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Abstract

This paper investigates the employment effects of foreign acquisitions in acquired firms in Swedish manufacturing during the 1990s, a period characterized by a dramatic increase in foreign ownership. To handle likely endogeneity problems, we evaluate the effects of foreign acquisitions on the targeted firms' employment by combining propensity score matching with difference-in-difference estimation. We find some evidence of positive employment effects in firms taken over by foreigners and it seems that the employment of skilled labor increases more than the employment of less-skilled labor. Moreover, we examine whether the employment impact of foreign ownership differs between takeovers of Swedish MNEs and non-MNEs. Our results indicate that the positive employment effects only appear in acquired non-MNEs. Furthermore, we observe shifts in skill intensities toward higher shares of skilled labor in non-MNEs taken over by foreign MNEs but not in acquired Swedish MNEs.

Key words: Foreign acquisitions, labor demand, matching, difference-in difference, multinational enterprises
JEL classification: F16, F23, J23

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1. Introduction

During the 1990s, Sweden has witnessed a dramatic increase in foreign ownership mainly driven by foreign acquisitions of Swedish owned firms. This has entailed that at the beginning of the 2000s, the employment share in foreign owned firms in manufacturing was among the highest in OECD.[1] In the public Swedish debate, as well as in other countries with similar experiences, such a development has given rise to mixed feelings. Some fear that foreign acquisitions lead to job losses in acquired firms because foreign owners would be less committed to the host economy. Moreover, multinational enterprises (MNEs) are more footloose owing to their possibilities to relocate production and employment between their affiliates in different countries. Others maintain that foreign acquisitions strengthen the competitiveness of the acquired firms due to transfers of technology, knowledge and skills from the acquiring foreign MNE which, in turn, improve the performance in target firms which may involve higher employment.

The purpose of this paper is to contribute to this discussion by carrying out a systematic investigation of the effects of foreign acquisitions on employment in acquired firms. To this end, we use a panel of Swedish manufacturing firms between 1993 and 2002. A number of papers have examined the impact of domestic acquisitions on employment and the results are ambiguous.[2] Other, more recent studies for the UK have focused on employment effects of foreign acquisitions. Girma and Görg (2004) provide some evidence of reduced employment growth in domestic plants taken over by foreigners in the electronics sector but not in the food sector. Girma (2005) finds, on average, no impact of foreign acquisitions on employment in acquired domestic firms. Huttenen (2007) finds that foreign acquisition has a negative effect on the share of highly educated workers among the plant's employees.[3]

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[1] As compared to 21 other OECD countries in 2002, only Ireland, Luxembourg and Hungary had larger employment shares than Sweden in foreign owned firms in manufacturing. Moreover, in the service sector, where the prevalence of foreign ownership is generally lower than in manufacturing, the employment share in foreign owned firms is high in Sweden (Hansson et.al. 2007).

[2] See e.g. Brown and Medoff (1988), Lichtenberg and Siegel (1990), McGuckin and Nguyen (2001) for the US and Conyon et. al. (2001) and (2002) for the UK.

[3] Brännlund et. al. (2004) is the only study of which we are aware that examines the effects of foreign ownership on employment using Swedish data. As a theoretical framework, they utilize a model where trade unions and employers bargain over wages and employment. Their empirical analysis is based on a panel of around 200 firms in Swedish manufacturing spanning over the period 1980-1994. They find no effect on employment of foreign ownership.

As in Girma (2005) and Girma and Görg (2004), we evaluate the effects of foreign acquisitions on the targeted firms' employment by combining propensity score matching with difference-in-difference estimation; a method suggested by e.g. Blundell and Costas Dias (2000).[4] The advantage of this approach is that we can deal with likely endogeneity problems. Domestic firms taken over by foreign firms are not randomly acquired, rather their characteristics differ systematically from those of non-acquired firms. Foreign investors may, for instance, cherry pick firms with good proprieties, such as firms with high productivity and high wages. Biased estimates on the employment effect will then arise if these characteristics also influence post-acquisition employment trajectories and are not controlled for. The difference-in-difference estimator, which compares the difference in employment before and after the acquisition of acquired firms with the difference in employment of non-acquired firms in the same period, allows for the existence of time-invariant factors that affect the selection.

To preview our results, we find some evidence of positive employment effects in firms taken over by foreigners. If we, like Girma and Görg (2004), divide employment into skilled and less skilled labor, it appears that employment of skilled labor increases more than employment of less-skilled labor.[5] In Girma and Görg (2004), there is a reduction in employment of unskilled labor, whereas in plants acquired by foreign firms in the electronics industry, the employment of skilled labor is unaffected

Finally, we postulate that the impact on employment of foreign ownership differs depending on whether a Swedish MNE or a non-MNE is taken over. We expect the scope for restructuring and changes in employment to be larger in acquired non-MNEs than in more productive Swedish MNEs acquired by foreign firms. Moreover, we anticipate larger potentials for technology transfer from foreign MNEs to acquired non-MNEs than to acquired MNEs. If technological changes are skilled-biased we expect to see more pronounced shifts in skill intensities towards higher shares of skilled labor in non-MNEs taken over by foreign MNEs.[6] The results from our empirical analysis are consistent with both these hypotheses.

[4] Using similar methods, Karpaty (2007) finds a positive effect on productivity in Swedish firms acquired by foreign owners.
[5] Our definition of skilled and less-skilled labor is based on educational attainment, whereas in Girma and Görg (2004) non-production workers are supposed to be skilled and production workers to be unskilled.
[6] The same hypothesis is put forward and tested using a different approach in Bandick and Hansson (2005).

The paper is structured as follows. Section 2 outlines the methodological framework and the econometric specifications. Section 3 describes the data and the construction of the matched sample. Section 4 reports the empirical findings. Section 5 summarizes and concludes.

2. The methodological framework

Our empirical modeling problem is to evaluate whether there is a causal effect of foreign acquisition on employment *y* in a targeted domestic firm. We let $AF_{it} \in \{0,1\}$ be an indicator of whether firm *i* is acquired by a foreign firm in time period *t* and let y^1_{it+s} be employment at time $t+s$; $s \geq 0$, following acquisition. Firm *i*'s employment had not been acquired is denoted y^0_{it+s}. We define the causal effect on employment of a foreign acquisition of firm *i* at time *t* as

$$y^1_{it+s} - y^0_{it+s} \tag{1}$$

However, the problem is that y^0_{it+s} is obviously unobservable, instead we observe y^1_{it+s}. This missing data problem is fundamental in evaluations of causal effects. Based on the microeconometric literature,[7] we define the average effect of acquisition of the acquired firms as:

$$E\{y^1_{t+s} - y^0_{t+s} | AF_{it} = 1\} = E\{y^1_{t+s} | AF_{it} = 1\} - E\{y^0_{t+s} | AF_{it} = 1\} \tag{2}$$

The challenge we face is to construct the counterfactual, the last term in equation (2), i.e. what would the employment in acquired firms have been, on average, had they not been acquired. One way of tackling this problem is to use the average employment of firms that still are domestically owned, $E\{y^0_{it+s} | AF_{it} = 0\}$. Unfortunately, there are strong reasons to believe that AF_{it}, if a firm *i* is acquired or not at time *t,* is endogenously determined, affected by contemporaneous effects. This must be taken into account, otherwise the estimate of the casual effect of foreign acquisition will be biased.

[7] See e.g. Heckman et.al. (1997) and Deheija and Wahba (2002).

Another approach is to employ matching techniques. With such techniques, we are able to construct a sample of non-acquired twin firms to acquired firms to approximate for the non-observed counterfactual event in equation (2). Matching involves pairing acquired with non-acquired firms with similar pre-acquisition characteristics *X*, e.g. productivity, wages, size, etc. The method we use is propensity score matching due to Rosenbaum and Rubin (1983). This technique has the advantage of summarizing all observables *X* into a single index variable. To implement propensity score matching, we begin by estimating the probability (or propensity score) of being acquired by a foreign firm using a probit model:

$$p(AF_{it} = 1) = F(X_{it-1}, D_j, D_t) \tag{3}$$

where $AF_{it} = 1$ if a domestically owned firm in year $t-1$ becomes foreign owned in year *t*. X_{it-1} is a vector of relevant firm-specific characteristics in year $t-1$ which may affect the firm's probability of being acquired in year *t*. D_j and D_t control for fixed industry and time effects. Once the propensity scores are calculated, we can (using the "caliper" matching method) select the nearest control firms in which the propensity score falls within a pre-specified radius as a match for an acquired firm.[8]

When we have identified the control group of firms, we proceed and estimate the impact of foreign acquisitions on employment by using a difference-in-difference estimator. This estimator compares the difference in employment of the acquired (treated) firms *A* before $t-1$ and after $t+s \quad s \geq 0$ with our control group of non-acquired firms *C*. Formally, the parameter we want to estimate is $\gamma_{t+s} = \left(y^A_{t+s} - y^A_{t-1}\right) - \left(y^C_{t+s} - y^C_{t-1}\right)$ and we can obtain it by regressing data pooled across treated firms and firms in the control group[9]

$$y_{it-1,t+s} = \beta_0 + \beta_1 AF_i + \beta_2 After_{t+s} + \beta_3 AF_i \times After_{t+s} + \varepsilon \tag{4}$$

where $y_{it-1,t+s}$ is our outcome variable. AF_i is a dummy variable taking the value of 1 for acquired (treated) firms *A* and 0 for non-acquired firms *C*. It controls for constant differences

[8] The procedure we utilize to match treated (acquired) firms with control (non-acquired) firms is the PSMATCH2 routine in Stata version 9 described in Leuven and Sianesi (2003). In our analysis, the pre-specified radius is set to 0.01.

[9] See Woolridge (2002).

in employment between target firms and firms in the control group before the acquisition. We define the dummy variable $After_{t+s}$ as taking the value of 1 in post-acquisition years $t+s$ and 0 before acquisition $t-1$. This dummy variable captures aggregate period effects that are common between the two groups *T* and *C*. Finally, the term $AF_i \times After_{t+s}$ is an interaction term between AF_i and $After_{t+s}$. Its coefficient β_3 represents the difference-in-difference (DiD) estimator of the effect of acquisition on the acquired (treated) firms *A*, i.e. $\beta_3 = \gamma_{t+s}$. An advantage of the DiD estimator is that it eliminates unobserved time-invariant differences in employment between acquired and non-acquired firms. *Table 1* summarizes the interpretation of the coefficients in the regression in equation (4). Moreover, in our empirical analysis below, we also include a vector of firm characteristics to control for differences in observable attributes between firms.

Table 1 Difference-in-difference (DiD) estimator

3. Data and description

3.1 The data

The data used in this paper covers the period 1993 to 2002 and includes all manufacturing firms with 20 employees or more. It has been collected by Statistics Sweden (SCB) and Swedish Institute for Growth Policy Studies (ITPS). For each firm, we have information on sales, value added, employment, and capital stocks. Moreover, the employees can be divided into skilled and less-skilled labor and we define skilled labor as employees with some post-secondary education. In addition, the firms can be separated into foreign-owned firms, Swedish owned MNEs and non-MNEs. In foreign-owned firms (foreign MNEs), foreigners possess more than 50 percent of the voting rights. A Swedish MNE is a domestically owned firm that is part of an enterprise with affiliates abroad.[10] Non-MNE firms are firms that are neither Swedish MNEs nor foreign MNEs.

Table 2 Swedish MNEs, foreign MNEs and non-MNEs: Number of firms and employment shares 1993-2002.

[10] The first year in which we can distinguish Swedish MNEs from non-MNEs is 1993 and explains why our analysis begins in 1993.

During the 1990s, Swedish manufacturing experienced a substantial increase in foreign ownership. *Table 2* shows how the numbers of firms and the employment shares have developed among Swedish MNEs, foreign MNEs and non-MNEs over the decade 1993-2002.[11] The employment share of foreign MNEs has grown from 17 percent to 38 percent and their share of the firms from 2 percent to 11 percent. This trend appears to have evolved at the expense of Swedish MNEs because their employment share has fallen from 58 percent to 35 percent and their share of firms has decreased from 26 percent to 19 percent. The importance of non-MNEs seems, on the other hand, to have remained more or less unchanged over the period studied. The employment share of non-MNEs fluctuates between 26 and 30 percent and their share of the firms between 70 and 75 percent.

Table 3 Frequency of foreign acquisitions by year 1993-2002

Table 3 reports, by year, the frequencies of foreign acquisitions in the manufacturing sector for firms with at least 20 employees. The number of foreign acquisitions varies considerably between years, from 37 in 1998 to 121 in 1996. On average, there are 64 foreign acquisitions per year and most of them, around 80 percent, consist of non-MNEs acquired by a foreign firm.

Table 4 Foreign acquisitions by sectors 1994-2002

In *Table 4,* we can see that more than 8 percent of all manufacturing firms have been acquired by foreign firms over the period studied. At the sector level, the table shows that foreign acquisition shares are especially high in chemicals, but also in the sectors of basic metals and paper and pulp products. A more systematic analysis on a more disaggregated industry level shows that the employment shares of foreign-owned firms are large in industries with high R&D intensity and a high degree of product differentiation, indicating that there are substantial economies of scale on the enterprise level in such industries. Moreover, the average size of plants and trade ratios tends to be low in industries with a large foreign presence, which suggests that economies of scale are small at the plant level and that trade

[11] Notice that the figures in Table 2 differ from Figure 1 in Bandick (2007). This since the latter is based on plant-level data and includes all manufacturing plants irrespective of size. Due to the cut-off limit at 20 employees and the fact that non-MNE firms are smaller than MNE firms, the employment share of MNEs (foreign as well as Swedish) is larger here than in Bandick (2007).

costs are high.[12] These results are consistent with implications from the theory of horizontal foreign direct investment.

Table 5 Differences in means between foreign acquired firms and non-acquired firms in pre- and post-acquisition years. All firms

Firms taken over by foreigners differ from non-target firms in many respects. *Table 5* points out differences in characteristics and performance between acquired and non-acquired firms before and after acquisition for all manufacturing firms with 20 employees or more. In the first column, which describes the situation one year before acquisition ($T = -1$), we can see that firms taken over by foreigners are larger. Both employment and shipment are significantly higher in acquired firms. Furthermore, they have higher capital-labor ratios and they are more skill intensive. To some extent this may explain the higher labor productivity in acquired firms and that these firms also pay higher wages. The results in the first column thus provide us with some evidence of "cherry picking", i.e. that firms with good characteristics and performance are more likely to be targeted for acquisitions by foreigners. From the other columns in *Table 5* that depict the pattern at the time of acquisition ($T = 0$) and after acquisition ($T > 0$), we infer that the differences between acquired and non-acquired firms appear to be persistent. The targeted firms continue to be larger, more capital and skill intensive, have higher productivity and pay higher wages than non-targeted firms.

From the discussion in section 2, we know that differences in characteristics and performance between target and non-target firms before acquisition could bias estimates of the causal effect of foreign acquisition. The reason is that it is difficult to distinguish whether firms' performance in post-acquisition years is attributable to the foreign takeover or to the fact that foreign firms tend to acquire firms with good characteristics and high performance. To overcome this problem, we apply a matching approach.

3.2 The matched sample

Our aim is to construct a sample of non-acquired (non-treated) firms − a comparison group − with similar pre-acquisition characteristics as the acquired (treated) firms. This group is supposed to constitute the counterfactual outcome: What would the outcome be in the

[12] See chapter 4 in Hansson et.al. (2007). The results are similar to empirical findings for other developed countries (Barba Navaretti and Venables 2004).

acquired firms had they never been acquired? To this end, we employ the propensity score matching method outlined in section 2. We estimate the propensity score, i.e. the conditional probability of being acquired by a foreign firm, by using the probit model in equation (3).

To determine the firm specific characteristics that may affect a firm's probability of being acquired, we notice that there is no consensus, neither in the theoretical nor in the empirical literature, about what causes a foreign acquisition.[13] Arguably, a key factor is differences in expected profits between the owner of the firm and the buyer. For instance, we would expect to observe acquisitions in cases where the buyer believes that the profits will rise in a potential target firm owing to the implementation of, e.g. better management, organization or technology, etc. Unfortunately, expected profits are not known to the econometrician. Therefore, in our probit model, we include observable characteristics such as the variables in Table 5. The variables used in the probit model are assumed to be important for the creation of a comparison group that comes from the same economic environment.

To evaluate different specifications, we use the balancing condition which controls that each independent variable does not differ significantly between treated and non-treated firms. This means that only treated and non-treated firms with the same propensity score and the same distribution of their observable characteristics will be matched. The set of explanatory variables that fulfils the balancing condition criterion is: firm labor productivity, a firm's employment relative to industry mean (two-digit) firm employment, age of firm and age squared, firm skill intensity, a dummy variable indicating whether the firm is a Swedish MNE firm or not, and the share of foreign employment at the industry level (two-digit) as a proxy of foreign presence in the industry.[14] All variables are lagged one year. *Table 6* shows the results from estimating the probit model.

Table 6 Probit model to estimate propensity score

[13] Norbäck and Persson (2007a) and (2007b) set up a model for acquisition, greenfield and no entry and show that inward FDI affects the domestic economy through efficient ownership, competition effects and knowledge dispersion. In their model, they analyze different scenarios with a specific focus on welfare effects in the host country due to inward FDI either by acquisition or greenfield entry.

[14] Average wages, capital-labor ratios and sales are other firm-specific variables that may affect a firm's probability of being acquired. The variables are not included in the probit model since the criteria for the balancing condition are not fulfilled. However, we control for these variables in the estimations of the difference-in-difference regression model in section 4.

We find that skill intensive firms with high productivity are more likely to be acquired by foreign firms. Moreover, firms in industries with a large foreign presence are more often taken over. Finally, it appears that younger firms (non-linear relationship), relatively large firms, and firms of Swedish MNEs have higher probabilities of being targeted by foreign firms. However, for the latter variables, the coefficients are only significant at the 10 percent level.

Table 7 Differences in means between foreign acquired firms and non-acquired firms in pre- and post-acquisition years. Matched firms.

Another condition that must be fulfilled in the matching procedure is the so-called common support condition. This criterion implies that at each point in time, a newly acquired (treated) firm is matched with non-target firms with propensity scores that are only slightly larger or less than those of the target firm. Some treated firms may be matched with more than one non-acquired firm, while acquired firms not matched with a non-treated firm are excluded. Furthermore, since our purpose is to study post-acquisition employment dynamics, we only include firms for which information is reported at least three years after acquisition in the analysis.[15] Eventually, we end up with a sample, henceforth denoted the matched sample, which consists of 181 treated and 372 non-treated firms.

The aim of the matching procedure is thus to find a group of non-acquired firms that displays the same characteristics as the group of acquired firms. To see whether the treatment and the control group differ, in *Table 7,* we once more report differences in means with respect to size, productivity, factor intensities and wages, but this time for the acquired and non-acquired firms that were successfully matched together. Regarding size, and to a large extent also labor productivity and factor intensities, the matching procedure has been successful in reducing the difference between acquired and non-acquired firms. However, there are still significant differences in wages. Compared to the unmatched sample in *Table 4*, the differences have also been substantially reduced in these variables.

[15] Moreover, firms that switch back and forth between different ownership status and greenfield operations are excluded.

4. Difference-in-difference matching results

To examine whether foreign acquisitions of Swedish owned firms have had any effects on employment in post-acquisition years, we estimate the regression model in equation (4). Our dependent variable is employment at the firm level in logs and the key estimate is the difference-in-difference (DiD) estimator β_3. *Table 8* reports the effects of foreign takeovers on post-acquisition total employment. The sample consists of matched firms remaining in the panel at least five consecutive years.

Table 8 Effects of foreign acquisitions on post-acquisition total employment

Column (i) presents the results from OLS estimations of the basic model in equation (4). The DiD estimator is positive, which suggests that, on average, foreign acquisitions have had a positive effect on total employment in the years following takeovers. However, the coefficient is only significant at the 10 percent level and in column (ii), where we add firm-level controls, the acquisition effect on employment disappears.

To investigate the dynamic pattern of the post-acquisition employment effect, in column (iii), we replace the interaction variable for the whole post-acquisition period $AF_i \times After_{t+s}$ with year-by-year interaction variables. None of the coefficients on these year-by-year interactions variables are significant.

The positive and significant estimate on the dummy variable, AF_i, indicates that there is a difference between acquired and non-acquired firms before acquisition. Employment appears to be larger in target firms before takeover.[16] However, this difference is heavily reduced as compared to the results from the sample consisting of all firms remaining at least five years in the panel, as shown in *Table A1*.

Even though the differences in pre-acquisition characteristics between treated and non-treated firms in the matched sample were substantially reduced, according to *Table 7* there still seem to be significant differences in some characteristics that may affect the results. One way of taking remaining differences into account is to estimate a firm-fixed effect (FE) model. In

[16] Note that in our matching procedure we do not use employment but relative employment.

such a model, time invariant permanent firm-specific effects are absorbed by the fixed effect transformation. The DiD estimator in the fixed effect model in column (iv) suggests that foreign acquisitions have had a positive impact on employment in target firms. Total employment has, on average, increased by about 4 percent in acquired firms relative to non-acquired firms after takeover.

In *Tables 9* and *10*, we present results showing whether the employment effects of foreign acquisitions differ between skilled and less-skilled labor. We estimate the same type of specifications as in *Table 8* and the result for skilled labor is reported in *Table 9* and that for less-skilled labor in *Table 10*.

Table 9 Effects of foreign acquisitions on post-acquisition skilled labor employment

Table 10 Effects of foreign acquisitions on post-acquisition less-skilled labor employment

We notice that a similar pattern stands out in *Table 9* and *Table 10*. Yet the positive employment effect for skilled labor is more pronounced. Comparing the results in the fixed effect model in specifications (iv), we find that after acquisition, skilled labor employment, on average, grew by 8 percent, whereas less-skilled labor employment, on average, increased by almost 4 percent in target firms relative to non-target firms.

In the 1990s, many important manufacturing Swedish MNEs have been targets in foreign acquisitions.[17] In *Table 2*, we observed that the employment share of foreign MNEs in Swedish manufacturing increased at the expense of Swedish MNEs. Yet, we also noticed in *Table 3* that, on average, only 20 percent of the firms acquired by foreigners were Swedish MNEs. We presume that the impact on employment after takeover may differ due to whether the acquired firm is a Swedish MNE or a non-MNE. The reason is that the scope for restructuring and changes in employment is probably less in firms already operating in multinational networks. Such firms are forced to be more efficient and we know that MNEs tend to have higher productivity than non-MNEs. The possibilities of development after foreign acquisitions are better in non-MNEs. Accordingly, we expect larger employment changes in non-MNEs than in Swedish MNEs after foreign takeovers. Moreover, technology

[17] Firms such as Astra, Pharmacia, Volvo Car and Saab Automobile are some well-known former Swedish MNEs that shifted ownership in the 1990s and nowadays are foreign owned.

transfers are more likely to take place when foreign-owned firms acquire non-MNEs, since the technology levels are high in Swedish MNEs even before takeover. If technological changes owing to technology transfers to acquired firms are skilled-biased, we also expect to see the shares of skilled labor grow faster in non-MNEs taken over by foreigners than in targeted Swedish MNEs.

To investigate these hypotheses, we interact our key variable $AF_i \times After_{t+s}$ (and the treatment dummy AF_i) with dummies showing the status of the acquired firm − Swedish MNE or non-MNE − before takeover; if $MNE_i = 1$ firm *i* was a Swedish MNE and if $NMNE_i = 1$, it was a non-MNE. *Table 11* shows the results.

Table 11 Effects of foreign acquisitions on post-acquisition employment in targeted MNEs and non-MNEs

The DiD estimators indicate that there are positive effects on employment after acquisition in non-MNEs, whereas there seems to be no impact of foreign acquisitions on employment in Swedish MNEs. From our fixed effect model, in specification (ii), we infer that, on average, employment in acquired non-MNEs is 6.5 percent higher after a takeover relative to non-acquired firms. If we divide employment into skilled and less-skilled employment, our estimates suggest that after acquisition, employment of skilled labor has grown faster than employment of less-skilled labor in targeted non-MNEs. This indicates that foreign acquisitions have led to increased skill intensities in acquired non-MNEs, relative to non-targeted firms. In acquired Swedish MNEs, foreign takeovers appear to have no effect, neither on skilled labor employment, nor on less-skilled labor employment, and thus, not on skilled intensities either.[18]

[18] The results conform to the outcome in Bandick and Hansson (2005).

5. Concluding remarks

In the 1990s, the employment share in foreign owned firms in Swedish manufacturing has grown spectacularly. To examine the employment effects in firms that have become foreign owned in the 1990s, we utilize a propensity score matching technique with difference-in-difference estimation. We allowed these effects to be different for less-skilled and skilled employees. Moreover, we argue that the effect may be smaller in firms already engaged in international networks. Therefore, we also allowed for differential impact on employment due to acquisitions of Swedish MNEs and acquisitions of non-MNEs.

Our analysis gives no support to the worries that foreign acquisitions may lead to job losses in acquired firms. If anything, there are some indications of positive employment growth in acquired non-MNEs, especially of skilled labor, which may be due to technology transfers from the acquiring foreign MNEs that lead to skilled-biased technical change in acquired non-MNEs. In Swedish MNEs taken over by foreigners, on the other hand, there appear to be no employment effects at all.

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Table 1 Difference-in-difference estimator.

	Before acquisition	After acquisition	Difference
Acquired (treated) firms	$\beta_0 + \beta_1$	$\beta_0 + \beta_1 + \beta_2 + \beta_3$	$\beta_2 + \beta_3$
Non-acquired (control) firms	β_0	$\beta_0 + \beta_2$	β_2
Difference	β_1	$\beta_1 + \beta_3$	β_3

Table 2 Foreign MNEs, Swedish MNEs and non-MNEs: Number of firms and employment shares 1993-2002.

Year	Foreign MNEs		Swedish MNEs		Non-MNEs	
	Firms (Percent)	Employment Percent	Firms (Percent)	Employment Percent	Firms (Percent)	Employment Percent
1993	50 (2.1)	16.7	603 (25.7)	57.6	1693 (72.2)	25.7
1994	86 (3.5)	17.4	619 (24.9)	56.8	1777 (71.6)	25.8
1995	115 (4.3)	20.0	601 (22.6)	50.1	1949 (73.1)	29.9
1996	166 (5.7)	22.7	553 (19.1)	48.6	2175 (75.2)	28.7
1997	183 (6.1)	23.2	550 (18.5)	49.6	2245 (75.4)	27.2
1998	204 (6.5)	24.7	552 (17.6)	48.0	2378 (75.9)	27.3
1999	223 (7.2)	29.1	585 (19.0)	42.2	2269 (73.7)	28.7
2000	253 (8.0)	32.7	603 (19.1)	40.2	2296 (72.8)	27.1
2001	326 (10.2)	37.3	588 (18.4)	34.4	2276 (71.3)	28.3
2002	340 (10.9)	38.0	604 (19.4)	35.3	2162 (69.6)	26.7

Table 3 Frequency of foreign acquisitions by year 1993-2002.

	1994	1995	1996	1997	1998	1999	2000	2001	2002	94-02
Non-MNEs to foreign MNEs	40 (95.2)	35 (81.4)	79 (65.3)	34 (79.1)	29 (78.4)	45 (71.4)	49 (87.5)	95 (94.1)	58 (81.7)	51.6 (80.4)
Swedish MNEs to foreign MNEs	2 (4.8)	8 (18.6)	42 (34.7)	9 (20.9)	8 (21.6)	18 (28.6)	7 (12.5)	6 (5.9)	13 (18.3)	12.6 (19.6)
Total	42	43	121	43	37	63	56	101	71	64.2

Notes: Percent of total number of foreign acquisitions within parenthesis.

Table 4 Foreign acquisitions by sectors 1994-2002.

Industry	Target firms	Number of firms*	Acquisition share Percent
Food, beverages and tobacco	28	440	6.4
Textiles, apparel and leather	10	182	5.5
Wood products	33	576	5.7
Paper and pulp products	20	122	16.4
Printing and publishing	35	617	5.7
Chemicals	44	138	31.9
Rubber and plastics	25	266	9.4
Non-metallic products	23	161	14.3
Basic metals	19	111	17.1
Non-electrical machinery	55	1,043	5.3
Electrical machinery	75	816	9.2
Telecommunication	18	209	8.6
Professional goods	9	141	6.4
Motor vehicles	24	172	14.0
Transport equipment	25	204	12.3
and other manufacturing	21	426	4.9
Total	464	5,624	8.3

Notes: *Unique number of firms during the period in each sector.

Table 5 Differences in means between foreign acquired firms and non-acquired firms in pre- and post-acquisition years. All firms.

Variable	Unmatched firms Target vs. non-target firms				
	$T=-1$	$T=0$	$T=1$	$T=2$	$T=3$
	Difference (t-ratio)	Difference (t-ratio)	Difference (t-ratio)	Difference (t-ratio)	Difference (t-ratio)
Employment	277 (6.65)***	286 (6.66)***	323 (6.75)***	329 (6.85)***	333 (7.01)***
Shipment	626 (7.12)***	727 (6.78)***	784 (6.09)***	647 (5.01)***	233 (2.28)**
Labor productivity	85 (2.20)***	44 (0.70)	65 (3.41)***	84 (2.19)**	84 (3.64)***
Capital-labor ratio	150 (2.41)***	138 (2.46)***	146 (2.48)***	164 (2.49)***	165 (2.46)***
Skill intensity	5.4 (5.13)***	5.5 (5.60)***	5.4 (5.73)***	5.0 (5.23)***	5.1 (5.26)***
Average wage	26 (7.48)***	26 (7.45)***	27 (8.95)***	25 (7.94)***	23 (6.93)***
Wages: skilled	71 (9.72)***	68 (9.51)***	64 (9.52)***	61 (9.01)***	55 (7.48)***
Wages: less-skilled	19 (7.10)***	19 (7.06)***	19 (7.78)***	18 (7.46)***	17 (6.41)***
Observations					
Target firms	192	192	192	192	192
Non-target firms	3,659	3,659	3,659	3,659	3,659

Notes: Shipment is in million SEK. Wages, capital-labor ratios and labor productivity, value added per employee, are in thousand SEK. Skill intensity, share of employees with a post-secondary education, is in percentages. $T=-1$ means one year before acquisition and $T=3$, accordingly, three years after acquisition.

Table 6 Probit model to estimate propensity score.

Variables	Probability of foreign acquisition
Labor productivity	0.214 (3.45)***
Relative employment	0.005 (1.82)*
Skill intensity	0.139 (3.86)***
Age	−0.030 (1.95)*
$(Age)^2$	0.001 (2.05)**
Swedish MNE	0.118 (1.94)*
Foreign presence	0.071 (2.54)**
Year dummies	Yes
Pseudo R^2	0.043
LR chi2(13)	105.18
Observations	14,148

Notes: The dependent variable $AF_{it} = 1$ if a domestically owned firm in year $t-1$ becomes foreign owned in year *t*. z-statistics is within parenthesis. The explanatory variables are, with the exception of foreign presence, firm specific characteristics in year $t-1$. Relative employment is firm employment relative to mean firm employment at the industry level. Labor productivity is value added per employee and skill intensity is the share of employees with post-secondary education at the firm level. Age is age of the firm and Swedish MNE is a dummy variable indicating whether the firm is a Swedish MNE firm or not, and the share of foreign employment at industry the level (two-digit) is a proxy of foreign presence in the industry.

Table 7 Differences in means between foreign acquired firms and non-acquired firms in pre- and post-acquisition years. Matched firms.

Variable	Matched firms Treated vs. control firms				
	$T = -1$	$T = 0$	$T = 1$	$T = 2$	$T = 3$
	Difference (t-ratio)	Difference (t-ratio)	Difference (t-ratio)	Difference (t-ratio)	Difference (t-ratio)
Employment	99 (0.98)	88 (0.84)	126 (1.04)	139 (1.15)	156 (1.32)
Shipment	380 (1.46)	424 (1.39)	462 (1.29)	280 (0.92)	-166 (0.73)
Labor productivity	49 (1.98)**	23 (1.11)	26 (1.22)	46 (1.97)**	48 (1.89)*
Capital-labor ratio	-21 (0.09)	75 (1.15)	81 (1.13)	113 (1.86)*	109 (1.69)*
Skill intensity	1.9 (1.56)	2.0 (1.69)*	1.7 (1.43)	1.2 (1.06)	1.4 (1.22)
Average wage	19 (7.37)***	19 (5.82)***	21 (7.60)***	16 (5.20)***	13 (3.29)***
Wages: skilled	39 (6.76)***	35 (6.26)***	34 (6.09)***	28 (4.65)***	19 (2.13)**
Wages: less-skilled	15 (6.24)***	16 (5.03)***	18 (7.64)***	14 (4.82)***	10 (3.23)***
Observations					
Target firms	181	181	181	181	181
Non-target firms	372	372	372	372	372

Notes: See notes Table 5.

Table 8 Effects of foreign acquisitions on post-acquisition total employment

Variables	(i) DiD OLS (t-ratio)	(ii) DiD OLS (t-ratio)	(iii) DiD OLS (t-ratio)	(iv) DiD FE (t-ratio)	(v) DiD FE (t-ratio)
$AF_i \times After_{t+s}$	0.077 [1.73]*	0.041 [0.95]		0.037 [2.14]**	
$AF_i \times After_{t+1}$			0.033 [0.70]		0.011 [0.38]
$AF_i \times After_{t+2}$			-0.019 [0.35]		0.022 [0.80]
$AF_i \times After_{t+3}$			0.042 [0.80]		0.042 [1.47]
$AF_i \times After_{t+4}$			0.045 [0.73]		0.055 [1.84]*
$AF_i \times After_{t+5}$			0.112 [1.56]		0.048 [1.48]
AF_i	0.350 [3.13]***	0.339 [3.24]***	0.340 [3.22]***		
$After_{t+s}$	0.001 [0.03]	-0.008 [-0.23]		-0.014 [-1.03]	
Firm controls	no	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes
Industry dummies	yes	yes	yes	no	no
$\overline{R}^2$	0.37	0.46	0.46		
R^2 within				0.057	0.059
R^2 between				0.131	0.119
R^2 overall				0.061	0.055
Observations	3,643	3,643	3,643	3,643	3,643

Notes: As firm controls we use average wage, sales and capital-labor ratio. Square brackets [ ] give White's heteroskedasticity-consistent *t* statistics.

Table 9 Effects of foreign acquisition on post-acquisition skilled labor Employment.

Variables	(i) DiD OLS (t-ratio)	(ii) DiD OLS (t-ratio)	(iii) DiD OLS (t-ratio)	(iv) DiD FE (t-ratio)	(v) DiD FE (t-ratio)
$AF_i \times After_{t+s}$	0.104 [2.00]**	0.095 [1.85]*		0.080 [3.56]***	
$AF_i \times After_{t+1}$			0.112 [1.96]**		0.078 [2.15]**
$AF_i \times After_{t+2}$			0.056 [0.88]		0.068 [1.85]*
$AF_i \times After_{t+3}$			0.060 [0.93]		0.066 [1.77]*
$AF_i \times After_{t+4}$			0.086 [1.14]		0.090 [2.31]**
$AF_i \times After_{t+5}$			0.167 [1.97]**		0.122 [2.84]***
AF_i	0.358 [2.79]***	0.298 [2.48]**	0.299 [2.45]***		
$After_{t+s}$	0.009 [0.21]	-0.033 [-0.79]		-0.013 [-0.73]	
Firm controls	No	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes
Industry dummies	yes	yes	yes	no	no
$\overline{R}^2$	0.43	0.53	0.53		
R^2 within				0.157	0.141
R^2 between				0.004	0.120
R^2 overall				0.015	0.056
Observations	3,643	3,643	3,643	3,643	3,643

Notes: See notes Table 8.

Table 10 Effects of foreign acquisition on post-acquisition less-skilled labor employment.

Variables	(i) DiD OLS (t-ratio)	(ii) DiD OLS (t-ratio)	(iii) DiD OLS (t-ratio)	(iv) DiD FE (t-ratio)	(v) DiD FE (t-ratio)
$AF_i \times After_{t+s}$	0.090 [1.96]**	0.046 [1.05]		0.037 [2.07]***	
$AF_i \times After_{t+1}$			0.031 [0.67]		0.005 [0.17]
$AF_i \times After_{t+2}$			-0.016 [0.30]		0.023 [0.77]
$AF_i \times After_{t+3}$			0.058 [1.05]		0.047 [1.58]
$AF_i \times After_{t+4}$			0.058 [0.93]		0.062 [2.00]**
$AF_i \times After_{t+5}$			0.120 [1.63]		0.048 [1.39]
AF_i	0.346 [3.27]***	0.346 [3.27]**	0.347 [3.25]***		
$After_{t+s}$	-0.008 [-0.21]	-0.008 [-0.22]		-0.016 [-1.09]	
Firm controls	no	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes
Industry dummies	yes	yes	yes	no	no
$\overline{R}^2$	0.35	0.44	0.44		
R^2 within				0.040	0.042
R^2 between				0.061	0.051
R^2 overall				0.034	0.030
Observations	3,643	3,643	3,643	3,643	3,643

Notes: See notes Table 8.

Table 11 Effects of foreign acquisition on post-acquisition employment in targeted MNEs and non-MNEs.

Variables	Total employment		Skilled labor		Less-skilled labor	
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
	DiD OLS (t-ratio)	DiD FE (t-ratio)	DiD OLS (t-ratio)	DiD FE (t-ratio)	DiD OLS (t-ratio)	DiD FE (t-ratio)
$MNE_i \times AF_i \times After_{t+s}$	-0.057 [-0.87]	-0.021 [-0.85]	-0.047 [-0.63]	0.015 [0.45]	-0.033 [-0.48]	-0.011 [-0.44]
$NMNE_i \times AF_i \times After_{t+s}$	0.121 [2.41]**	0.065 [3.23]***	0.170 [2.83]***	0.104 [3.95]***	0.120 [2.31]***	0.064 [3.04]***
$MNE_i \times AF_i$	0.500 [2.59]***		0.617 [2.85]***		0.457 [2.34]***	
$NMNE_i \times AF_i$	0.044 [0.39]		-0.052 [-0.41]		0.070 [0.61]	
$After_{t+s}$	-0.021 [-0.62]	-0.012 [-0.90]	-0.033 [-0.82]	-0.008 [-0.47]	-0.022 [-0.62]	-0.014 [-1.03]
Firm controls	yes	Yes	yes	yes	yes	yes
Year dummies	yes	Yes	yes	yes	yes	yes
Industry dummies	yes	No	yes	no	yes	no
$\overline{R}^2$	0.45		0.53		0.43	
R^2 within		0.060		0.141		0.042
R^2 between		0.076		0.087		0.033
R^2 overall		0.044		0.048		0.023
Observations	3,643	3,643	3,643	3,643	3,643	3,643

Notes: See notes Table 8.

Appendix

Table A1 Effects of foreign acquisitions on post-acquisition employment, unmatched sample.

Variables	Total employment		Skilled employment		Less-skilled employment	
	(i)	(ii)	(iii)	(iv)	(v)	(vi)
	DiD OLS (t-ratio)	DiD OLS (t-ratio)	DiD OLS (t-ratio)	DiD OLS (t-ratio)	DiD OLS (t-ratio)	DiD OLS (t-ratio)
$AF_i \times After_{t+s}$	0.196 [4.91]***	0.152 [3.84]***	0.202 [4.82]***	0.156 [3.61]***	0.211 [4.81]***	0.166 [3.94]***
AF_i	0.851 [9.22]***	0.702 [8.84]***	1.032 [9.67]***	0.801 [8.72]***	0.815 [8.67]***	0.692 [8.56]***
$After_{t+s}$	-0.079 [5.32]***	-0.076 [5.27]***	-0.123 [7.15]***	-0.120 [7.20]***	-0.086 [5.64]***	-0.083 [5.68]***
Firm controls	no	yes	no	Yes	no	yes
Year dummies	yes	yes	yes	Yes	yes	yes
Industry dummies	yes	yes	yes	Yes	yes	yes
$\overline{R}^2$	0.20	0.30	0.30	0.40	0.17	0.28
Observations	30,053	30,053	30,053	30,053	30,053	30,053

Notes: As firm controls we use average wage, sales and capital-labor ratio. Square brackets [ ] give White's heteroskedasticity-consistent *t* statistics.