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The purpose of the Temi di discussione *series is to promote the circulation of working papers prepared within the Bank of Italy or presented in Bank seminars by outside economists with the aim of stimulating comments and suggestions.*

The views expressed in the articles are those of the authors and do not involve the responsibility of the Bank.

CORPORATE GEOGRAPHY IN MULTI-PLANT FIRMS

by Rita Cappariello*, Stefano Federico* and Roberta Zizza*

Abstract

This paper focuses on how multi-plant firms allocate their workforce and investments between headquarters or plants located in or close to the headquarters area (HQ plants) and plants located in the same country farther from the headquarters area (non-HQ plants). Using survey data on Italian industrial multi-plant firms for the last decade, we find that employment and investments grow significantly less in non-HQ plants compared to HQ plants of the same firm. We discuss several possible interpretations of these patterns in "corporate geography".

JEL Classification: R30, L20, F23.
Keywords: multi-plant firms, firm headquarters, employment, investment, Italy.

Contents

* Bank of Italy, Economic Research and International Relations.

1 Introduction[1]

Large firms are often multi-plant firms. In this case, the standard model of single-plant firms does not apply and empirical analysis at the firm level may not capture interesting *within-firm* patterns. This paper argues that focusing on what happens *inside* firms (among their own different plants) yields insights that fully deserve to be analysed in greater depth.

Specifically, we focus on a sample of Italian industrial multi-plant firms and make a distinction between plants located in or close to the headquarters area ("HQ plants") and plants located in Italy farther from the headquarters area ("non-HQ plants"). We then compare employment or investments between HQ plants and non-HQ plants. Our research question is the following: do HQ plants show different trends compared to non-HQ plants?

This novel research question is - in our opinion - very interesting in several respects. First, multi-plant firms are not an exception but rather a very widespread feature of industrial economies. For instance, in our sample, which includes only firms with at least 50 employees, multi-plant firms account for more than 60 per cent of employment, while they account for 78 per cent of employment and 88 per cent of output in the U.S. manufacturing sector (Bernard and Jensen 2007).

Second, the distribution of plants owned by firms having their headquarters in a different area is far from uniform in geographical terms. For example, as we shall see in the next section, the South of Italy hosts a disproportionately higher number of plants owned by firms headquartered in the Central and Northern areas. This feature has indeed already led to concerns about Mezzogiorno being dependent on decision makers located outside the area (Svimez 2006). More generally, "corporate geography" decisions by large firms may clearly have a huge impact on geography of economic activity in a given country.

Figure 1 provides a first illustration of how the data on employment trends differed

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between HQ plants and non-HQ plants. The figure reports the number of employees, in thousands of units, of a balanced sample of Italian industrial multi-plant firms over the years 2001-10. Employment in HQ plants remained generally stable over the whole period, while employment in non-HQ plants recorded a sharp decrease. Figure 2 broadly confirms these patterns for investments, although the latter are obviously much more volatile than employment.

Our paper is related to recent work by Landier et al. (2009) on U.S. firms: they show that layoffs and divestitures are more likely to happen, or happen earlier, in plants located farther from headquarters (for a similar evidence on multinationals headquartered in Belgium see the working paper by Abraham et al. 2010). Another related study is that of Bernard and Jensen (2007), who compare the likelihood of plant closure in single-plant, multi-plant and multinational firms. They find that plants owned by multinational firms are unconditionally less likely to close, but if one controls for plant and industry characteristics, the opposite result is observed. Multinational firms seem therefore to have greater flexibility in labour adjustments than purely domestic firms. Our paper adds a further perspective to this issue by investigating whether multinational firms have also different employment trends in HQ compared to non-HQ plants.

The rest of our 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 survey covers firms with at least 50 employees in the industrial sector net of construction (corresponding to sections C, D and E in the NACE rev. 1 classification, thereafter referred to as the industrial sector). We use very recent data

covering the 2001-10 period. In 2006 the survey represents 12.1 per cent of the total workforce in the industrial sector. Compared to the reference population of firms with at least 50 employees, it is even more representative (28.2 per cent in terms of employment).

We exploit data on the distribution of workforce and of total fixed investments by geographical area within the country (North-West, North-East, Centre, South), as well as information on the location of headquarters. To give an example, for a hypothetical firm "CFZ & Co." we observe that its headquarter is located in the North-West of Italy, that 30 per cent of its total employment is in that area and that the firm is also active in the three other geographical areas (North-East, Centre, South) with respectively 22, 43 and 5 per cent of employment. We are thus able to make a distinction between single-area firms (single-plant firms or multi-plant firms whose plants are all located in the same area as their headquarters) and multi-area firms (multi-plant firms with plants in at least two different areas). We will look at multi-area firms only, for which we are able to compare plants located in the HQ area (HQ plants) to plants located in non-HQ areas (non-HQ plants; table 1). While multi-area firms represent slightly more than a fifth of the number of firms in total INVIND sample, they account for 62 per cent of total employment.

The INVIND sample breakdown by geographical area shows that the share of employment in the South of Italy is much higher if it is considered by location of plants rather than by location of headquarters, because of the presence in the South of a high number of plants owned by firms headquartered in the Central and Northern areas. If we consider only non-HQ plants, the share of employment in those owned by firms headquartered in the South is even lower (table 2).

We adopt a within-firm strategy by comparing investment and employment performance between non-HQ plants and HQ plants owned by the same firm. In this regard, the comparison is within firm but across plants. We implement this approach by estimating employment or investment regressions at the firm-area level and including firm fixed effects.

Our baseline specification is the following dynamic panel regression for multi-area firms

over the 2002-10 period:

$$y_{i,j,t} = \beta_0 + \beta_1 y_{i,j,t-1} + \beta_2 nohq_{i,j} + \beta_3 cu_{i,t} + \beta_z Z + \alpha_i + \alpha_t + \epsilon_{i,j,t} \quad (1)$$

where the dependent variable y is the log level of employment (investment) in plants located in area j and owned by firm i in the year t. Since the focus is on the geographical dispersion of firms' activity, rather than their absolute size, as an alternative dependent variable we use the share of employment (investment) in each area.

The set of explanatory variables includes: the lagged value of the dependent variable (to take into account serial correlation in employment or investment); the *nohq* dummy, which is equal to one if the area j is not the area where firm is headquartered (non-HQ plants) and equal to zero if firm is headquartered in area j (HQ plants); firm and year fixed effects (α_i and α_t); the capacity utilisation rate (cu), which is aimed to capture firm-specific time-varying shocks. Finally, the vector Z contains additional dummies accounting for: changes in ownership structure (from a national to a foreign owner or vice versa); corporate events (mergers and acquisitions, spin-offs, transfer of assets); the area where plants are located (to take into account unobserved area-specific heterogeneity).

One potential concern is that our definition of HQ area is too broad. The extension of geographical macro-areas is such that the HQ area could include plants located in the same area but totally unrelated to HQ activities. First, notice that this type of measurement error would bias us against finding any different behavior between HQ and non-HQ plants. Second, for a sub-period (2003-2010) we observe the share of employment or investment in the region where the headquarters are located. This allows us to compare the share of activity in the HQ region relative to the activity in the HQ area. We find that this share is very high: the mean is almost 95% for both employment and investments. The activity in the HQ area is largely concentrated in the HQ region, while the activity in the other regions of the same area is marginal. This increases the likelihood that plants in the HQ area are actually involved in HQ activities.[2]

[2]Ideally, one would need information on the type of activity carried out in each plant (HQ activities, non-HQ activities) and on the exact location of each plant in order to measure the distance between HQ

There are some econometric issues to be considered. First, as we aim at estimating a coefficient which is representative of a population effect, we weight observations by firm employment in each area; this also allows mitigating the effect of measurement errors, which are likely to be negatively correlated with the size of the plant itself. Second, standard errors are clustered by firms so as to control for the well-known bias when aggregate variables are included in a regression (Moulton 1990). Third, in alternative to OLS we implement a system-GMM estimation, which tackles the issue of endogeneity of the lagged dependent variable. On the other hand we are conscious of the limitations of this method when the number of fixed effects is huge, as in our case (Blundell and Bond, 1998).

Finally, changes at the extensive margin, i.e. the shift to zero (or from zero to a positive value) of employment (investment), due to closures or openings of all plants in a given geographical area, cannot be considered when the dependent variable is in log-levels. However, this should not be regarded as a matter of concern as the share of activity affected by firm entry and exit in a given area is rather negligible: entry and exit involve on average respectively 7 and 5 per cent of the observations, but only 0.3 per cent of employment in both cases (table 3). The small incidence of the extensive margin mainly reflects the structure of our data, which are not at plant level, but at a more aggregate firm-area level: this implies that, for instance, the closure of one plant is included in the log level of employment as long as there are other plants owned by the same firm and located in the same area; in a similar way, the opening of a new plant is taken into account if the parent firm already owned other plants in the same area. To ensure comparability regressions for the share of employment (investment) are run on the same sample.

A list of our dependent and main explanatory variables with corresponding summary statistics is reported in table 4.

and non-HQ plants. However, this information is not available in our data.

3 Results

3.1 Main results

This section presents the results of a set of regressions run to evaluate the differential performance between HQ and non-HQ plants within the same firm.

Table 5 reports OLS estimates with firm fixed effects (columns (1) and (2) for log-employment and the share of employment, respectively), and system-GMM estimates with firm fixed effects for the same variables (columns (3) and (4), respectively). Overall, the estimates point to a negative and significant effect of being a non-HQ plant on employment. As our specification is dynamic, this implies that employment in non-HQ plants grows less than employment in HQ plants. The estimated effect tells that employment growth is lower by 6.8 per cent in non-HQ plants (column (1)), and that the share of employment in non-HQ plants decreases by 1.8 percentage points (column (2)).

The results on the other main explanatory variables are consistent with our priors: employment is very persistent (with a coefficient larger than 0.9); capacity utilisation rates show a positive sign, but are not significant.

These results are broadly confirmed looking at system-GMM estimates, where the instrument for the equation in first-differences is the lagged level of the dependent variable dated $t-4$, and the instrument for the equation in levels is the lagged first-differences of the dependent variable. The negative effect of non-HQ plants is magnified, while employment persistence is attenuated. Caveats are needed for the GMM estimation as the Sargan test of overidentifying restrictions rejects the null of exogeneity.

Table 6 presents results for the same set of regressions estimated so far, except that we now consider investment as the dependent variable. The coefficient for non-HQ is again negative and strongly significant. Investment growth is lower by 36 per cent in non-HQ plants (column (1)), and that the share of investment in non-HQ plants decreases by 7.4 percentage points (column (2)). The magnitude of the coefficients is larger than for employment, probably reflecting the higher volatility of investments. The results on the

other main explanatory variables are largely expected: investments are less persistent than employment, as shown by the smaller coefficient of the lagged value (0.6-0.7 in the OLS estimates). Investments tend to grow more in firms with higher rates of capacity utilisation. GMM estimates confirm a negative and significant coefficient for non-HQ plants, although the specification tests cast serious doubts on their validity (columns (3) and (4)).

3.2 Potential explanations

We explore several potential explanations behind different behaviours between HQ and non-HQ plants: multinational activity; corporate restructuring and downsizing; the role of business cycle; skill intensity.

First, we distinguish purely domestic and multinational firms, namely firms producing abroad through their own foreign affiliates (FDI). A large literature (e.g. Ottaviano and Mayer 2008) has pointed out systematic differences in terms of size, productivity and technology between these two groups. Moreover, there are several reasons to expect that international activity through FDI may have an impact on how production is organised in the home country. "Horizontal" FDI may increase the need for management and coordination of foreign activities, which are typically carried out in the headquarters. "Vertical" FDI may require a specialisation in skill-intensive activities, such as R&D, product innovation and marketing, which are also often undertaken in the headquarters. Using information collected in the 2006 survey, multinational firms are assumed as those producing goods and services abroad in 2000-06 (through ownership/control of foreign firms, ownership of local production units without separate legal status).

Table 7 shows that for employment the coefficient for non-HQ remains negative and significant in both sub-samples for either dependent variable. Looking at log-level specifications, the effect seems to be more pronounced for multinational firms (-6.9 per cent, compared to -5.4 per cent for domestic firms), though according to a formal test of equality the two coefficients are not statistically distinct. The opposite pattern is found in terms of the employment share, but also in this case the test suggests that the coefficients are

statistically equivalent. A similar picture emerges for investments, whose results are not reported for the sake of brevity.

Similar results are obtained if we introduce a broader definition of firms' international activity, adding firms with major technical collaboration agreements with foreign firms. A firm can indeed produce abroad not only through own affiliates, but also through independent suppliers (international outsourcing). We have also introduced a further distinction within the group of multinational firms based on the seniority of the investment abroad. The idea is that firms which have recently started to produce abroad could experience a stronger reallocation of their domestic plants. To this end we use information from the 2004 survey on the year of the first investment abroad, although this shrinks significantly the sample size. The results point indeed in the expected direction, as the negative effect prevails for firms starting to produce abroad since the mid-Nineties.

Second, as in Abraham et al. (2010), we split the sample in a group of firms with growing employment and in a group of firms with falling employment over the whole period. This enables us to disentangle between two competing explanations for a negative non-HQ effect: should a negative effect hold only for shrinking firms, this would support a restructuring hypothesis, predicting that non-HQ plants are more likely to be downsized or closed down in bad times; in the opposite case one could be led to conclude that the relative growth in HQ employment reflects an increase in HQ activities (management, coordination, R&D). We therefore split the sample by classifying firms according to the overall employment dynamics at the firm level in the whole period ("expanding" versus "shrinking" firms), to check whether the non-HQ effect is only due to restructuring after adverse shocks, or reflects a reallocation towards activities usually carried out by HQ plants. Expanding (shrinking) firms are defined as those whose average employment in 2006-10 period was above (below) that in 2001-05. Table 8 shows that employment growth is always lower in non-HQ plants irrespective of the trend in overall employment. This effect turns out to be stronger for "expanding" firms, giving more support to the reallocation hypothesis. According to formal tests of equality the two coefficients – growing versus falling - are statistically distinct only in the specification in log-levels.

A related explanation is that activity in non-HQ plants is more sensitive to the business cycle. One might expect a higher volatility in non-HQ plants than in HQ plants, since the former are more involved in production activities and therefore might respond more quickly to changes in demand for a firm's products. We therefore interact the *nohq* variable with two cyclical indicators: the GDP growth rate or the firm-level capacity utilization rate. The evidence does not provide support to this explanation. Table 9 shows that the interaction terms are never significant in employment regressions. Similar results are obtained for investments in unreported estimates.[3]

Finally, we consider the skill intensity of the firm. The idea is that more skill-intensive firms might focus in activities such as marketing and R&D which are often carried out in or near the headquarters. We therefore split the sample according to the skill intensity of the firm, proxied by the share of white collars. In this way we evaluate whether the bias against non-HQ plants is stronger for firms whose activity is more low-skilled labour intensive. In unreported estimates we do not find however significant differences in terms of employment between less and more skill-intensive firms.

3.3 Robustness

We run several robustness checks. We consider that employment and investments are both outcomes of a joint decision and are not independent outcomes. We therefore estimate a seemingly unrelated regression (SURE) model that takes into account the correlation between the error terms across the two equations. The results are reported in Table 10 and are very similar to the OLS estimates.

We then investigate whether our findings vary across sectors. We split our sample into five different sectors, based on firms' main sector.[4] Table 11 reports the results based on the OLS estimates where we control for the usual set of explanatory variables (lagged dependent variable, firm capacity utilization rate, firm fixed effects and year dummies). The coefficient on *nohq* is almost always negative and is statistically significant in most

[3]Similar results are also obtained interacting *nohq* with a crisis dummy, equal to one if the economy is in recession or stagnation (defined as a GDP growth rate lower than 0.5 per cent) and zero otherwise.

[4]Unfortunately we do not have information on each plant's sector.

specifications. It is always significant in the two largest sectors ("Metals, machinery and transport equipment" and "Other manufacturing products"). A negative non-HQ effect is also found for investment in "Textile, clothing and leather" and for employment in "Minerals, electricity, gas and energy".

We also check whether our findings vary across time. We repeat the estimation on two sub-periods, before and after 2006. Both subsamples include years of expansion as well as years of stagnation or recession (2002-03, 2008-09). The negative effect on *nohq* is signficant in both sub-periods for employment and investment. Its magnitude is slightly larger in the first period.

Another interesting issue is whether firms with headquarters in different geographical areas show different behaviors between HQ and non-HQ plants. We interact *nohq* with a dummy corresponding to a given HQ area, one at a time. The coefficient of this interaction shows the differential non-HQ effect for firms headquartered in that given area. As a whole we find no evidence of differential behaviors across firms headquartered in all areas in terms of employment. For investment, the interaction term is positive and marginally significant for firms headquartered in the North-West while negative and significant for firms headquartered in the North-East. Thus, if the headquarter is in the North-West the worst relative performance of investment in the non-HQ plants is partly attenuated, while it is amplified if located in the North-East (Table 12).

Among the other robustness checks, we run the regression either omitting the weights or using an alternative weighting scheme based on the probability of inclusion of each firm in the INVIND sample. We also drop firms with a small share of employment in the HQ region on employment in the HQ area, thus excluding firms where HQ plants are measured with lower precision, as discussed in Section 2. The results are unchanged.

4 Concluding remarks

Large firms are often multi-plant firms, which organize production into different units located in their home country or abroad. In this paper we argue that treating each firm

as a single unit can hide interesting within-firm patterns that in our view deserve a deeper analysis.

Using survey data on Italian industrial multi-plant firms, we focus on how firms allocate their workforce and investments between headquarters or plants which are located close the headquarters (HQ plants) and plants located farther from the headquarters in the rest of Italy (non-HQ plants). This enables us to compare the employment or investment trends across different plants of the same firm, thereby adopting a within-firm approach.

Our baseline estimate indicates that employment grows by 6.8 per cent less in non-HQ plants compared to HQ plants of the same firm and that the share of workers in non-HQ plants decreases by 1.8 percentage points. We detect even stronger effects against non-HQ plants in the case of investments. These results are consistent with recent evidence for the United States (Landier et al. 2009) and Belgium (Abraham et al. 2010). A caveat of our analysis is that we do not actually observe the functions (production vs. headquarters) carried out in each plant and that our results are based on relatively broad geographical areas.

The reasons behind this "bias" in favour of headquarters need to be explored. As a preliminary contribution to this investigation, we find that the negative effect of non-HQ plants is slightly stronger for the group of multinational firms, especially those shifting part of their production abroad in recent years. This could be explained in the context of "horizontal" FDI as well as "vertical" FDI. Both models predict that HQ activities would increase after FDI, relatively to non-HQ 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.

We also find that the negative effect of non-HQ plants holds for "expanding" firms as well as "shrinking" firms, although its magnitude is stronger for the former. This suggests that the restructuring hypothesis advanced in the literature, namely that layoffs and divestitures are more frequent or happen earlier in plants farther from headquarters,

is not the whole story and that there is also a role for the expansion of HQ tasks. We do not find support instead for the hypotheses that the negative effect of non-HQ plants is due to a higher volatility or sensitivity to the business cycle or to the firms' skill intensity level.

Further research is needed in order to explore other determinants of the reallocation of activity towards HQ plants, as this could be of interest for the policy makers. Corporate geography may indeed reflect not only factors that are internal to the firm, but also the external environment (infrastructures, facilities, and so on). Furthermore, firms' location choices might in turn drive changes which could be of interest for policy making: for example, if headquarters tend to be located in urban areas (Davis and Henderson 2008), agglomeration patterns would change, ceteris paribus, towards larger cities.

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Appendix: tables and figures

Table 1: Characteristics of the sample

	firms	firms-areas	employment
2002	198	481	301,770
2003	201	486	315,302
2004	228	554	320,538
2005	262	632	328,031
2006	308	757	363,577
2007	306	751	350,543
2008	283	703	343,905
2009	270	654	318,525
2010	236	563	292,522

Notes: Multi-area firms only. Firms ever considered are 487, accounting for 5,581 firm-area-year observations.

Table 2: Sample geographical distribution

Area	**firms**	**employment**		
		by HQ area	*of which: in non-HQ*	**by plant area**
North West	33.1	48.3	47.3	36.7
North East	22.4	17.7	10.0	21.2
Center	23.0	29.7	39.7	18.6
South and Islands	21.4	4.4	3.0	23.6
Italy	**100.0**	**100.0**	**100.0**	**100.0**

Notes: Statistics calculated on multi-area firms only.

Table 3: Entry and exit

	Entry		**Exit**	
	% obs.	**% empl.**	**% obs.**	**% empl.**
2002	6.65	0.15	6.86	0.30
2003	8.64	0.41	7.61	0.21
2004	8.48	0.26	5.05	0.25
2005	8.07	0.44	5.06	0.38
2006	6.21	0.43	3.83	0.23
2007	7.19	0.24	3.86	0.27
2008	6.12	0.26	4.84	0.49
2009	7.19	0.59	6.27	0.25
2010	8.35	0.26	8.17	1.14
Average	7.43	0.34	5.73	0.39

Notes: The table reports the percentage share of entry and exit on the sample of multi-area firms, in terms of number of observations and employees. Entry is defined as the observations (firm i in area j) with zero employees in year $t-1$ and at least one employee in year t. Exit is defined as the observations with at least one employee in year $t-1$ and zero employees in year t. For exit, the share on employment is computed using one-year lagged employment.

Table 4: Summary statistics: multi-area firms

Variable	Mean	Std. Dev.	Min.	Max.	N
Employment (level)	525.8	1,520.2	1	23,664.0	5,581
Investments (level)	12.9	73.5	0	1,737.1	5,528
Employment (share)	0.41	0.36	0	1	5,581
Investments (share)	0.41	0.41	0	1	5,474
Nohq	0.60	0.49	0	1	5,581
Capacity utilization	0.79	0.14	0	1	5,581
Spin-offs	0.02	0.15	0	1	5,581
Mergers	0.03	0.18	0	1	5,581
Contributions (to another firm)	0.03	0.17	0	1	5,581
Take-overs	0.06	0.23	0	1	5,581
Result of a spin-off	0.00	0.06	0	1	5,581
Contributions (from another firm)	0.01	0.10	0	1	5,581
Belong to a group	0.78	0.41	0	1	5,581
Belong to a foreign group	0.22	0.41	0	1	5,581

Notes: employment is measured in units and investments in millions of euro. All statistics are computed at the firm-area level.

Table 5: Employment

	OLS		gmm-sys	
	$\log(\text{empl})_t$	share(empl)_t	$\log(\text{empl})_t$	share(empl)_t
	(1)	(2)	(3)	(4)
$\log(\text{empl})_{t-1}$	0.926***		0.838***	
	(0.016)		(0.077)	
share(empl)_{t-1}		0.938***		0.737***
		(0.011)		(0.083)
nohq	-0.068***	-0.018***	-0.151**	-0.080***
	(0.014)	(0.004)	(0.072)	(0.026)
cap util	0.053	-0.016	0.062	-0.019
	(0.088)	(0.017)	(0.072)	(0.029)
R^2	0.988	0.978		
Hansen p-value			0	0
Sargan p-value			0	0
Observations	5,581	5,581	5,581	5,581
Firms	487	487	487	487

Notes: The dependent variable in columns (1) and (3) is the (log) number of employees of firm i in area j at time t. The dependent variable in columns (2) and (4) is the share of employees of firm i in area j at time t on total employees of firm i at time t. All models include firm fixed effects, area and year dummies and a set of variables accounting for changes in ownership structure and for mergers and acquisitions. Columns (1)-(2) are estimated with OLS; standard errors are adjusted for clustering at the firm level. Columns (3)-(4) are estimated with system GMM. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 6: Investment

	OLS		gmm-sys	
	$\log(\text{inv})_t$	share(inv)_t	$\log(\text{inv})_t$	share(inv)_t
	(1)	(2)	(3)	(4)
$\log(\text{inv})_{t-1}$	0.608***		0.382**	
	(0.025)		(0.185)	
share(inv)_{t-1}		0.745***		0.769***
		(0.031)		(0.142)
nohq	-0.361***	-0.074***	-0.552***	-0.068*
	(0.062)	(0.014)	(0.167)	(0.039)
cap util	0.889***	0.036	0.496*	-0.009
	(0.244)	(0.048)	(0.300)	(0.062)
R^2	0.942	0.886		
Hansen p-value			0	0
Sargan p-value			0	0
Observations	3,883	3,883	3,883	3,883
Firms	480	480	480	480

Notes: The dependent variable in columns (1) and (3) is the (log) level of investment of firm i in area j at time t. The dependent variable in columns (2) and (4) is the share of investment of firm i in area j at time t on total investment of firm i at time t. All models include firm fixed effects, area and year dummies and a set of variables accounting for changes in ownership structure and for mergers and acquisitions. Columns (1)-(2) are estimated with OLS; standard errors are adjusted for clustering at the firm level. Columns (3)-(4) are estimated with system GMM. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 7: Employment: multinationals versus domestic firms

	$\log(\text{empl})_t$		share(empl)_t	
	multinational	domestic	multinational	domestic
	(1)	(2)	(3)	(4)
$\log(\text{empl})_{t-1}$	0.923***	0.930***		
	(0.024)	(0.019)		
share(empl)_{t-1}			0.950***	0.918***
			(0.014)	(0.018)
nohq	-0.069***	-0.054***	-0.015***	-0.022***
	(0.020)	(0.018)	(0.004)	(0.008)
cap util	0.058	0.059**	-0.026	0.003
	(0.137)	(0.030)	(0.030)	(0.009)
R^2	0.986	0.987	0.981	0.967
Observations	1784	3797	1784	3797
Firms	136	351	136	351

Notes: The dependent variable in columns (1) and (2) is the (log) number of employees of firm i in area j at time t, respectively for multinational firms and purely domestic firms. The dependent variable in columns (3) and (4) is the share of employees of firm i in area j at time t on total employees of firm i at time t for the same two categories of firms. All models include firm fixed effects, area and year dummies and a set of variables accounting for changes in ownership structure and for mergers and acquisitions. All columns are estimated with OLS; standard errors are adjusted for clustering at the firm level. *** p<0.01, ** p<0.05, * p<0.1.

Table 8: Employment: expanding versus shrinking firms

	$\log(\text{empl})_t$		$\text{share}(\text{empl})_t$	
	expanding firms	shrinking firms	expanding firms	shrinking firms
	(1)	(2)	(3)	(4)
$\log(\text{empl})_{t-1}$	0.885***	0.956***		
	(0.023)	(0.010)		
$\text{share}(\text{empl})_{t-1}$			0.924***	0.946***
			(0.014)	(0.015)
nohq	-0.109***	-0.049***	-0.023***	-0.017***
	(0.022)	(0.012)	(0.005)	(0.005)
cap util	-0.014	0.069	-0.035	-0.001
	(0.031)	(0.116)	(0.034)	(0.014)
R^2	0.982	0.991	0.976	0.975
Observations	2922	2487	2922	2487
Firms	237	213	237	213

Notes: The dependent variable in columns (1) and (2) is the (log) number of employees of firm i in area j at time t, respectively for firms increasing overall employment in 2007-2010 relative to 2001-2005 and firms reducing it. The dependent variable in columns (3) and (4) is the share of employees of firm i in area j at time t on total employees of firm i at time t for the same two categories of firms. All models include firm fixed effects, area and year dummies and a set of variables accounting for changes in ownership structure and for mergers and acquisitions. Some firms are dropped as they do not feature in one of the two subperiods. All models are estimated with OLS; standard errors are adjusted for clustering at the firm level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 9: Employment and business cycle

	$\log(\text{empl})_t$		$\text{share}(\text{empl})_t$	
	(1)	(2)	(3)	(4)
$\log(\text{empl})_{t-1}$	0.925***	0.926***		
	(0.016)	(0.016)		
$\text{share}(\text{empl})_{t-1}$			0.938***	0.940***
			(0.011)	(0.011)
nohq	-0.069***	-0.096***	-0.018***	-0.032**
	(0.014)	(0.036)	(0.004)	(0.014)
nohq∗gdp	0.004		0.001	
	(0.003)		(0.001)	
nohq∗cap util		0.040		0.020
		(0.046)		(0.018)
cap util	0.055	0.033	-0.015	-0.026
	(0.089)	(0.096)	(0.017)	(0.024)
R^2	0.988	0.988	0.978	0.978
Observations	5,581	5,581	5,581	5,581
Firms	487	487	487	487

Notes: The dependent variable is the (log) number of employees of firm i in area j at time t in columns (1)-(2) and the share of employees of firm i in area j at time t on total employees of firm i at time t in columns (3)-(4). All models include firm fixed effects, area and year dummies and a set of variables accounting for changes in ownership structure and for mergers and acquisitions. All models are estimated with OLS; standard errors are adjusted for clustering at the firm level. *** p<0.01, ** p<0.05, * p<0.1.

Table 10: Employment and investment: SURE model

	(1)		(2)	
	$\log(\text{empl})_t$	$\log(\text{inv})_t$	share(empl)_t	share(inv)_t
$\log(\text{empl})_{t-1}$	0.905***			
	(0.006)			
share(empl)_{t-1}			0.921***	
			(0.006)	
$\log(\text{inv})_{t-1}$		0.593***		
		(0.013)		
share(inv)_{t-1}				0.735***
				(0.011)
nohq	-0.080***	-0.374***	-0.022***	-0.077***
	(0.008)	(0.029)	(0.003)	(0.006)
cap util	0.058**	0.899***	-0.017**	0.036*
	(0.028)	(0.111)	(0.009)	(0.022)
R^2	0.990	0.942	0.978	0.886
Observations	3872		3872	
Firms	480		480	

Notes: The dependent variables are the (log) number of employees and the (log) investment of firm i in area j at time t in model (1) and the share of employees and the share of investment of firm i in area j at time t on total employees and investment of firm i at time t in model (2). All models include firm fixed effects, area and year dummies and a set of variables accounting for changes in ownership structure and for mergers and acquisitions. All models are estimated with seemingly unrelated regression (SURE). *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 11: Employment and investment by sector

	Textile, clothing, leather	Coke, chemicals, rubber, plastic	Metals, machinery, transport equip.	Other manuf. sectors	Minerals, electr., gas and water
			Panel A: $\log(\text{empl})_t$		
nohq	-0.200	0.012	-0.069**	-0.066**	-0.019***
	(0.212)	(0.034)	(0.027)	(0.028)	(0.006)
R^2	0.957	0.986	0.986	0.979	0.994
Observations	526	967	2239	1623	226
Firms	51	81	223	129	15
			Panel B: $\text{share}(\text{empl})_t$		
nohq	-0.022	0.002	-0.027**	-0.018**	-0.004**
	(0.031)	(0.011)	(0.011)	(0.009)	(0.002)
R^2	0.966	0.964	0.976	0.972	0.955
Observations	526	967	2239	1623	226
Firms	51	81	223	129	15
			Panel C: $\log(\text{inv})_t$		
nohq	-1.293***	-0.166	-0.462***	-0.334***	-0.082
	(0.365)	(0.138)	(0.080)	(0.118)	(0.096)
R^2	0.883	0.940	0.910	0.808	0.955
Observations	328	596	1646	1122	191
Firms	50	80	222	126	15
			Panel D: $\text{share}(\text{inv})_t$		
nohq	-0.326***	-0.013	-0.122***	-0.068**	-0.018
	(0.120)	(0.022)	(0.018)	(0.027)	(0.024)
R^2	0.834	0.935	0.860	0.852	0.730
Observations	328	596	1,646	1,122	191
Firms	50	80	222	126	15

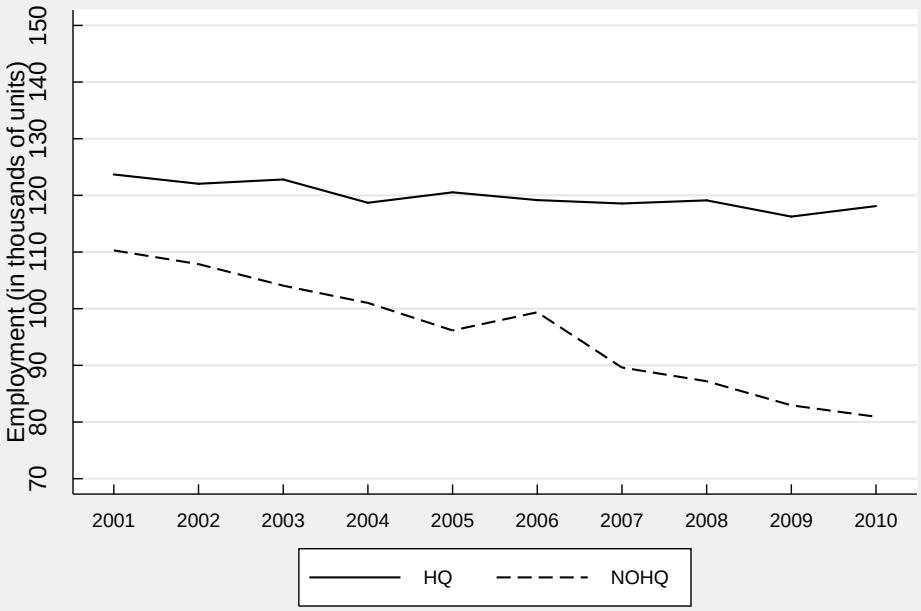
Notes: The dependent variable is the (log) number of employees of firm i in area j at time t in panel A, the share of employees of firm i in area j at time t on total employees of firm i at time t in panel B, the (log) level of investment of firm i in area j at time t in panel C, the share of investment of firm i in area j at time t on total investment of firm i at time t. Regressions are separately estimated for each of the five groups of sectors. All models include controls for the lagged dependent variable, firm capacity utilization rate, firm fixed effects, area and year dummies and a set of variables accounting for changes in ownership structure and for mergers and acquisitions. All models are estimated with OLS. Standard errors are adjusted for clustering at the firm level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 12: Employment and investment: differences by geographical area

	North-West	North-East	Center	South and Isles
		Panel A: log(empl)$_t$		
nohq	-0.091***	-0.057***	-0.068***	-0.070***
	(0.027)	(0.012)	(0.021)	(0.014)
nohq*area	0.048	-0.064*	0.000	0.034
	(0.041)	(0.039)	(0.044)	(0.041)
R^2	0.987	0.987	0.987	0.987
Observations	5,581	5,581	5,581	5,581
		Panel B: share(empl)$_t$		
nohq	-0.019***	-0.016***	-0.019***	-0.018***
	(0.005)	(0.004)	(0.006)	(0.004)
nohq*area	0.003	-0.011	0.004	0.010
	(0.009)	(0.009)	(0.011)	(0.010)
R^2	0.976	0.976	0.976	0.976
Observations	5,581	5,581	5,581	5,581
		Panel C: log(inv)$_t$		
nohq	-0.478***	-0.281***	-0.373***	-0.366***
	(0.087)	(0.075)	(0.066)	(0.064)
nohq*area	0.253*	-0.385**	0.040	0.193
	(0.141)	(0.150)	(0.179)	(0.129)
R^2	0.934	0.934	0.934	0.934
Observations	3,872	3,872	3,872	3,872
		Panel D: share(inv)$_t$		
nohq	-0.100***	-0.069***	-0.087***	-0.078***
	(0.018)	(0.015)	(0.014)	(0.014)
nohq*area	0.045*	-0.058*	0.021	-0.046*
	(0.025)	(0.031)	(0.030)	(0.024)
R^2	0.855	0.855	0.855	0.855
Observations	3,872	3,872	3,872	3,872

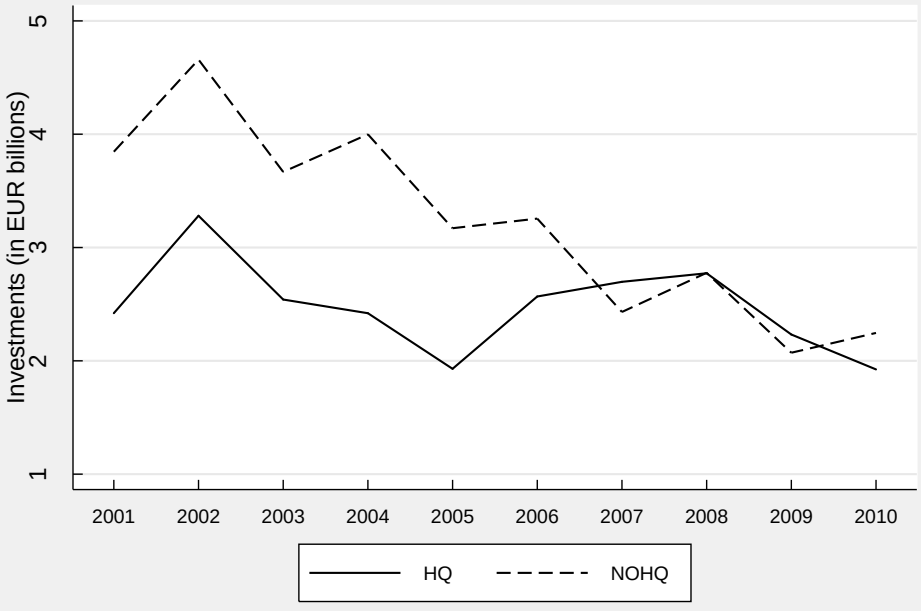
Notes: The dependent variable is the (log) number of employees of firm i in area j at time t in panel A, the share of employees of firm i in area j at time t on total employees of firm i at time t in panel B, the (log) level of investment of firm i in area j at time t in panel C, the share of investment of firm i in area j at time t on total investment of firm i at time t. All models include controls for the lagged dependent variable, firm capacity utilization rate, firm fixed effects, area and year dummies and a set of variables accounting for changes in ownership structure and for mergers and acquisitions. All models are estimated with OLS. 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 firms



Source: Authors' calculations on a balanced sample of multi−area firms. The figure shows the overall number of employees in the headquarter area (HQ) and in no−headquarter areas (NOHQ).

Figure 2: Investment in multi-area firms



Source: Authors' calculations on a balanced sample of multi−area firms. The figure shows the overall level of investments in the headquarter area (HQ) and in no−headquarter areas (NOHQ).

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