positive, although not always statistically significant, while the coefficients on the variables *nohq* (dummy for non-headquarter plants), and *nohq*fdi* (the interaction variable), are always negative. As happens with interactions between dummies, their interpretation is not immediately straightforward. We are mainly interested in the employment performance of non-headquarter plants, relatively to headquarter plants, among FDI firms. Therefore, we should consider the sum of the coefficients on variables *nohq* and *nohq*fdi*, which turns out to be negative and jointly significant in all specifications, as shown by the corresponding F-tests. This suggests that the annual employment growth rate is significantly weaker in non-headquarter plants than in headquarter plants, among FDI firms.

The estimated effect seems to be quantitatively relevant. According to the specification in log-levels (column 1), the sum of the coefficient for the interaction term *nohq*fdi* (-0.018) and the coefficient for the base effect *nohq* (-0.027) yields -0.045. This means that among FDI firms the employment growth rate in non-headquarter plants is on average 4.5 percentage points lower than in the headquarter plants of the same firm every year. The effect is also relevant on an aggregate level since multi-area FDI firms account for more than one third of total employment in our sample.

One could suppose that in the case of non-headquarters plants the presence of foreign investments diminishes employment as the low-skill labour activities shift towards low-cost labour countries. In the case of headquarters, it has a positive effect on employment, because of the increased need for coordination and management activities due to the delocalisation abroad or the increased specialisation in headquarter activities such as R&D

and marketing.

These results turn out to be robust to different definitions of "investing abroad". Column (2) shows results when we redefine the dummy variable *fdi* creating a new variable *broad fdi* which includes also firms declaring to have major technical collaboration agreements with foreign firms. The interaction term *nohq*fdi* is consistently calculated. This change does not alter the results relative to column (1) much, except for raising the coefficient on the interaction variable.

Moving to the specification in levels, which takes into account the variations in employment including those due to firms' openings and closures of all plants in a given area [column (3)], does not change the signs of the estimates. However, the level of significance is strongly increased. Both the coefficients on the dummy relative to the non-headquarter status and on the variable capturing the interaction term are negative and significant at the 5 per cent significance level. The joint significance of the two variables is confirmed by the F-statistics. Therefore, if the variation of employment at the extensive margin is taken into account, the employment loss among the multi-area non-headquarter plants with foreign investments amounts to 41 units (relatively to headquarter plants in the same firm). As average employment for multi-area plant firms with foreign investments in our sample is equal to about 967 units, we get a result of the same order of magnitude of that from the specification in logarithms.

Table 6 presents results for the same set of regressions estimated in the previous table except that now we consider investment variations, in log-levels and in levels, as dependent variables. The sign of the coefficients on our dummy variables confirms the results obtained for employment, although they are not statistically significant in the level specification. Foreign investments are associated to a higher reduction in investments for non-headquarter plants but the negative interaction term *nohq*fdi*, measuring the differential among the non-headquarters between FDI and non-FDI firms, is small relative to that for the coefficient for the *nohq* dummy and not significant. This points to a more general negative trend of investment in non-headquarter plants, which does not seem to be specifically related to FDI.

As a robustness check we run the same regressions for the whole sample, i.e. including in the sample both the plants of multi-area firms and the plants of single-area firms. On the one hand, the coefficients on the industry and area dummies might be estimated with more precision. On the other hand, we might introduce a bias as the units of observation are now less homogeneous.[3] The results, presented in tables 7 and 8, do not change much with respect to the ones based on our baseline multi-area specification. The influence of foreign direct investments on the employment growth in non-headquarter plants does not change when we employ the full sample data. The negative influence of FDI for the non-headquarter plants continues to be strong whereas the *fdi* variable continues to have a positive and significant sign.

Furthermore, for multi-area firms only we switched from a specification for the growth rate of employment to a specification for the (log)level of employment. Variables on the right-hand-side have been chosen as in (1), including a lagged value of the dependent variable. This model has been estimated, apart from OLS, according to three alternative techniques: we have in turn either introduced random effects at firm-area level or fixed effects at firm-level (only for firms producing abroad), or implemented a system-GMM estimation, where the instrument for the equation in first-differences is the lagged level of the dependent variable dated *t-2* and the instrument for the equation in levels is the lagged first-differences of the dependent variable. Our results are broadly confirmed (table 9). The sum of the coefficients on variables *nohq* and *nohq*fdi* turns out to be always negative and significantly different from zero. Among FDI firms, employment in NOHQ plants is on average between 8 and 22 per cent lower in the four specifications. Caveats are needed for the GMM estimation as it passes only the Hansen test of overidentifying restrictions.

As variables accounting for skill composition emerged as not significant, this suggests that a "genuine" NOHQ effect is at work, not entirely overlapping with the workforce recomposition of the exporting firms towards positions with a higher skill content.

[3]Summary statistics for the whole sample are reported in table 4

4 Concluding remarks

In this paper we quantify the home-country effects of FDI in multi-plant firms, focusing on the relative performance in the headquarters versus non-headquarters within the same firm. Using survey data on Italian industrial firms, we find that investing abroad has a negative effect on domestic employment in non-headquarters plants, relatively to headquarter plants. The annual employment growth rate in the former is about 4.5 percentage points lower than in the latter. The effect is even more statistically significant in specifications where the extensive margin (namely, the opening/closure of all plants in a given area) is taken into account. It is also larger if one looks at investments, although in this case it seems to be part of a more general - irrespective of FDI - negative trend in non-headquarter plants.

These findings could be well explained in the context of "horizontal" FDI as well as "vertical" FDI. Both models predict that headquarters activities would increase after FDI, relatively to non-headquarters activities, reflecting the need for management and coordination of foreign activities in the "horizontal" model and the specialisation in skill-intensive activities such as R&D, product innovation and marketing in the "vertical" one. More generally, they are consistent with available results in the literature showing that layoffs and divestitures are more likely or happen earlier in divisions further from headquarters.

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Appendix: tables and figures

Table 1: Sample firms' characteristics

Year 2006	Multi-area firms	of which: fdi	Single-area firms	of which: fdi	Total firms	of which: fdi
Firms	305	91	1,141	159	1,446	250
Firms-areas	787	246	1,141	159	1,928	405
Employment	364	219	241	67	605	287

Source and notes: authors' elaborations on Invind data. Units of firms and thousands of employees.

Table 2: Sample firms' representativeness

	Employees		
	Sample	**Population**	**% share**
North West	201,385	1,868,762	10.8
North East	148,871	1,447,941	10.3
Center	115,446	889,362	13.0
South and Islands	139,398	852,015	16.4
Italy	605,101	5,058,080	12.0

Source and notes: authors' elaborations on Invind and on 2001 Census data.

Table 3: Summary statistics in the multi-area firms

Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**N**
Employment	0.483	1.579	0.000	23.664	3281
Δ_{t-1} (Employment)	-0.006	0.179	-4.287	2.119	3281
log(Employment)	4.409	2.079	-2.313	10.072	3121
Δ_{t-1} log(Employment)	0.004	0.334	-3.714	4.424	2900
Investments	11.489	75.672	0.000	1737.06	3281
Δ_{t-1} (Investments)	-0.277	33.290	-613.930	1132.260	3281
log(Investments)	7.033	2.369	-0.868	14.368	2234
Δ_{t-1} log(Investments)	-0.026	0.964	-9.183	8.987	2093
Dummy variables					
nohq	0.640	0.480	0	1	3281
fdi	0.319	0.466	0	1	3281
broad fdi	0.379	0.485	0	1	3281
nohq*fdi	0.207	0.405	0	1	3281
nohq*broad fdi	0.244	0.429	0	1	3281
group	0.755	0.430	0	1	3281

Notes: employment is measured in thousands and investments in millions of euro.

Table 4: Summary statistics in the whole sample

Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**N**
Employment	341.174	1075.623	0.000	23664	7708
Δ_{t-1} (Employment)	-0.002	0.122	-4.287	2.119	7708
log (Employment)	4.758	1.51	-2.313	10.072	7548
Δ_{t-1} log(Employment)	0.005	0.242	-3.714	4.424	7327
Investments	6617	50682	0	1737060	7708
Δ_{t-1} (Investments)	-0.083	22.501	-613.930	1132.26	7708
log(Investments)	6.712	1.954	-0.868	14.368	6573
Δ_{t-1} log(Investments)	-0.046	1.044	-9.183	8.987	6380
Dummy variables					
nohq	0.274	0.446	0	1	7708
fdi	0.221	0.415	0	1	7708
broad fdi	0.283	0.45	0	1	7708
nohq*fdi	0.088	0.284	0	1	7708
nohq*broadfdi	0.104	0.305	0	1	7708
group	0.592	0.492	0	1	7708

Note: employment is measured in thousands and investments in millions of euro.

Table 5: Impact of FDI on employment at the area level in multi-area firms

Dependent variable:	Δ_{t-1} log(Employment)		Δ_{t-1} (Employment)	
	(1)	(2)	(3)	(4)
nohq	-.027	-.021	-.013**	-.013**
	(.025)	(.026)	(.005)	(.006)
fdi	.022	-	.027**	-
	(.016)		(.013)	
broad fdi	-	.022	-	.025**
		(.016)		(.010)
nohq*fdi	-.018	-.025	-.028**	-.024**
	(.029)	(.030)	(.013)	(.011)
group	.078***	.079***	.004	.004
	(.023)	(.024)	(.003)	(.003)
Tests of joint significance:				
nohq+nohq*fdi=0	$F(1,380) = 3.58$ p-value=0.06	$F(1,380) = 4.01$ p-value=0.05	$F(1,391) = 9.78$ p-value=0.00	$F(1,391) = 10.93$ p-value=0.00
Observations	2900	2900	3281	3281
R^2	.202	.202	.174	.174

Notes: (a) Employment is measured in thousands. (b) In columns (2) and (4) the interaction dummy *nohq*fdi* is calculated by using the *broad fdi* variable used in the same regressions. (c) All columns include year, industry and area fixed effects, the lagged value of the dependent variable, as well as a series of variables accounting for mergers and acquisition events. (d) In columns (1) and (2) the observations have been weighted by the average employment in each area-plant in years t and $t-1$.
Standard errors are adjusted for clustering at the firm level.
*** p<0.01, ** p<0.05, * p<0.1.

Table 6: Impact of FDI on investments at the area level in multi-area firms

Dependent variable:	Δ_{t-1} log(Investments)		Δ_{t-1} (Investments)	
	(1)	(2)	(3)	(4)
nohq	-.201***	-.203***	-1.614**	-1.708**
	(.068)	(.074)	(.632)	(.706)
fdi	.032	-	4.539	-
	(.079)		(4.557)	
broad fdi	-	.017	-	3.788
		(.077)		(3.731)
nohq*fdi	-.005	-.00005	-.819	-.354
	(.094)	(.095)	(2.060)	(1.525)
group	.252**	.256***	-.483	-.266
	(.099)	(.099)	(.595)	(.428)
Tests of joint significance:				
nohq+nohq*fdi=0	$F(1,376) = 14.29$ p-value=0.00	$F(1,376) = 16.1$ p-value=0.00	$F(1,390) = 0.95$ p-value=0.33	$F(1,390) = 1.06$ p-value=0.30
Observations	2073	2073	3261	3261
R^2	.155	.155	.103	.102

Notes: (a) Investments are measured in millions of euro. (b) In columns (2) and (4) the interaction dummy *nohq*fdi* is calculated by using the *broad fdi* variable used in the same regressions. (c) All columns include year, industry and area fixed effects, the lagged value of the dependent variable, as well as a series of variables accounting for mergers and acquisition events. (d) In columns (1) and (2) the observations have been weighted by the average employment in each area-plant in years t and $t-1$.
Standard errors are adjusted for clustering at the firm level.
*** p<0.01, ** p<0.05, * p<0.1.

Table 7: Impact of FDI on employment at the area level in the whole sample

Dependent variable:	Δ_{t-1} log(Employment)		Δ_{t-1} (Employment)	
	(1)	(2)	(3)	(4)
nohq	.017	.022	-.006**	-.006*
	(.017)	(.018)	(.003)	(.003)
fdi	.019*	-	.012**	-
	(.011)		(.005)	
broad fdi	-	.019**	-	.010***
		(.009)		(.004)
nohq*fdi	-.044*	-.047**	-.022***	-.018***
	(.024)	(.024)	(.008)	(.007)
group	.030***	.030***	.006***	.006***
	(.011)	(.011)	(.002)	(.002)
Tests of joint significance:				
nohq+nohq*fdi=0	$F(1, 1592) = 1.91$ p-value=0.17	$F(1, 1592) = 2.00$ p-value=0.16	$F(1, 1592) = 10.50$ p-value=0.00	$F(1, 1592) = 11.95$ p-value=0.00
Observations	7307	7307	7688	7688
R^2	.145	.146	.144	.144

Notes: (a) Employment is measured in thousands. (b) In columns (2) and (4) the interaction dummy *nohq*fdi* is calculated by using the *broad fdi* variable used in the same regressions. (c) All columns include year, industry and area fixed effects, the lagged value of the dependent variable, as well as a series of variables accounting for mergers and acquisition events. (d) In columns (1) and (2) the observations have been weighted by the average employment in each area-plant in years t and $t-1$.
Standard errors are adjusted for clustering at the firm level.
*** p<0.01, ** p<0.05, * p<0.1.

Table 8: Impact of FDI on investments at the area level in the whole sample

Dependent variable:	Δ_{t-1} log(Investments)		Δ_{t-1} (Investments)	
	(1)	(2)	(3)	(4)
nohq	.066	.080	-.193	-.196
	(.071)	(.080)	(.541)	(.610)
fdi	.090**	-	1.536	-
	(.043)		(1.412)	
broad fdi	-	.103**	-	1.295
		(.042)		(1.003)
nohq*fdi	-.206**	-.214**	-.330	-.210
	(.098)	(.102)	(.885)	(.911)
group	.199***	.197***	.506**	.542**
	(.034)	(.034)	(.213)	(.245)
Tests of joint significance:				
nohq+nohq*fdi=0	$F(1, 1567) = 6.50$ p-value=0.10	$F(1, 1567) = 6.85$ p-value=0.00	$F(1, 1592) = 0.93$ p-value=0.33	$F(1, 1592) = 0.85$ p-value=0.36
Observations	6360	6360	7688	7688
R^2	.103	.104	.077	.077

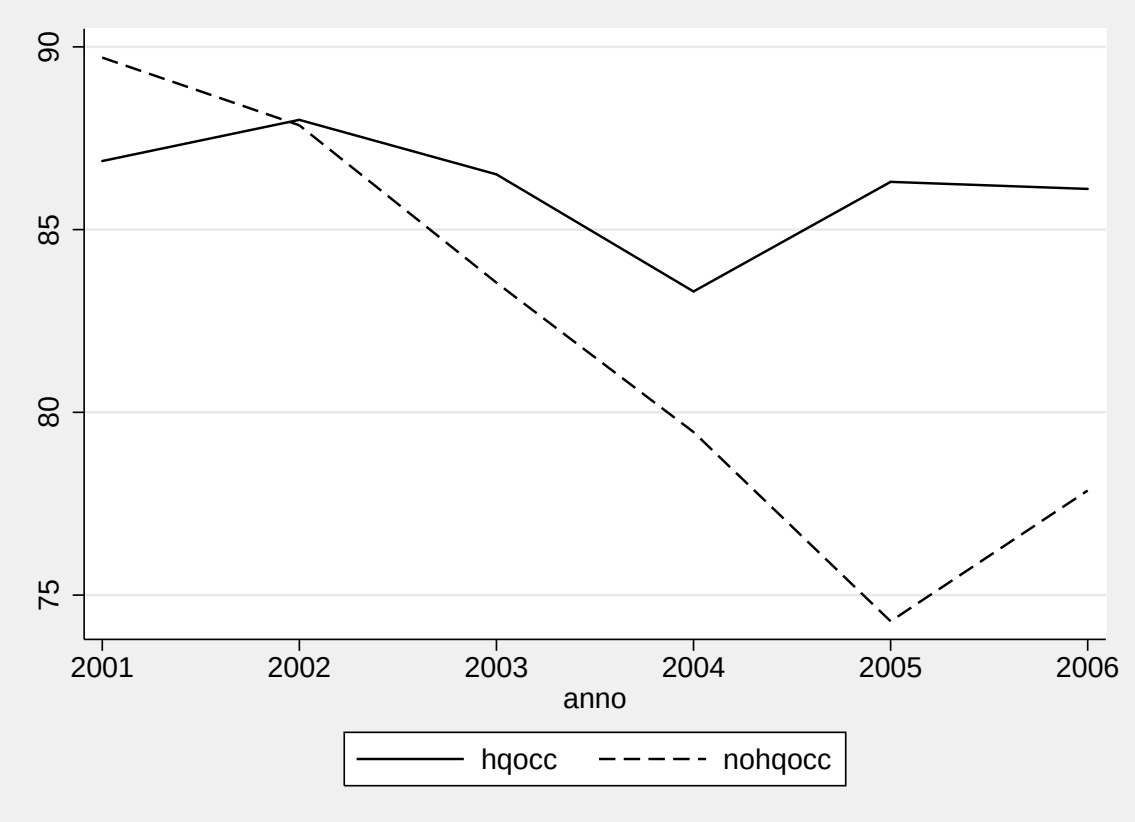
Notes: (a) Investments are measured in millions of euro. (b) In columns (2) and (4) the interaction dummy *nohq*fdi* is calculated by using the *broad fdi* variable used in the same regressions. (c) All columns include year, industry and area fixed effects, the lagged value of the dependent variable, as well as a series of variables accounting for mergers and acquisition events. (d) In columns (1) and (2) the observations have been weighted by the average employment in each area-plant in years t and $t-1$.
Standard errors are adjusted for clustering at the firm level.
*** p<0.01, ** p<0.05, * p<0.1.

Table 9: Impact of FDI on employment: alternative estimation methods

Dependent variable: $\log(\text{Employment})_t$	OLS	random effects (firm-area)	fixed effects (firm)	gmm-sys
	(1)	(2)	(3)	(4)
$\log(\text{Employment})_{t-1}$	0.968***	0.959***	0.930***	0.878***
	(0.006)	(0.007)	(0.019)	(0.045)
nohq	-0.030*	-0.050***	-0.169***	-0.221**
	(0.018)	(0.019)	(0.044)	(0.099)
fdi	0.032*	0.039**	-	0.081**
	(0.016)	(0.017)		(0.037)
nohq*fdi	-0.048**	-0.049**	-	-0.029
	(0.024)	(0.025)		(0.035)
group	0.037*	0.044**	0.034	0.115***
	(0.020)	(0.021)	(0.076)	(0.043)
Tests of joint significance:				
nohq+nohq*fdi=0	$F(1, 383) = 12.12$ p-value=0.00	$X^2(1)$=16.26 p-value=0.00	$F(1, 109) = 14.39$ p-value=0.00	$F(1, 391) = 7.88$ p-value=0.00
Test overid. restrictions				Hansen test $X^2(24)$=20.60 p-value=0.66 Sargan test $X^2(24)$=64.25 p-value=0.00
Observations	2915	2915	940	2915
R^2	0.975		0.978	

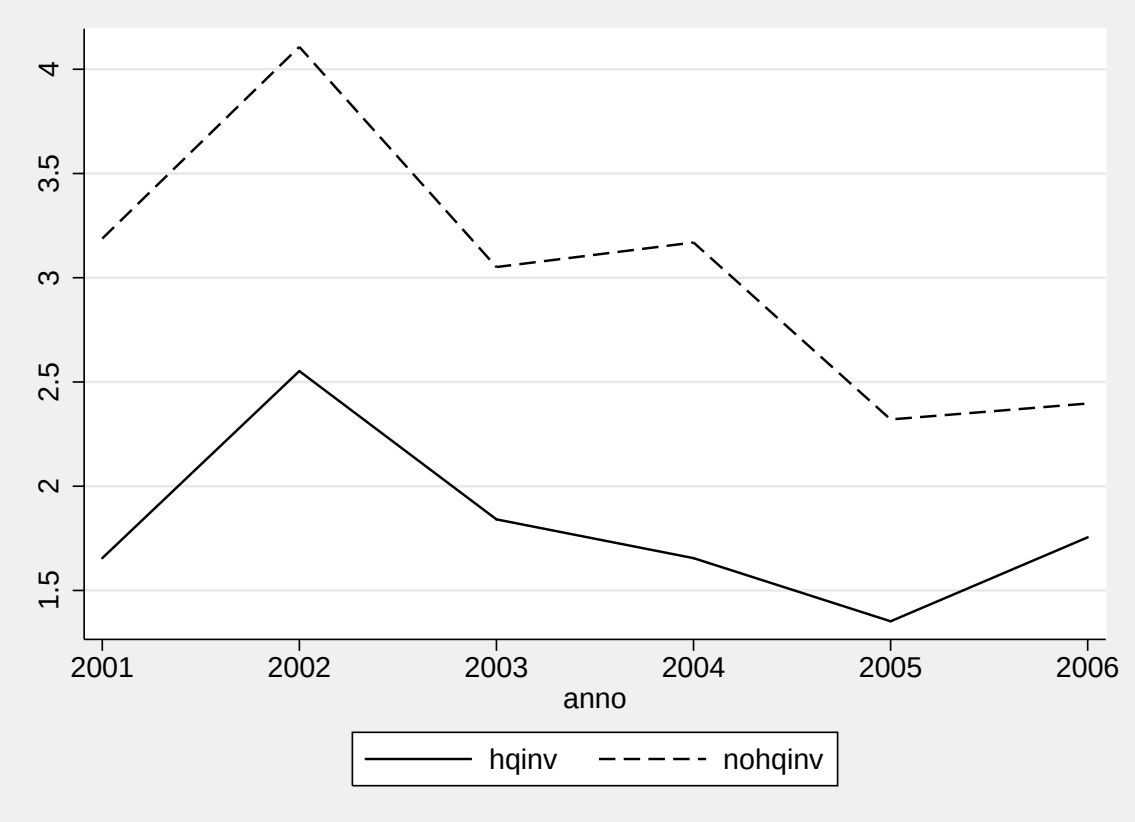
Notes: (a) Columns (1), (2) and (4) include year, industry and area fixed effects. Column (3) includes year and area fixed effects. All columns include also a set of variables accounting for mergers and acquisition events. (b) Column (3) includes only FDI firms.
Standard errors are adjusted for clustering at the firm level.
*** p<0.01, ** p<0.05, * p<0.1.

Figure 1: Employment in multi-area FDI firms



Source: Authors' elaborations on Invind data using a balanced sample of multi-area FDI firms. The figure shows the employment level (in thousands of units) in the head-quarter areas (hqocc) and in the no-headquarter areas (nohqocc).

Figure 2: Investments in multi-area FDI firms



Source: Authors' elaborations on Invind data using a balanced sample of multi-area FDI firms. The figure shows the investments level (in billions of euro) in the head-quarter areas (hqinv) and in the no-headquarter areas (nohqinv).