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## **Cross-Border Acquisitions, Multinationals and Wage Elasticities**

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# Cross-Border Acquisitions, Multinationals and Wage Elasticities\*

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## Abstract

The growing number of cross-border acquisitions has in many countries raised concerns about labor demand consequences. In this study, we use detailed firm level data to examine how increased internationalization and multinational activity affect the volatility of employment, or rather, the wage elasticity of labor demand. We analyze whether the wage elasticity of labor demand differs between multinational and non-multinational firms as well as between foreign-owned and domestic firms, and we are able to distinguish between different skill groups of employees. Moreover, we separate between an acquisition effect and a general ownership effect. Our results do not show any general difference in wage elasticities between different types of firms.

**JEL:** J23, F16, F21, F23

**Keywords:** FDI, Cross-Border Acquisitions, Multinational Enterprises, Foreign Ownership, Labor Demand, Skill Groups, GMM.

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## **I. Introduction**

Foreign Direct Investment (FDI) has played a key role in the globalization of the last decades. A striking feature of the growing FDI flows is that most investments in developed countries now take place in the form of cross-border mergers and acquisitions (M&As) rather than in the form of greenfield investments. The growth in FDI has increased the number of workers world wide that are employed in affiliates of foreign-owned multinational enterprises (MNEs) (Jungnickel, 2002, p.2). This development has raised concerns among policy-makers, particularly about domestic jobs. Multinational firms tend to pay relatively high wages and inward FDI is believed to generate knowledge spillovers and productivity improvements but, on other hand, the “footloose” nature of multinationals is regarded as a threat to domestic jobs. Despite these issues having attracted a great deal of attention in the public debate, there is relatively little research on the topic.

Detailed matched employer-employee data, spanning the period 1990–2002, are used to examine labor demand consequences of increased foreign ownership in Sweden. We focus on how internationalization and multinationality affect the volatility of employment, or rather, the wage elasticity of labor demand. More specifically, we analyze the effect of foreign ownership and multinationality, as well as the impact of changes in ownership, on the wage elasticity of labor demand. Sweden is suitable for a study of this issue as it has experienced a dramatic increase in foreign ownership; the share of the total labor force employed in foreign-owned firms increased from about 9 percent in 1990 to 23 percent in 2005 (ITPS, 2006). Moreover, acquisitions are the most common form of entry mode for inward FDI in Sweden; almost 60 percent of the foreign-

owned firms have been established through acquisitions and about 6 percent through mergers (ITPS, 2006).<sup>1</sup>

There are several reasons to believe that foreign acquisitions of domestic firms and, foreign ownership or multinationality in general, may affect the elasticity of labor demand. However, it is unclear whether the change in ownership implies a permanent change reflected in a different elasticity of labor demand in foreign-owned and multinational firms as compared to domestic firms, or whether the shift in ownership itself leads to a temporary impact on the elasticity of labor demand.

Previous empirical studies on the impact of foreign ownership on wage elasticity provide ambiguous results. For instance, Barba Navaretti *et al.* (2003) find in a study on several European countries that foreign affiliates have a lower wage elasticity of labor demand than domestic firms while Görg *et al.* (2006) report higher wage elasticity in foreign-owned firms in their study on Ireland. Barba Navaretti *et al.* (2003) suggest that the result might be caused by different skill compositions of the workforce in domestic and foreign-owned firms, in combination with differences in wage elasticities for different skill groups. However, they are unable to confirm their explanation due to lack of data on the skill composition of the labor force.

Our paper contributes to the existing literature in several respects. Previous empirical studies examine the difference between foreign and national firms whereas economic theory suggests that employment aspects may differ between MNEs and non-MNEs. Multinational firms differ from local firms in their ability to shift production between different countries. The international organization enables multinational firms to

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<sup>1</sup> See also ITPS (2007) for a comprehensive report on the increased internationalisation of the Swedish economy.

react to changes in the cost of production, including wages, in a more flexible way than domestic firms by reorganizing and relocating parts of the production chain. Since a large share of national firms in developed countries are MNEs, with the same possibility as foreign firms to shift employment between affiliates in different countries, it is important to distinguish between the effects of multinationality and foreign ownership. We analyze whether the wage elasticity of labor demand differs between multinational and non-multinational firms, as well as between foreign-owned and domestic firms.<sup>2</sup>

Moreover, previous studies only analyze ownership effects while we are able to differentiate between the immediate acquisition effect and the general ownership effect. As argued above, these effects may be essentially different. Finally, we distinguish between the effects on different skill groups to examine if aggregate differences in wage elasticities may be caused by firm-level differences in the skill composition of the labor force.

The rest of the paper is organized as follows. In the next section, we discuss the background to this paper and related empirical literature, section III describes data, section IV presents the empirical methodology, V presents the results and VI concludes the paper.

## **II. Background and Related Empirical Literature**

The effect of international trade or trade liberalization on wage elasticities of labor demand has been examined in a number of studies.<sup>3</sup> Less explored is the issue of how multinational activity affects wage elasticities but different reasons why elasticities

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<sup>2</sup> Empirical studies on related issues also show that the important distinction is between MNEs and non-MNEs rather than between foreign and domestic firms (see e.g. Heyman *et al.*, 2006a and 2006b).

<sup>3</sup> See e.g. Faini *et al.* (1999), Krishna *et al.* (2001), and Slaughter (2001).

might differ between multinational and non-multinational firms can be distinguished from the theoretical literature.

The first argument concerns a temporary effect caused by rent-sharing after acquisitions. More precisely, Nocke and Yeaple (2005, 2007) show that cross-border mergers and acquisitions may combine firm-specific assets of the target and acquiring firms to exploit complementarities. The link between firm-specific assets and FDI through acquisitions is also emphasized by Blonigen (1997). Such complementarities will create rents and economic internationalization will increase the pool of firms with complementarities (Norbäck and Persson, 2007). The created rents can be divided by different actors, such as the owner and employees, and may thereby result in temporarily changing wage elasticities of labor demand. There are also other studies which suggest that international acquisitions weaken the bargaining power of trade unions. For instance, Lommerud *et al.* (2006) use an international oligopoly model to study how the presence of trade unions affects firms' merger decisions and wages. They show that wages become lower in international mergers as compared to purely national mergers. The underlying mechanism is a weakening of unions' bargaining power. Weaker unions, following an international acquisition, can also lead to a temporary shift in wage elasticities.

However, the wage elasticity of labor demand may also increase permanently after an acquisition, since an international production network enables the firm to react to changes in the cost of production, including wages, in a more flexible way than domestic firms by reorganizing the production chain and relocating parts of production. Ultimately, the possibility of such relocation depends on the degree of substitutability of employees in different countries. Brainard and Riker (2001) find that

the degree of substitution between employment in parent companies in the US and foreign affiliates is low. However, in another study, they show that substitution between employment in affiliates in alternative low wage locations is quite high (Brainard and Riker, 1997). Braconier and Ekholm (2000) use firm-level data on Swedish multinationals and find some evidence of substitution between employment in parent companies and subsidiaries located in high-income countries, but not between employment in parent and subsidiaries in low-income countries. Using firm-level data on multinational firms in all EU countries, Konings and Murphy (2001) also find that there is substitution of employment between parent companies and subsidiaries and that these effects are particularly important in the case of affiliates located within the EU. These findings are relevant for our study since any degree of substitution of employment between different locations of MNEs' activities may translate into higher wage elasticity of labor demand among MNEs, as compared to firms without affiliates in other countries.

There are also other reasons why wage elasticities may differ between multinational and non-multinational firms that are related to other firm characteristics than the existence of international production networks. For instance, Barba Navaretti and Venables (2004) argue that MNEs tend to be relatively capital intensive with a relatively skilled labor force, and with large market shares. High capital intensity makes wages a relatively low share of the total production cost and thereby a wage change has a lower impact on employment. Moreover, labor demand is typically less elastic for high-skilled workers than for low-skilled workers which will also affect aggregate wage elasticities (Hamermesh, 1993). Wage elasticity may be lower in MNEs also if the MNEs produce differentiated goods and have relatively large market shares. In such cases, the

demand elasticities for MNEs' products are relatively low, which may translate into relatively low wage elasticities.

Previous empirical studies on FDI and wage elasticity of labor demand provide mixed evidence. Fabbri *et al.* (2003) examine wage elasticities of labor demand in the UK and US manufacturing industry for about thirty years since the early 1960s. They find increasingly elastic labor demand in both countries: elasticities have increased in absolute values from about  $-0.5$  to  $-1.0$ . The authors argue that this is likely to be related to FDI, which has also grown over the examined period but they do not provide any formal analysis that can shed light on a possible causation.

Barba Navaretti *et al.* (2003) examine wage elasticities for domestically-owned (including both multinational and non-multinational firms) and foreign-owned firms in 11 European countries between 1993 and 2000. Their study provides some interesting results. First, the speed of employment adjustment is higher in foreign-owned firms in all included countries. Moreover, the magnitude of adjustment is lower in foreign than in domestically-owned firms: short-run wage elasticities are higher for domestic firms than for foreign-owned firms in all countries except two, and long-run wage elasticities are higher for domestic firms in all countries. The unweighted short-run wage elasticity for the affiliates of foreign MNEs is about  $-0.6$  and for other firms  $-0.7$ . Barba Navaretti *et al.* suggest that their result might be caused by different skill compositions of the workforce in domestic and foreign-owned firms, in combination with differences in wage elasticities for different skill groups.

Görg *et al.* (2006) do not have any data on the skill level of employees either but still get a different result in their study on wage elasticities in a large survey of



domestic- and foreign-owned plants in Ireland over the period 1983–1998. They report somewhat higher wage elasticities in foreign-owned firms than in domestic firms. The point estimates suggest the wage elasticity to be about  $-0.44$  in domestic firms and about  $-0.5$  in foreign-owned firms (Görg *et al.*, 2006, Table 2, column 3). An interesting feature of their study is a focus on linkages with the local economy and they find wage elasticities to be reduced with such linkages.

Hence, the studies by Barba Navaretti *et al.* (2003) and Görg *et al.* (2006) give opposite results. A difference in the skill composition between MNEs and non-MNEs, or a difference between Ireland and other European countries, might constitute one explanation. Another possible explanation could be that the studies compare elasticities in foreign and domestic firms rather than in MNEs and non-MNEs. It might also be the case that domestically-owned MNEs are of less importance in Ireland (the study by Görg *et al.*) than in most other European countries (the study by Barba Navaretti *et al.*).

### **III. Data and Descriptive Statistics**

The data in our study consist of register based data from Statistics Sweden. Firm- and plant-level data are linked together by way of unique identification numbers. The *firm-level* data (FS) contain a large amount of detailed data for the period 1990–2002, including all manufacturing firms with at least 20 employees and non-manufacturing

firms with at least 50 employees.<sup>4</sup> A large number of variables are included such as value added, capital stock (book value), number of employees, wages, ownership status, sales and industry affiliation. The *plant-level* statistics (RAMS) add detailed information at the plant-level on variables such as the educational level of the labor force. It also adds data on wages for different educational groups. RAMS covers all Swedish plants for the period 1990–2002.<sup>5</sup> A detailed description of the variables is presented in Table A1 in the appendix.

To distinguish between different types of firms, we divide our sample into three groups: foreign-owned MNEs, domestically-owned MNEs, and domestically-owned non-MNEs. A firm is a foreign-owned MNE if, according to information in the firm data, more than 50 percent of the equity is foreign owned.<sup>6</sup> We define a domestically-owned MNE as a firm reporting positive exports to other firms within the corporation. Finally, firms reporting no such exports are classified as domestically-owned non-MNEs.<sup>7</sup> To ensure that we have information on all our key variables, we will study manufacturing firms with at least 50 employees.

Table 1 shows that if we divide our firms by nationality and multinational status, we find that most firms are domestically-owned non-MNEs. Approximately 50 percent of our sample are multinational corporations divided equally between foreign-

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<sup>4</sup> We have a stratified random sample for non-manufacturing firms with less than 50 employees. Data on financial sector firms are not available.

<sup>5</sup> The plant level data are aggregated to the firm level.

<sup>6</sup> Statistics Sweden uses the internationally common 50 percent cut-off in defining foreign ownership. We are not able to study whether the results are sensitive to this definition. However, other authors have examined the sensitivity in related studies (see e.g. Martins (2004) and Barbosa and Louri (2002)). These studies do not find the results to be sensitive to cut-off values.

<sup>7</sup> Export information is available for firms with at least 50 employees or smaller firms with large sales. There might exist a few small multinationals that are classified as local firms, due to missing information on exports. The potential bias is likely to be of minor importance.

owned MNEs and domestically-owned MNEs, an indication of how internationalized the Swedish manufacturing sector is.

-Table 1 about here-

Foreign- and domestically-owned MNEs tend to be rather similar. This means that the major differences between firms are not between domestic and foreign firms, but rather between multinational and non-multinational firms. MNEs are generally larger, have higher average wages and value added, and employ more high educated workers. For instance, average firm size and value added are more than twice as high in MNEs than in non-MNEs.

A large part of our analysis will focus on changes in ownership or, in other words, acquisitions. Our main interest is in firms that change ownership from domestic to foreign or from non-MNE to MNE, but we also include other types of acquisitions as a way of examining if it is ownership or the acquisition itself that has a possible effect on the wage elasticity of labor demand. Figure 1 shows the two types of acquisitions that are of our main interest over the sample period. Foreign acquisitions of domestic firms include acquisitions of domestic MNEs as well as non-MNEs, and acquisitions of non-MNEs by MNEs include acquisitions by domestic as well as foreign MNEs. The number of acquisitions has increased since the early 1990s for both types and averages about 30 per year each over the sample period.

-Figure 1 about here-

#### IV. Model and Econometric Approach

Following the standard approach in the literature, we assume a constant returns to scale production function with two factors of production, capital and labor.<sup>8</sup> The demand for labor is given by Shepherd's lemma and can be expressed as

$$L^D(w, r, Y) = l(w, r)Y[p(w)], \quad (1)$$

where  $w$ ,  $r$ , and  $Y$  are wages, cost of capital and output, respectively.  $l$  is the amount of labor used per unit of output, and  $p$  is the price of output. The elasticity of demand for labor is given by

$$\eta_{LL} = \frac{\partial L^D}{\partial w} \frac{w}{L^D} = L_w^D \frac{w}{L^D} + L_Y^D \frac{\partial Y}{\partial p} \frac{\partial p}{\partial w} \frac{w}{L^D}. \quad (2)$$

The first term on the right-hand side captures a change in labor demand from a change in wages and can be expressed as the share of labor in total production cost times the own Allen elasticity of substitution

$$S_L \sigma_{LL}. \quad (3)$$

The second term on the right-hand side of equation (2) is an indirect effect of wages on labor demand from the effect on output. Assuming that prices equal marginal costs, and once again using Shephard's lemma, this term can be expressed as

$$S_L \phi \quad (4)$$

where, as previously,  $S_L$  is the share of labor in total production cost, and  $\phi$  is output demand elasticity. Combining equations (3) and (4), we can express total labor demand elasticity as

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<sup>8</sup> See e.g. Barba Navaretti and Venables (2004).

$$\eta_{LL} = \frac{\partial L^D}{\partial w} \frac{w}{L^D} = S_L(\sigma_{LL} + \phi). \quad (5)$$

Equation (5) shows that wage changes have a large impact on employment when the share of labor in the total production cost is high. Moreover, the effect on employment comes both from a substitution effect and from an effect on the price of the product and thereby on the quantity sold and the required quantity of labor. In view of the previous discussion, there are reasons why the elasticity might differ between MNEs and non-MNEs. For instance, the first term on the right-hand side in Equation (5), the substitution effect, might be higher in MNEs that do not only have the possibility to substitute between different production factors but also between production factors in different countries. Moreover, if the share of labor in production is comparably low in MNEs, or the market power is relatively high (a small impact of cost changes on product demand), they will tend to have a low wage elasticity of labor demand.

### ***Estimation Approach***

In the first step of our econometric analysis, we aim at examining if there is an ownership effect on the elasticity of labor demand. We distinguish between foreign and domestic firms as well as between multinational and non-multinational firms. The former distinction is comparable with the one in Barba Navaretti *et al.* (2003) and Görg *et al.* (2006). In order to isolate ownership effects from other temporary effects caused by changes in ownership, we use observations only for firms that remain in one type of ownership, that is, domestic, foreign, multinational, or non-multinational firms during the entire period.

Based on equation (5) we specify the following dynamic conditional labor demand function for firm  $i$  in year  $t$ ,

$$l_{it} = \alpha_0 l_{it-1} + \alpha_1 l_{it-2} + \alpha_2 w_{it} + \alpha_3 y_{it} + \alpha_4 \text{owner}_{it} + \alpha_5 (w * \text{owner})_{it} + d_i + d_t + e_{it}$$

where  $l$ ,  $w$ , and  $y$ , are logged values of employment, wages per employee, and output, respectively. We use value added as a proxy for output. Variables  $d_i$ ,  $d_t$ , and  $e_{it}$  are firm-specific time invariant effects, time-specific effects and an i.i.d. error term, respectively. Hiring and firing of employees is presumably costly and the labor force is therefore rigid. Thus, we assume a dynamic model with up to two lags of the dependent variable as regressors. *Owner* is a dummy variable equal to one if a firm is foreign-owned, and zero otherwise, or when we compare multinationals to non-multinationals, it is equal to one if the firm is a multinational. This variable is interacted with  $w$  to allow for ownership differences in wage elasticity. Our focus will be on  $\alpha_2$  and  $\alpha_5$ .  $\alpha_2$  is equal to the estimated elasticity of labor demand with respect to wages for the reference group. For instance,  $\alpha_2$  is, in the case of domestic vs. foreign firms, interpreted as the estimated wage elasticity for domestic firms, whereas the corresponding elasticity for foreign firms is equal to  $\alpha_2 + \alpha_5$ . The coefficients  $\alpha_0$  and  $\alpha_1$  measure the persistence in labor demand. Finally,  $\alpha_3$  is interpreted as the short-run output elasticity.

In the second step of our analysis, we focus on ownership changes. Firms that change ownership are compared to firms that do not change ownership. We study several different types of ownership changes, namely (i) from domestic to foreign, (ii) from domestic non-MNE to MNE, (iii) from domestic non-MNE to foreign ownership,

(iv) from domestic non-MNE to domestic MNE, and finally (v) from domestic MNE to foreign ownership. These different types of acquisitions can guide us to whether it is nationality of ownership, multinational status, or acquisitions *per se* that has the largest impact on labor demand elasticity. We are careful to restrict our sample separately for the different ownership changes in this part of the analysis, to avoid confusing different effects and have a clearly defined reference group of firms. For instance, we restrict our sample to firms that are either domestically owned during the entire period or change ownership from domestic to foreign when we analyze ownership type (i) above (from domestically to foreign owned). Similar restrictions are applied in the other types of acquisitions.

Finally, we estimate separate labor demand equations for different types of labor to address labor heterogeneity. We are able to study if the effects on labor demand elasticity vary between different skill groups, since we have detailed information on the employees' skill composition.<sup>9</sup>

OLS is not appropriate in our study since  $l_{it-s}$  is endogenous to the fixed effects and to output, which gives rise to a “dynamic panel bias”. Therefore, we apply the system GMM approach developed by Arellano and Bover (1995) and Blundell and Bond (1998), which implies that lagged values of  $l_t$  and any other similarly endogenous variables are instrumented. Another estimation method would be difference GMM developed by Arellano and Bond (1991). This estimator uses suitably lagged levels of the endogenous variables as instruments in the first differenced equation. However, Blundell and Bond (1998) have demonstrated that lagged levels of variables may be weak instruments for the variables in first differences if the dependent variable is close to random walk. The

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<sup>9</sup> See Table A1 in the Appendix for information on how employees are classified in skill groups.

system GMM estimator, building on one equation in level and one in differences, improves efficiency by using more instruments. More precisely, the estimator uses first differenced and level versions of the estimating equation, where lagged values and lagged differences can serve as valid instruments for the former and the latter, respectively. The differentiated transformed instruments are assumed to be uncorrelated with the unobserved fixed-effects, implying that first differentiated variables can act as instruments for variables in levels, i.e. instrumenting levels with differences. A particularly important feature of the system GMM for our purpose is that it adds an equation in levels to the system and can, as opposed to difference GMM, estimate time-invariant variables.

The joint validity of the instruments may be tested with the Sargan/Hansen test. In addition, the validity of instruments depends on the assumption that there is no second-order correlation of the residuals of the first-differenced equation. Arellano and Bond (1991) develop a test for the autocorrelation in the idiosyncratic disturbance term  $e_{it}$  that would render some lags invalid as instruments.

The system GMM-analysis in this paper uses the algorithms provided by Roodman (2006). This algorithm takes into account that two-step standard errors are asymptotically more efficient, but have been reported to be downward biased. By implementing a Windmeijer (2005) correction to the two-step standard errors, a more efficient estimator can be reported.

One drawback with the GMM is that results tend to be relatively sensitive to the choice of instruments and the choice of variables being instrumented (Fajnzylber and Maloney, 2001). This is particularly troublesome since most studies do not describe these



choices or whether the specifications differ between estimations. Our default specification instruments the lagged size variables, the wage elasticity variable, the ownership dummy variable, and the interaction term between ownership and wage elasticity. This specification will be used if it passes the three specification tests described above, irrespective of the coefficients or the significance level of the variables. If it does pass these tests, we continue by restricting the lag structure of instruments (first choice) or changing the variables being instrumented. In the results, we will show if we have abandoned the default specification and used a modified specification.

## **V. Results**

### ***Ownership effect***

We start in Table 2 by examining elasticities in a sample of firms that do not change ownership over the period. This criterion allows us to isolate the effect of ownership on wages and not run the risk of capturing an effect of the change in ownership itself – the acquisition.

-Table 2 about here-

The first estimation shows there to be a high persistence in employment as shown by the coefficient of 0.72 on lagged employment (column 1). Moreover, the wage elasticity is  $-0.16$  which is lower than what has been found for many other countries (Barba Navaretti *et al.* 2003; Görg *et al.* 2006). Next, we examine if wage elasticities differ between foreign and domestically-owned firms by including an interaction variable

between foreign ownership and wages (columns 2 to 5). The interaction variable is not statistically significant (column 2), suggesting that there is no significant difference in the wage elasticity between foreign and domestically-owned firms. This result is in accordance with the cross-country study by Barba Navaretti *et al.* (2003), which also found no difference in the wage elasticity between domestic and foreign-owned firms in Sweden.

Barba Navaretti *et al.* (2003) suggest that there might be differences in the skill mix of employees in firms with different ownership and that the wage elasticities for different skill groups differ. This could possibly explain their result of relatively low wage elasticities in foreign firms. We examine this by dividing our sample into low-, medium- and high-skilled employees (see columns 3–5). The results show that the elasticity in domestic firms is higher for medium-skilled than for low-skilled and that the wage elasticity for high-skilled is statistically insignificant. Moreover, foreign-owned firms have a higher elasticity of labor demand for medium-skilled employees, in absolute terms, than domestic firms. This is in contrast to the other two skill groups where we do not find any significant differences between domestic and foreign firms. It is interesting to note that this result corresponds to studies on off-shoring that find medium-skilled employees to suffer most from declining demand (Ekholm and Hakkala, 2005). We conclude by noting that we are not able to provide evidence of the wage elasticity of labor demand being lower in the high-skilled group, which in combination with a different skill composition of the workforce in domestic and foreign-owned firms would result in a lower elasticity in foreign firms, as suggested by Barba Navaretti *et al.* (2003).

Previous studies tend to follow the above approach and study the difference between domestic and foreign-owned firms. Theoretically, we would expect the relevant distinction to rather be between MNEs and non-MNEs. Therefore, we examine the difference in wage elasticities between these two groups in columns 6 to 9 in Table 2. The results suggest there to be no difference between wage elasticities in MNEs and non-MNEs, neither in the aggregate nor for different skill groups. In particular, it should be noted that there is no difference in the medium skilled group, a result that opposes the finding in estimations on foreign- vs. domestically-owned firms.

We follow previous studies in the literature and examine changes in employment in continuing firms. A related response to a wage increase could be to close a plant and expand activities in foreign affiliates (see e.g. Bernard and Sjöholm, 2003; Görg and Strobl, 2003; Bernard and Jensen, 2006; and van Beveren, 2007)). Bandick (2007) uses the same data set as ours to study this issue for Sweden. Interestingly, he finds that foreign-owned MNEs have the highest survival rates and, hence, a relatively low tendency to close down their Swedish affiliates. This, in turn, implies that our results are not driven by a higher risk of plant closures among foreign-owned firms as a response to wage increases.

### ***Acquisition effect***

Our second analytical approach is to analyze the effect of changes in ownership on wage elasticities. We follow this approach in Table 3 where a number of different types of acquisitions are included.

-Table 3 about here-

The wage elasticity ranges between  $-0.10$  and  $-0.20$ . Moreover, as in most previous estimations, there are no signs of a difference in the wage elasticity between domestic- and foreign-owned firms or between MNEs and non-MNEs.

The wage elasticity is affected by the share of wages in total costs as seen in equation (5). As previously explained, wage changes will have a relatively high impact on changes in employment when the share of wages in total costs is high. Moreover, it is possible that multinationals exercise their ability to shift production between countries only when wage costs already constitute a substantial fraction of total costs. When wage costs are relatively small, any changes might have a minor impact on the employment decision. To examine this issue, we divide our sample into three equally large groups according to the wage share in value added. Firms with a relatively low wage share and the group of firms with a relatively high wage share are seen in Table 4. The group with a medium wage share has been omitted from the table. The results suggest that wage elasticities are higher in firms with high wage shares as suggested by theory, but it should be noted that many of the elasticities are statistically insignificant. One plausible explanation to insignificant elasticities is that the variation in wages declines when we divide our sample into high-, medium and low-wage firms.

Moreover, there is no sign of a difference between foreign and domestic firms or between MNEs and non-MNEs. The interaction term between MNE status and wage elasticity is statistically significant among high-wage firms in acquisitions of non-MNEs by domestic MNEs, but the quantitative effect is small. The results in Table 4

suggest that differences in wage shares do not imply differences in wage elasticities across firms as suggested by Barba Navaretti and Venables (2004).

-Table 4 about here -

We continue by estimating the effect of foreign acquisitions on different skill groups. The results in Table 5 show that foreign acquisitions decrease the wage elasticity in two thirds of the estimations, indicating lower elasticities in firms that have been acquired. The results suggest that it is important to control for skills and that a change in ownership from domestic to foreign decreases the wage elasticity. Moreover, there seems to be a larger effect for medium and high-skilled workers than for low-skilled workers and also a larger effect for foreign acquisitions of domestic non-MNEs than for foreign acquisitions of domestic MNEs. The latter result is consistent with the notion that multinationality rather than nationality is of importance for wage elasticities. However, we also find an effect after acquisitions by foreign owners of domestic MNEs which suggest that there are other mechanisms at work than only internationalization. One likely candidate is that the change in ownership itself has an effect on the elasticity.

-Table 5 about here-

We further examine the issue in Table 6 by looking at changes in ownership from domestic non-MNEs to domestic MNEs. If internationalization is the main cause for changes in wage elasticities, we would expect the same effect for a takeover of a

domestic non-MNE firm by a domestic and foreign MNE, respectively. The results suggest this not to be the case: there is a statistically significant effect of a change in ownership only for high-skilled workers and in this group, the coefficient is smaller than the one found in Table 5 for foreign acquisitions of domestic non-MNEs. The effect is even positive in Table 5 and negative in Table 6.

-Table 6 about here-

There are also other reasons for concern. For instance, there are estimations where the wage elasticity is statistically insignificant. In addition, the coefficients suggest that wage elasticity could be positive after an acquisition. Such positive wage elasticity is found for high-skilled workers after all types of ownership changes (Table 5) except for the acquisition of a domestic non-MNE firm by a domestic MNE (Table 6). This does not seem reasonable and the results could be caused by a temporary effect following an acquisition. The turbulence created by a change in ownership might temporarily diffuse the normal relationship between wages and labor demand. Low or positive elasticities for high-skilled workers are consistent with the idea that if acquisitions are driven by access to firm-specific assets, such as skilled labor, new owners are not very sensitive to wage costs of high-skilled labor but may even offer higher wages after the acquisition in order to prevent a loss of important firm-specific skills (Heyman *et al.*, 2006b).

To examine this issue further, we have analyzed the wage elasticity for individual years after a change in ownership.<sup>10</sup> For most types of ownership changes, the wage elasticity coefficients for individual years were statistically insignificant. In the few

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<sup>10</sup> The results are not shown but are available upon request.

instances where they were significant, we found an effect only in the first year after a change in ownership. This suggests that the effect in Table 2 may be a result of temporary effects due to complementarities generated by the acquisition as suggested by, for instance, Norbäck and Persson (2007) rather than by a long-run difference in labor demand between firms with different ownership.

We have also divided our sample into high- and low-wage firms, as previously discussed, and examined the effect of acquisitions on different skill groups. There was no clear pattern of acquisitions affecting different skill groups differently depending on the wage share (not shown).

To sum up the results, there are no strong indications of a general difference in the wage elasticities between firms with different ownership: domestically-owned vs. foreign-owned and non-MNEs vs. MNEs. However, we do find an effect of foreign acquisitions on wage elasticities in estimations on different skill groups. One plausible explanation is that this is caused by the acquisition itself, rather than by internationalization. Moreover, some tentative results indicate that the effect is temporary and that elasticities in firms with different ownership converge a few years after the acquisition.

## **VI. Concluding Remarks**

FDI, and cross-border mergers and acquisitions in particular, have increased substantially over the last decades. As a result, large shares of employees are in most developed countries employed in foreign-owned multinational companies. The increased importance of FDI has arguably benefited employees by, for instance, high real wages but there are

widespread concerns that it may also negatively affect job-security. The fear is that since MNEs can rather easily shift production between affiliates in different countries, job volatility will increase as a consequence. We examine one such aspect of job volatility, namely the wage elasticity of labor demand.

Few studies have examined if wage elasticities differ between firms and those that do examine foreign vs. domestic rather than multinational vs. non-multinational. Moreover, previous studies do not examine the effect of acquisitions on elasticities. Finally, these studies do not have any information on the skill levels of employees which could have an impact on wage elasticities.

We start by examining wage elasticities in firms with different ownership and find no difference between foreign and domestic firms, or between multinational and non-multinational firms. Moreover, it has been argued in previous studies that the skill level of employees in foreign and domestic firms might differ and that the wage elasticities for different skill groups could also differ. We do not find this aspect to be important in the Swedish context: there is no robust difference between wage elasticities for employees of the same skill group employed in firms with different ownership.

We continue our analysis by looking at the effect of acquisitions on wage elasticities. The results show an effect within different skill groups of employees. It seems that acquisitions of domestic firms by foreign owners, or acquisitions of non-MNEs by MNEs, tend to reduce the wage elasticity. However, it is not clear what causes this effect. There is no effect after acquisitions of non-MNEs by Swedish-owned MNEs which suggests that there are other explanations than a pure internationalization effect. One likely explanation is that it is the acquisition itself that explains the changing wage



elasticity and we provide some tentative results suggesting that the diminishing effect on wage elasticity which is found is temporary and that wage elasticities converge shortly after the acquisition. One explanation is that acquisitions create rents generated by firm complementarities and that these rents are divided between different actors including the employees, which could temporarily change the wage elasticities.

Hence, we conclude the paper by noting that there is no strong evidence of an increased volatility of labor demand caused by inflows of FDI.

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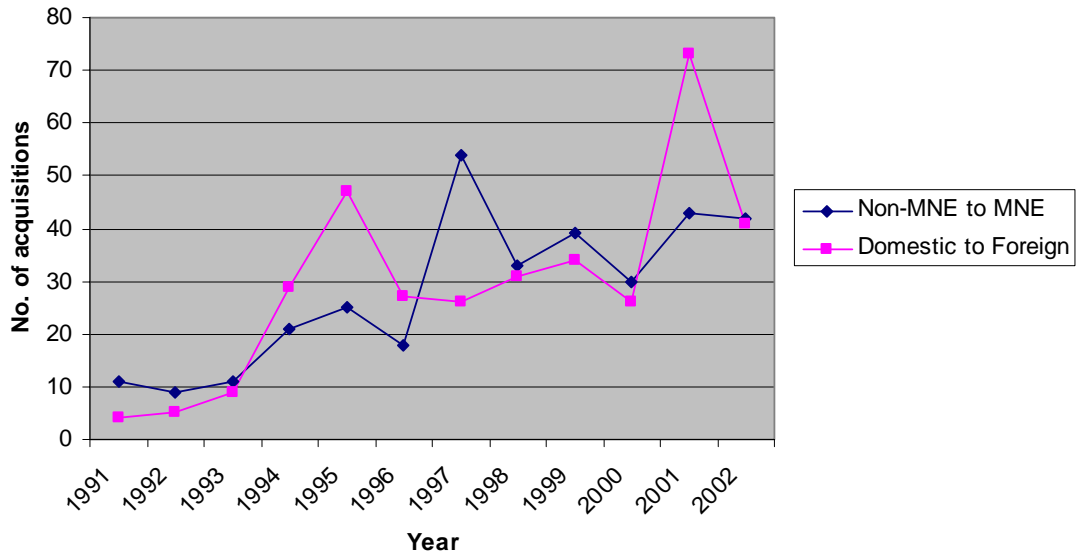
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**Table 1.** Descriptive statistics of firms with different ownership, 1990–2002. Means and standard deviations within parenthesis.

	<b>Domestic Firms</b>	<b>Foreign- owned MNEs</b>	<b>Domestically- owned non-MNEs</b>	<b>Domestically- owned MNEs</b>	<b>MNEs</b>
Firm size	286 (935)	333 (706)	173 (532)	475 (1346)	408 (1094)
Mean wage	205 (47)	226 (45)	201 (49)	213 (42)	219 (44)
Mean wage, high-skill jobs	264 (75)	300 (65)	254 (78)	281 (66)	290 (66)
Mean wage, medium-skill jobs	199 (37)	214 (36)	195 (37)	205 (35)	209 (36)
Mean wage, low-skill jobs	187 (38)	199 (37)	186 (40)	190 (35)	194 (37)
Value added	108 (244)	159 (251)	68 (158)	176 (335)	168 (298)
Share of high-skill jobs	0.14 (0.13)	0.18 (0.13)	0.13 (0.12)	0.16 (0.13)	0.17 (0.13)
Share of medium-skill jobs	0.53 (0.11)	0.53 (0.10)	0.53 (0.12)	0.53 (0.10)	0.53 (0.10)
Share of low-skill jobs	0.33 (0.14)	0.29 (0.13)	0.34 (0.14)	0.31 (0.14)	0.30 (0.13)
Number of observations	15,509	5,150	9,739	5,770	10,920

Note: Figures are based on firms in the entire manufacturing industry with at least 50 employees. No sample restrictions.

**Figure 1. The number of acquisitions in Swedish industry 1991-2002**



**Table 2.** The impact of foreign ownership and multinationality on wage elasticities. No ownership changes, 1990–2002. Dependent variable is log(size).

	Total	Foreign vs. domestic			Multinational vs. non-Multinational				
		All	Low skilled	Medium skilled	High skilled	All	Low skilled	Medium skilled	High skilled
	1	2	3	4	5	6	7	8	9
Size (t–1)	0.72 (8.36)***	0.66 (8.64)***	0.58 (8.19)***	0.55 (8.76)	0.68 (14.11)***	0.82 (18.42)***	0.82 (11.67)***	0.63 (13.80)***	0.60 (9.86)***
Size (t–2)	–0.08 (4.40)***	0.06 (1.04)	–0.01 (0.48)	–0.01 (0.48)	0.03 (1.80)*	–0.09 (5.55)***	–0.03 (0.65)	–0.02 (0.95)	0.11 (2.39)*
Foreign (t)	--	0.041 (0.28)	–1.11 (0.86)	1.37 (2.49)**	0.14 (0.25)	--	--	--	--
Multinational (t)	--	--	--	--	--	–0.00 (0.10)	0.45 (1.06)	0.00 (0.41)	0.52 (0.93)
Wage (t)	–0.16 (2.19)***	–0.42 (4.60)***	–0.38 (1.73)*	–1.02 (6.45)***	–0.08 (0.55)	–0.18 (2.93)***	0.14 (1.08)	–0.93 (5.01)***	–0.02 (0.20)
(Foreign*Wage) (t)	--	–0.003 (0.06)	0.20 (0.83)	–0.25 (2.44)**	–0.01 (0.13)	--	--	--	--
(Multinational*Wage) (t)	--	--	--	--	--	0.00 (0.07)	–0.09 (1.18)	0.00 (0.41)	–0.08 (0.81)
Output (t)	0.29 (5.01)***	0.25 (9.86)***	0.30 (6.82)***	0.39 (8.40)***	0.28 (5.99)***	0.23 (7.72)***	0.16 (5.18)***	0.35 (9.85)***	0.27 (7.08)***
Year	Included	Included	Included	Included	Included	Included	Included	Included	Included
Industry	Included	Included	Included	Included	Included	Included	Included	Included	Included
AR (1)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AR (2)	0.389	0.214	0.438	0.236	0.702	0.695	0.655	0.661	0.318
Hansen	0.237	0.115	0.000	0.118	0.080	0.133	0.118	0.446	0.124
No. of observations	10,264	10,264	10,240	10,257	10,134	8,012	7,996	8,007	7,927

Notes: Results from system GMM estimations. Absolute t-values within parentheses, based on robust Windmeijer (2005) corrected second step standard errors. AR(1) and AR(2) test for first- and second-order autocorrelation (reported p-values). Hansen is a test for over identifying restrictions (reported p-values). The results in columns 2, 5, 7, 8 and 9 are based on alternative specifications as discussed in Section IV. \*\*\* indicate significance at the 1 %-level, \*\* significance at the 5 %-level and \* significance at the 10 %-level.



**Table 3.** The impact of ownership changes on wage elasticities, 1990–2002. Dependent variable is log(size).

	Domestic to Foreign	Domestic non-MNE to MNE	Domestic MNE to Foreign	Domestic non-MNE to Foreign	Domestic non-MNE to Domestic MNE
	1	2	3	4	5
Size (t-1)	0.70 (6.34)***	0.88 (22.21)***	0.74 (8.62)***	0.87 (19.72)***	0.84 (22.35)***
Size (t-2)	-0.07 (3.71)***	-0.11 (5.32)***	-0.04 (1.54)	-0.10 (4.43)***	-0.09 (4.72)***
Foreign (t)	-0.23 (0.59)	--	-0.10 (0.25)	-0.28 (0.75)	--
Multinational (t)	--	-0.01 (0.77)	--	--	-0.00 (0.47)
Wage (t)	-0.16 (1.79)*	-0.13 (2.46)***	-0.13 (1.45)	-0.23 (3.42)***	-0.10 (1.95)*
(Foreign*Wage) (t)	0.04 (0.57)	--	0.02 (0.26)	0.05 (0.77)	--
(Multinational*Wage) (t)	--	0.00 (0.31)	--	--	0.00 (1.37)
Output (t)	0.30 (3.86)***	0.18 (7.87)***	0.25 (4.24)***	0.18 (5.59)***	0.19 (8.50)***
Year	Included	Included	Included	Included	Included
Industry	Included	Included	Included	Included	Included
AR (1)	0.000	0.000	0.000	0.000	0.000
AR (2)	0.453	0.726	0.994	0.916	0.821
Hansen	0.917	0.939	0.970	0.995	0.997
No. of observations	10,699	5,021	2,982	4,115	4,467

Notes: Results from system GMM estimations. Absolute t-values within parentheses, based on robust Windmeijer (2005) corrected second step standard errors. AR(1) and AR(2) test for first- and second-order autocorrelation (reported p-values). Hansen is a test for over identifying restrictions (reported p-values). \*\*\* indicate significance at the 1 %-level, \*\* significance at the 5 %-level and \* significance at the 10 %-level.

**Table 4.** The impact of acquisitions on wage elasticities in firms with different wage shares, 1990–2002. Dependent variable is log(size).

	From Domestic to Foreign		From Swedish non-MNE to MNE		From Swedish MNE to Foreign		From Swedish non-MNE to Swedish MNE	
	Low wage share	High wage share	Low wage share	High wage share	Low wage share	High wage share	Low wage share	High wage share
Size (t-1)	0.74 (10.21)***	0.78 (5.68)***	0.80 (15.24)***	0.98 (21.67)***	0.57 (3.49)***	0.85 (12.43)***	0.71 (14.64)	0.96 (22.66)***
Size (t-2)	-0.06 (2.75)***	-0.10 (3.53)***	-0.10 (3.08)***	-0.13 (3.58)***	-0.03 (0.96)	-0.04 (0.88)	-0.07 (2.34)**	-0.10 (2.78)***
Foreign (t)	-0.02 (0.03)	-1.16 (0.81)	0.02 (1.03)	0.02 (1.44)	-0.67 (0.99)	0.09 (0.16)	0.02 (0.85)	0.01 (0.86)
Wage (t)	-0.01 (0.08)	-0.29 (1.12)	-0.07 (1.39)	-0.26 (2.61)***	-0.20 (1.07)	0.00 (0.04)	-0.06 (0.86)	-0.24 (2.92)***
(Foreign*Wage) (t)	-0.00 (0.01)	0.22 (0.81)	0.00 (0.38)	0.00 (0.11)	0.12 (0.97)	-0.02 (0.15)	0.01 (1.54)	0.01 (2.01)**
Output (t)	0.28 (5.39)***	0.26 (2.36)**	0.23 (7.48)***	0.13 (5.77)***	0.41 (3.01)***	0.17 (4.53)***	0.27 (9.77)***	0.13 (5.37)***
Year	Included	Included	Included	Included	Included	Included	Included	Included
Industry	Included	Included	Included	Included	Included	Included	Included	Included
No. of observations	3,536	3,493	1,615	1,649	1,021	962	1,450	1,454
AR (1)	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000
AR (2)	0.315	0.301	0.727	0.866	0.264	0.530	0.998	0.681
Hansen	0.288	0.033	0.955	0.720	0.976	0.933	0.973	0.774

Notes: Results from system GMM estimations. Firms are divided into three groups according to the wage share in value added. The group of firms with medium wage shares is omitted. Absolute t-values within parentheses, based on robust Windmeijer (2005) corrected second step standard errors. AR(1) and AR(2) test for first- and second-order autocorrelation (reported p-values). Hansen is a test for over identifying restrictions (reported p-values). \*\*\* indicate significance at the 1 %-level, \*\* significance at the 5 %-level and \* significance at the 10 %-level.

**Table 5.** The impact of acquisitions on wage elasticities for different skill groups, 1990–2002. Dependent variable is log(size).

	From Domestic to Foreign			From Domestic non-MNE to Foreign			From Domestic MNE to Foreign		
	Low skilled	Medium skilled	High skilled	Low skilled	Medium skilled	High skilled	Low skilled	Medium skilled	High skilled
	1	2	3	4	5	6	7	8	9
Size (t–1)	0.71 (10.13)***	0.60 (8.36)***	0.71 (16.69)***	0.73 (12.35)***	0.76 (13.36)***	0.72 (14.76)***	0.79 (10.39)***	0.68 (10.17)***	0.70 (10.79)***
Size (t–2)	0.02 (0.28)	–0.00 (0.26)	0.05 (3.38)***	–0.04 (2.23)**	–0.06 (2.34)**	0.07 (2.61)***	0.04 (1.16)	0.00 (0.17)	0.07 (2.49)**
Foreign (t)	–0.59 (0.83)	–3.41 (2.02)**	–3.06 (2.51)**	–4.42 (2.51)**	–4.91 (1.64)	–4.74 (2.37)**	–0.60 (0.47)	–2.15 (2.35)**	–1.56 (1.08)
Wage (t)	–0.40 (2.00)**	–0.84 (4.10)***	–0.10 (0.63)	–0.54 (3.27)***	–0.51 (2.33)**	–0.62 (6.04)***	–0.42 (1.49)	–0.87 (4.21)***	–0.03 (0.17)
(Foreign*Wage) (t)	0.11 (0.85)	0.64 (2.04)**	0.57 (2.53)***	0.82 (2.50)**	0.92 (1.65)*	0.85 (2.42)**	0.11 (0.49)	0.40 (2.34)**	0.27 (1.09)
Output (t)	0.20 (5.98)***	0.34 (6.46)***	0.22 (5.79)***	0.24 (6.42)***	0.25 (7.08)***	0.23 (5.10)***	0.15 (2.79)***	0.28 (5.37)***	0.21 (4.31)***
Year	Included	Included	Included	Included	Included	Included	Included	Included	Included
Industry	Included	Included	Included	Included	Included	Included	Included	Included	Included
AR (1)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AR (2)	0.632	0.624	0.959	0.217	0.239	0.090	0.677	0.594	0.167
Hansen	0.282	0.485	0.291	0.400	0.656	0.717	0.994	0.949	0.970
No. of observations	10,676	10,691	10,565	4,109	4,111	4,039	2,976	2,980	2,971

Notes: Results from system GMM estimations. Absolute t-values within parentheses, based on robust Windmeijer (2005) corrected second step standard errors. AR(1) and AR(2) test for first- and second-order autocorrelation (reported p-values). Hansen is a test for over identifying restrictions (reported p-values). ). The results in columns 1 and 3 are based on an alternative specification as discussed in Section IV. \*\*\* indicate significance at the 1 %-level, \*\* significance at the 5 %-level and \* significance at the 10 %-level.

**Table 6.** The impact of acquisitions on wage elasticities for different skill groups, 1990–2002, continued. Dependent variable is log(size).

	From Domestic non-MNE to Domestic MNE		
	Low skilled	Medium skilled	High skilled
	1	2	3
Size (t–1)	0.69 (8.60)***	0.69 (12.08)***	0.69 (14.70)***
Size (t–2)	0.09 (1.21)	–0.02 (0.46)	0.07 (2.59)***
Multinational (t)	–0.99 (0.98)	1.15 (1.31)	–2.17 (2.18)**
Wage (t)	–0.17 (1.04)	–0.55 (2.49)**	–0.63 (5.73)***
(Multinational*Wage) (t)	0.17 (0.90)	–0.21 (1.29)	0.39 (2.21)**
Output (t)	0.17 (6.33)***	0.28 (8.59)***	0.26 (5.92)***
Year	Included	Included	Included
Industry	Included	Included	Included
AR (1)	0.000	0.000	0.000
AR (2)	0.195	0.733	0.167
Hansen	0.786	0.583	0.437
Number of observations	4,455	4,462	4,380

Notes: Results from system GMM estimations. Absolute t-values within parentheses, based on robust Windmeijer (2005) corrected second step standard errors. AR(1) and AR(2) test for first- and second-order autocorrelation (reported p-values). Hansen is a test for over identifying restrictions (reported p-values). \*\*\* indicate significance at the 1 %-level, \*\* significance at the 5 %-level and \* significance at the 10 %-level.

## Appendix

**Table A1.** Variables.

<b>Firm variable</b>	<b>Description</b>	<b>Source</b>
Wage	Average wage compensation per employee, including payroll taxes, 1990 year prices.	FS
Size	Number of employees.	FS
Capital Intensity	Capital stock per employee, 1990 year prices.	FS
Output	Value added, 1990 year prices (in 100,000 SEK)	FS
High Skilled	Share of workers with at least a 3 year post-secondary education.	RAMS
Medium skilled	Share of workers with 1–2 years of upper secondary education.	RAMS
Low Skilled	Share of workers with at most 9 years of elementary education.	RAMS
Foreign ownership	Dummy=1 if more than 50 percent of a firm's votes are foreign owned.	FS
Industry affiliation	Industry classification based on two-digit SIC.	FS

Note: Abbreviations: Financial Statistics (FS) and Plant-level statistics (RAMS).