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DO WORKERS BENEFIT FROM FOREIGN OWNERSHIP?

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Abstract

The paper examines whether foreign-owned firms pay higher wages than domestically owned firms, controlling for a number of firm characteristics. As in most other similar studies I find that this appears to be the case. In particular, skilled labor seems to profit from working in foreign-owned firms. Furthermore, I distinguish between Swedish multinational enterprises (MNEs) and other domestically owned firms. In accordance with the idea that MNEs are superior to other firms the former pays significantly higher wages than other domestically owned firms. Foreigners acquiring high-wage Swedish MNEs may thus account for the higher wages in foreign-owned firms. Alternatively, the acquired firms might have more favorable wage growth than non-targeted domestically owned firms. Nevertheless, the two explanations are not mutually exclusive I only get support for that foreign firms select high-wage firms (Swedish MNEs as well as non-MNEs) for acquisition.

Key words: wage differentials, multinational enterprises, foreign ownership
JEL classification: F23, J31

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1. Introduction

From the theory on multinational enterprises (MNEs)[1] one might expect that multinationals pay higher wages than the predominant wage level. The reason is that firms that become MNEs possess firm-specific assets – unique products and production processes or intangibles, such as trademarks or reputations for quality – that induce productivity and profitability gaps between MNEs and other firms. This idea builds upon the conjecture that doing business abroad entails higher costs and risks than operating on the domestic market; only the most productive and innovative firms will find it profitable to engage in foreign production.[2] Also, the firm-specific assets involve that MNEs have an opportunity to pay non-competitive wages, i.e. in MNEs there exist some rents to be shared. The efficiency wage literature offers then some economic reasons why such behavior could be profitable and increase productivity: (i) minimization of turnover costs[3] (ii) motivation on workers' efforts, (iii) enhancement of workers' loyalty, and (iv) selection of workers with high quality.[4]

Multinational enterprises – Swedish-owned MNEs and foreign-owned firms – are dominating employers in Swedish manufacturing. More than 70 percent of the employees in manufacturing firms are employed in MNEs.[5] This is one important motive for investigating whether MNEs pay higher wages than non-MNEs for similar type workers in Swedish manufacturing. Moreover, in contrast to most other studies on foreign ownership and wages I am able to distinguish between wages paid by Swedish MNEs and foreign-owned firms. To preview my results I find, using a panel of manufacturing firms during the 1990s, that wages are almost 7 percent higher in foreign MNEs than in similar Swedish non-MNEs and Swedish MNEs pay more than 4 percent higher wages than Swedish non-MNEs. Notably, the wage differential between foreign MNEs and Swedish MNEs is significant.

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[1] See the early contributions by, e.g. Hymer (1960) and Dunning (1977). More recently, theories have been formalized and Markusen (2002) provide a thorough and synthesized survey of the modern models on MNEs.
[2] Helpman, Melitz and Yeaple (2004) set up a model predicting that only the most productive firms in an industry engage in FDI. They also provide evidence that MNEs have significant productivity advantages relative to non-MNEs.
[3] One could imagine MNEs to be particularly concerned by worker turnover when their firm-specific assets consist of proprietary technologies. Therefore, they may be willing to pay a wage premium to reduce the speed with which it leaks out to competitors as employees change jobs.
[4] Stiglitz (1987) surveys the theoretical literature on efficiency wages.
[5] See Figure 2 below where the firms have 20 employees or more.

Substantially increased foreign ownership is a striking feature in Swedish manufacturing in the 1990s. Partly, this situation has emerged as a result of foreign MNEs acquiring large Swedish MNEs. An obvious explanation to the higher wages in foreign owned firms might thus be that foreign MNEs have taken over Swedish MNEs that already pays higher wages. However, the higher wage level in foreign-owned firms could also proceed from a more general self-selection mechanism. Foreign-owned firms take over firms with good properties (cherry-picking). For instance, the targeted firms – Swedish MNEs or other Swedish firms – have employees with advantageous characteristics (often unobserved to an econometrician) and such firms pay relatively high wages.[6] By using a unique, detailed panel dataset on Swedish manufacturing firms in the 1990s I have the opportunity to examine these hypotheses. The results suggest that acquired Swedish firms pay higher wages before takeover, and this applies both to targeted Swedish MNEs and to targeted non-MNEs.

Another, not mutually exclusive, explanation to the higher wage level in foreign-owned firms is when transfers of foreign MNEs' firm-specific assets to acquired Swedish firms improve the post-acquisition performance of the targeted firms. Better ex-post performance might be manifested in, e.g. more favourable wage growth in acquired firms relative to firms that continue to be domestically owned. In contrast to self-selection (cherry-picking) the direction of causality between foreign ownership and wages runs here the other way around.

To investigate the hypothesis of improved post-acquisition performance I exploit my panel data on Swedish manufacturing firms in three different ways. First, by using a simple regression model, where I examine whether post-acquisition wage growth is higher in targeted firms. Second, by utilizing a firm-fixed effect model I can compare the wage level before and after the acquisition in firms that have turned into foreign ownership. Third, by employing a matching method. This latter method means that I pair together firms that have shifted to foreign ownership and firms with similar characteristics that continue to be domestically owned. After that I estimate if there is a difference in post-acquisition wage growth between the two types of firms. In none of the three approaches I am able to detect any significant differences in the development of wages after firms has been acquired by foreign MNEs.

[6] Consistent with this is the hypothesis that ownership transfers are associated with purchase and integration of good properties into new firms. Both McGuckin and Nguyen (1995), for US manufacturing, and Harris and Robinson (2002), for UK manufacturing, find that plants with high productivity were the most likely to experience ownership change. Yet the post-acquisition performance differs in the two studies. US plants that experienced ownership change improved their productivity, whereas in UK plants taken over by foreigners there is some evidence of decline in productivity.

The plan of the paper is as follows. Section 2 presents my panel data on Swedish manufacturing firms. Moreover, it shows some descriptive statistics on foreign-owned and domestically owned firms to see to what extent they differ. Also, it illustrates the increased importance of foreign ownership in Swedish manufacturing in the 1990s. In section 3, I estimate wage premiums in foreign MNEs and Swedish MNEs relative to non-MNEs. In section 4.1, I examine whether foreign firms acquire high wage Swedish firms (cherry picking) and, in section 4.2, if wage growth is better in firms taken over by foreigners. Section 5 summarizes and concludes.

2. Data and description

The dataset I employ in this study is supplied by Statistics Sweden and has been compiled into a microeconomic database at the Trade Union Institute for Economic Research (FIEF). The data comes from financial accounts of enterprises and register-based labor statistics. The dataset is a panel of firms that consists of all manufacturing firms with 20 employees and more for the period 1986 to 2000.[7] The constructed panel include 9833 unique firms and 870 firms are in the panel the whole fifteen-year period.[8] The firms' share in total manufacturing employment is about 95 percent, which is a rough indicator on the coverage of the panel, and indicates that the investigated firms represent most of the employment in Swedish manufacturing.

Figure 1 Employment share of foreign-owned firms in Swedish manufacturing, 1986-2000.

A foreign-owned firm is defined as a firm where foreign investors possess more than 50 percent of the voting rights. Foreign ownership has risen significantly in Swedish manufacturing between 1986 and 2000. *Figure 1* shows that the employment share in foreign-owned firm has increased by almost 25 percentage points over the period. Yet it was not until 1994 the employment in foreign-owned firms took off indeed. Since Sweden became member

[7] Obviously, this is an advantage compared to the many studies using plant data, since most of the theoretical arguments to why foreign-owned firms differ refer to firm or company level (Pfaffermayr and Bellak, 2002). One problem with plant data is, for instance, is that non-production workers, such as R&D personnel, employees at head-quarters and data-processing centers, might not be physically located at manufacturing establishments, but at auxiliary establishments (Doms and Jensen, 1998).

[8] More information on the panel can be found in Table A1 in Appendix.

of the European Union (EU), in 1995, the employment share in foreign-owned firms has increased by about 15 percentage points.

Table 1 Number of foreign firms and frequency of international ownership changes.

The development of the number of foreign firms and the frequencies of international ownership changes, in *Table 1*, reveal the same pattern. There is a steady increase in the number of foreign-owned firms and the number of ownership changes from domestic to foreign ownership is larger in the period after 1994 than in the period before 1994. Between 1986 and 1994, on average, 35 firms changed from domestic to foreign ownership, whereas the corresponding figure for the period 1994 to 2000 is 63 firms. After 1994 ownership changes from foreign to domestic ownership grew as well, yet the share of all international ownership changes is still around 25 percent. The most likely reasons to the increased foreign ownership are that regulations that prevented foreigners from acquiring Swedish firms were abolished and the general trend in developed countries towards an increasing amount of international mergers and acquisitions.[9] In *Table 1* we observe that between 1986 and 1994, on average, 1.3 percent of the firms in the panel changed ownership internationally, whereas that figure had increased to 2.3 percent in the period 1994 to 2000.

According to the theory on MNEs foreign firms are at an inherent disadvantage in the domestic market and must then have a specific advantage that enable them to invest abroad. Therefore, foreign firms might differ from domestically owned firms and a simple way to investigate that is to compare various characteristics of foreign-owned and domestically owned firms. *Table 2* shows the differences between foreign-owned and domestically owned firms in 1986 and 2000

Table 2 Characteristics of foreign-owned and domestically owned firms, 1986 and 2000.

[9] Other factors put forward are: (i) the Swedish tax system favour foreign ownership at expense of private Swedish ownership (Jonung 2002), (ii) Swedish firms were particularly cheap to acquire owing to the depreciation of the Swedish Krona in the beginning of the 1990s, (iii) the Swedish "business climate" had improved significantly in the 1990s compared with the situation in the 1980s, and (iv) it has been more inviting to acquire Swedish firms after the membership in the European Union (Malmberg and Sölvell 1998).

In *Table 2* we can see that foreign-owned firms pay significantly higher wages.[10] However, we also notice that the skill intensities (the shares of medium-skilled and high-skilled labor)[11] and the capital-labor ratio are higher in foreign-owned firms. Moreover, the size of foreign-owned firms is larger; employment and shipment are significantly higher. However there is no significant difference in the share of female workers. Differences in skill and capital intensities may explain the difference in wages between foreign-owned and domestically owned firms. Furthermore, it is an established fact that larger firms tend to pay higher wages,[12] which might be another source to the wage differential between foreign-owned and domestically owned firms. This means that to determine whether foreign-owned firms pay higher wages we have to rely on regression analysis, where we control for variations among the firms in skill intensities, capital-labor ratios and size. Lastly, we observe that foreign-owned firms have significantly higher labor productivity.[13]

3. Do foreign-owned firms pay higher wages?

To analyse whether there is a differential in wages between foreign-owned and domestically owned firms I estimate the following model

$$\ln w_{jit} = \alpha + \beta FO_{jt} + \lambda Firm_{jt} + \gamma_1 Industry_{jt} + \gamma_2 Year_t + \varepsilon_{jt} \qquad (1)$$

w_{jit} is average wage in firm j, in industry i at time t. In some specifications I divided average wage into skilled labor wage w^s and less-skilled labor wage w^u. FO_{jt} is a dummy variable for foreign ownership; $FO_{jt} = 1$ implies that firm j is foreign-owned at time t. $Firm_{jt}$ is a vector of firm specific characteristics, such as capital-labor ratio $\ln(K/L)$, shares of medium-

[10] As in most other similar studies wages are calculated as compensation/number of workers, which means that I do not take hours of work into account. This is a possible source of mismeasurement, even though it may be a more severe problem outside manufacturing (Lipsey 2002).
[11] Employees with some post-secondary education are defined as skilled labor. Most likely, such a division into skilled and less-skilled labor is more appropriate than the often used, e.g. in Doms and Jensen (1998), non-production/production worker classification. In addition, I divide skilled labor into medium-skilled and high-skilled labor. Employees with post-secondary education three years and more are high-skilled labor and employees with post-secondary education less than three years are medium-skilled labor.
[12] Oi and Idson (1999) survey that literature.
[13] The labor productivity differential between foreign-owned and domestically owned firms in Swedish manufacturing is still significant when variations in factor intensities and size are taken into account (Karpaty 2004).

skilled (*MS/L*) and high-skilled labor (*HS/L*), share of female workers (*Female/L*) and size $\ln(employment)$. $Industry_{jt}$ are industry dummy variables,[14] $Year_t$ are time dummies, and ε_{jt} is an error term.

Table 3 Foreign ownership wage premium, 1986-2000.

Foreign ownership wage premiums are shown in *Table 3*. According to column (1) foreign-owned firms pay, on average between 1986 and 2000, more than 9 percent higher wages than domestically owned firms. Partly, this wage differential is explained by a concentration of foreign-owned firms to industries that pay high wages. Controlling for industry effects, in column (2), reduces the wage differential to 7.6 percent. The significant differential between foreign–owned and domestically owned firms is sustained even when firm characteristics, such as capital-labor ratios, skill intensities, the share of female workers and size, are taken into account. Yet we notice, in column (3), that the differential has fallen to 4.1 percent, which signify that such controls play an important role. Moreover, we remark that the coefficients on all control variables have the expected sign and are highly significant. Finally, as is evident from columns (4) and (5), the wage differential between workers in foreign-owned firms and domestically owned firms appears to be more pronounced for skilled labor; 10.1 percent for skilled labor, whereas it is 4.3 percent for less-skilled labor. Hence, skilled labor seems to benefit more from working in foreign-owned firms.

It is well known that Swedish MNEs has been, and still are, dominating employers in Swedish manufacturing (see Figure 2 below). As MNEs they also should possess firm-specific assets that makes them more productive and profitable than non-MNEs. This means, in turn, that they, like foreign owned firms, would be able to pay higher wages. Consequently, significant differences should exist between MNEs and non-MNEs, rather than between domestically owned and foreign-owned firms (Doms and Jensen 1998).

To distinguish the relative importance in Swedish manufacturing of MNEs and non-MNEs and of foreign-owned and domestically owned firms, I divide the firms in our dataset into three groups: Swedish MNEs, foreign-owned firms, and non-MNEs. Between 1993 and 2000

[14] For the whole period 1986-2000 I use a consistent classification into 20 industries (Table A2 in Appendix), whereas for the period 1993-2000 I employ the SNI92 3-digit code (99 industries).

I am capable to discern Swedish MNEs and other domestically owned firms. A Swedish MNE is a domestically owned firm that has at least one affiliate abroad or is part of an enterprise group that has affiliates abroad.[15] Non-MNEs are firms that neither are Swedish MNEs nor are foreign-owned firms. *Figure 2* illustrates how the share of employment has developed for the various types of firms between 1993 and 2000.

Figure 2 Employment share in foreign-owned firms and in Swedish MNEs in Swedish manufacturing, 1993-2000.

In the figure I have excluded the non-MNEs since the employment share of that group has been almost constant, around 26 percent over the period. This implies that a considerable share of the employees in Swedish manufacturing is working in MNEs. From the figure we observe that the employment shares in Swedish MNEs and in foreign MNEs mirror each other; the share in foreign MNEs has increased at the expense of the share in Swedish MNEs. The employment share in Swedish MNEs has fallen from 55 percent in 1993 to 43 percent in 2000, whereas the employment share in foreign-owned firms, during the same period, has risen from 18 percent to 33 percent. One important explanation is that over the period several large Swedish MNEs has become foreign-owned due to mergers with and acquisitions by foreign MNEs, e.g. Pharmacia and Upjohn 1995 and Ford and Volvo Car Corporation 1999. In *Table 4*, we see that not quite 30 percent of the changes in ownership from domestic to foreign is Swedish MNEs turning into foreign MNEs. Also, worth noting is that these firms are significantly larger than other Swedish firms that become foreign-owned, on average, 630 employees compared with 215 employees in other Swedish firms.

Table 4 Frequency of ownership changes from Swedish MNEs to foreign MNEs, 1993-2000.

Table 5 Characteristics of MNEs (foreign and Swedish) and non-MNEs in Swedish manufacturing, 2000.

The summary statistics in *Table 5* indicates, as we expected, that the important differences in characteristics appear to exist between MNEs and non-MNEs. Swedish MNEs pay higher wages, have higher share of female workers, are more skill intensive, have higher capital-

[15] Contrary to Doms and Jensen (1998) my data also include smaller Swedish MNEs. Among U.S. firms that have more 500 employees they distinguish between plants in U.S. MNEs and plants in other U.S. firms; U.S. MNEs are defined as U.S. firms with foreign assets comprising more than 10 percent of total assets.

labor ratios, are larger, and have higher productivity than non-MNEs. All these differences are significant, whereas, on the other hand, there are no significant differences (except in productivity and wages for less-skilled) between foreign MNEs and Swedish MNEs.

To determine if the wages differ between the various types of firms I estimate the same regression model as in equation (1) for the period 1993 to 2000, except that I add another dummy variable $SMNE_{jt}$. $SMNE_{jt} = 1$ if firm j is a Swedish MNE at time t.

$$\ln w_{jit} = \alpha + \beta_1 FO_{jt} + \beta_2 SMNE_{jt} + \lambda Firm_{jt} + \gamma_1 Industry_{jt} + \gamma_2 Year_t + \varepsilon_{jt} \qquad (2)$$

β_1 and β_2 tells us whether foreign-owned firms and Swedish MNEs pay higher wages than non-MNEs. By testing the hypothesis $\beta_1 = \beta_2$ we can see if the wage level in foreign-owned firms and Swedish MNEs differ. *Table 6* presents the estimates.

Table 6 MNE (foreign and Swedish) wage premium in Swedish manufacturing, 1993-2000.

From column (1) we infer that foreign-owned firms pay 4.7 percent higher wages than domestically owned firms. Comparing the estimates in column (1) with my result in Table 3 column (3) indicates that using a more detailed industry classification and shortening of the time period do not affect the result to any larger extent (if so the wage differential is larger in Table 6). When I divide the domestically owned firms into Swedish MNEs and non-MNEs we observe that the wage differential is larger between foreign-owned firms and non-MNEs. According to column (2) the wages are 6.6 percent higher in foreign MNEs, whereas Swedish MNEs only pay 4.1 percent more than non-MNEs. Moreover, I find the wage differential of 2.5 percent between foreign MNEs and Swedish MNEs to be significant. Like in Table 3, it appears to be skilled labor that benefits most from working in MNEs, particularly in foreign-owned firms. Column (3) hints that the wage differential for skilled labor in foreign-owned firms and in non-MNEs is as large as 13.8 percent, while for less-skilled labor it is just 7 percent. A similar, yet less marked, pattern occurs between Swedish MNEs and non-MNEs.[16]

[16] Doms and Jensen (1998) obtain similar result for US manufacturing plants in 1987. Also in their study (Table 7.5), the large differences exist between plants of MNEs (foreign-owned and US-owned) and plants of other US firms. However, in contrast to my result in Table 6 it is plants of US MNEs that pay the highest wages and the production ("less-skilled") workers that gain most from working in MNEs.

4. Selection or favourable wage growth?

Section 3 has documented that foreign-owned firms pay higher wages than domestically owned firms. However, I also found that Swedish MNEs have higher wage level than other domestically owned firms. These results are consistent with the conjecture that the ability to pay high wages is linked to whether a firm is MNE or not, rather than related to if a firm is foreign-owned or not. The positive relationship between wages and foreign ownership might then be explained by the fact that many Swedish MNEs, through international mergers and acquisitions, have turn into foreign MNEs; firms already paying high wages have become foreign-owned. Nevertheless, the causality may as well run the other way around; firms that become foreign-owned have better wage growth than firms that continue to be domestically owned. Moreover, worthy of notice is that these two hypotheses are not mutually exclusive.

4.1 Do foreigners acquire high-wage firms?

To answer the question whether foreign firms pay higher wages simply because they acquire high-wage domestically owned firms I run the following regression model

$$\ln w_{jit-1} = \alpha + \beta FO_{jt} + \lambda Firm_{jt-1} + \gamma_1 Industry_{jt-1} + \gamma_2 Year_{t-1} + \varepsilon_{jt-1} \qquad (3)$$

Here, I select firms that are domestically owned in year *t-1* and regress ownership status in year *t* along with firm-specific characteristics in *t-1* on their wage level in year *t-1*. We can interpret the β coefficient as the wage premium in future acquired firms one year before the acquisition took place. A positive sign on β indicates that firms taken over by a foreign firm one year before the acquisition had relatively high wage level compared to those firms not been acquired by foreign firms.[17] The results are given in *Table 7*.

Table 7 Foreign ownership and selection of high-wage firms, 1993-2000.

The β coefficient in column (1) indicates that the wage level in targeted firms is significantly higher (3.1 percent) one year before the foreign takeover occurs than in firms that continue to

[17] I emphasize there is no causal effects; the regression equation in (3) is purely descriptive.

be domestically owned.[18] This indicates that almost 66 percent of the wage differential between foreign owned firms and domestically owned firms already exist before the foreign takeover between targeted firms and firms that continue to be Swedish owned.[19]

From Table 6 we know that Swedish MNEs pay higher wages than non-MNEs and Figure 2 shows that during the studied period several Swedish MNEs have turned into foreign MNEs. The result in column (1) might then be driven by high-wage Swedish MNEs becoming foreign owned. To examine to what extent this actually is the case I add, in column (2), a dummy variable $(SMNE)_{jt-1}$ which point out whether firm j is a Swedish MNE in $t-1$, $(SMNE)_{jt-1}=1$, or not. Moreover, I append an interaction variable $(SMNE)_{jt-1} \times FO_{jt}$. This means that I am capable to obtain estimates on wage levels in Swedish MNE, as well as non-MNEs, before foreign takeovers relative to the wage level in non-MNEs that continue to be domestically owned. Not surprisingly, the ex-ante wage level in Swedish MNEs is higher (4.1 % - 1.2 % = 2.9 %) and significant (t-value = 3.01). However, the wage level the year before foreign takeover is significantly higher in targeted non-MNEs as well (4.1 %). Hence and most interesting, the higher ex-ante wage level we observe in column (1) appears not only to be explained by high-wage Swedish MNEs becoming foreign-owned, even targeted non-MNEs pay high wages. Likewise in column (1), we notice, in columns (3) and (4), that ex-ante skilled, as well as ex-ante less-skilled, wages are significantly higher in firms acquired by foreign firms. *Table 8* summarizes the wage differentials between targeted firms and indigenous non-MNEs the year before foreign takeover.

Table 8 Wages in targeted firms (and indigenous Swedish MNEs) relative to indigenous non-MNEs the year before foreign takeover.

4.2 Do firms acquired by foreigners have better wage growth?

There are several ways to examine whether domestically owned firms taken over by foreign firms enjoy higher wage growth than firms that continue to be domestically owned. I will use three different approaches to investigate that. First, I compare the rate of growth in wages

[18] Using the longer time period 1986-2000 gives similar result. The wage levels in targeted firms are significantly higher (3.0 %).
[19] The 3.1 percent ex-ante wage differential is related to the estimate on *FO* in Table 6 column (1), where the wage differential is 4.7 percent.

between these types of firms in a simple regression model. Second, I utilize a panel model with fixed firm effects. Third, I employ a matching approach.

A simple regression model

A straightforward method to evaluate the effect of foreign ownership on the development of wages is to regress the rate of growth in wages over a time period (here four years) on ownership status in the beginning of the period and control for changes in factor intensities and for initial firm characteristics.

$$\Delta \ln w_{jiT} = \left(\ln w_{jit+3} - \ln w_{jit-1}\right)/4 = \alpha + \beta FO_{jt} + \lambda_1 \Delta Firm_{jT} + \lambda_2 Firm_{jt-1} + \gamma_1 Industry_{jt-1} + \gamma_2 Year_T + \varepsilon_{jT} \quad (4)$$

$\Delta \ln w_{jiT}$ is the annual average rate of wage growth in firm j in industry i over the four-year time period T, i.e. between $t-1$ and $t+3$. In the analysis I select all firms that are domestically owned in $t-1$ and FO_{jt} equals 1 if firm j is foreign owned at time t. As firm controls $\Delta Firm_{jT}$ I add changes in female worker share, capital-labor ratio and skill intensity in firm j during the period T; $Firm_{jt-1}$ is the initial size (employment) of firm j. Dummies for industries in $t-1$, $Industry_{t-1}$, and period dummies, $Year_T$, are included. *Table 9* presents the results.

Table 9 Annual wage growth after changes to foreign ownership.

We observe no difference in annual wage growth between firms that become foreign owned and firms that continue to be domestically owned.[20] As we would expect, annual wage growth is higher in firms where capital-labor ratios and skill intensities are growing faster. Moreover, larger firms seem to have slower wage growth, whereas changes in the share of female workers are unrelated to wage growth.

[20] I have experimented with using the shorter time period 1993-2000 and then taking into account that domestic firms are either Swedish MNEs or non-MNEs. However, there is still no difference in wage growth between targeted firms and indigenous firms.

Panel model with firm fixed effects

Another possible way to investigate if wage growth is higher in firms acquired by foreign firms is to use a long panel dataset and estimate a model with firm fixed effects. In such a model any permanent characteristics of individual firms are absorbed by the fixed effects and do not appear as the consequence of foreign ownership. I estimate the following model

$$\ln w_{jit} = \alpha + \beta FO_{jt} + \lambda Firm_{jt} + \gamma Year_t + f_j + \varepsilon_{jt} \qquad (5)$$

where f_j is a time-invariant firm-specific fix effect. The β coefficient tells us if wages in firms that switch to foreign ownership are higher after they have changed to foreign ownership. The usual vector of firm characteristics, $Firm_{jt}$, are added and year dummies, $Year_t$, control for cyclical factors. *Table 10* reports the outcome from estimating the firm fixed effect model.

Table 10 Firm fixed effect model.

In column (1), I estimate the model for the period 1986-2000 and I find no effect on wages of foreign ownership.[21] In column (2), I apply the same specification, but for a shorter period, 1993-2000. However, for that period I also have the opportunity to examine whether firms that become Swedish MNEs – establish affiliates abroad – pay higher wages after they go abroad. Still, there is no evidence of different wages after domestically owned firms have been taken over by foreigners. Nor is it any wage premium in firms turning into Swedish MNEs. In columns (3) and (4), I estimate the model separately for skilled and less-skilled labor. For skilled labor, there exist in fact a significant ex-post wage effect when firms change into Swedish MNE; no such effect prevail, however, when firms become foreign-owned. For less-skilled labor, on the other hand, there is no impact, neither on the wage level in firms that changes into Swedish MNE, nor on wages in firms that changes into foreign ownership. In sum, the fix effect estimates in Table 10 indicate that changes into foreign ownership do not

[21] Also, I find no effect on skilled and less-skilled wages of foreign ownership (not shown here). The results stand out in opposition to the findings in Conyon et al. (2002) and Lipsey and Sjöholm (2002). Both studies use firm(plant)-fixed effect models. In Conyon et al. there is a significant wage premium of 3.4 percent for workers in firms acquired by foreigners in the UK, 1989-1994. Lipsey and Sjöholm find significant wage premiums in Indonesian plants taken over by foreigners 1975-1999; for white-collar workers 21 percent and for blue-collar workers 10 percent.

have any effect on wage levels. Yet becoming a Swedish MNE may affect wages of skilled labor positively.

A matching approach

A quite popular method recently to investigate ex-post performance of, e.g. foreign ownership and exporting, is matching.[22] Although, one may have doubts about the appropriateness of utilizing the matching method on firms I, nevertheless, make use of it as a complement to the other approaches.

The matching approach means that for every domestically owned firm that become foreign owned (treated units) I attempt to find another firm, which has similar characteristics in the year before that event, but continue to be domestically owned (control units).[23] By using the nearest-neighbor matching method I pair together firms switching to foreign ownership and firms that always are domestically owned with the same or similar so-called propensity scores. I obtain the propensity scores from a probit regression of a dummy variable indicating whether a firm is foreign owned or not at time *t*, FO_{jt}, on relevant firm characteristics in $t-1$. More specifically, I estimate the regression equation

$$FO_{jt} = \alpha + \beta \ln w_{jt-1} + \lambda Firm_{jt-1} + \gamma_1 Industry_{jt-1} + \gamma_2 Year_{t-1} + \varepsilon_{jt} \qquad (6)$$

$\ln w_{jt-1}$ is log average wage in firm *j* at time $t-1$. $Firm_{jt-1}$ is capital-labor ratio, $\ln(K/L)$, shares of medium-skilled (*MS/L*) and high-skilled labor (*HS/L*), share of female workers (*Female/L*) and size $\ln(employment)$ in firm *j* at time $t-1$. *Table 11* presents the estimates

Table 11 Determinants of foreign acquisitions, 1986-2000.

Interestingly, we observe that wages are significantly higher in firms that become foreign owned, which is consistent with my result in Tables 7 and 8. Also, we notice that larger firms

[22] See e.g. Girma et al. (2002) and Girma and Görg (2003). The method is frequently used in the evaluation literature on active labor market programs. Heckman et al. (1999) give a comprehensive overview of the labor economics literature. Becker and Ichino (2002) is a useful guide to handle matching with Stata.
[23] See Rosenbaum and Rubin (1983).

are more inclined to be foreign owned. Somewhat surprising it seems that the share of medium-skilled labor is significantly lower in target firms.[24]

Once each firm that switch to foreign ownership is matched with a firm that continue to be domestically owned, the difference in annual average wage growth between the treated units and the control units is computed.[25] By averaging these differences I get the Average effect of Treatment on the Treated (ATT). Ex-post annual average wage growth is about 0.4 percent higher in the firms that become foreign owned. Yet the difference is far from significant (t-value = 0.32). In other words, the outcome of the matching approach confirms the previous results I obtained from using the simple regression model in Table 9 and the firm-fixed effect model in Table 10, namely, that firms acquired by foreigners do not have higher wage growth than firms that continue to be domestically owned.

5. Summary and conclusions

Like in most other studies for various countries[26] foreign-owned Swedish manufacturing firms pay higher wages than other domestically owned firms, also when I control for appropriate firm characteristics.[27] However, consistent with theories on MNEs and in conformity with Doms and Jensen (1998) for the US, the important differences appear to exist between MNEs (Swedish MNEs and foreign-owned firms) and non-MNEs, rather than between foreign-owned and domestically owned firms. Interestingly, my estimates indicate that there are even higher wages in foreign MNEs than in Swedish MNEs. Moreover, my results suggest that skilled labor benefit most from working in MNEs. The higher wages in MNEs might reflect that workers share some of the rents the MNEs' firm-specific assets may generate or that working in an MNE require higher level of effort or greater skills (unexplained by the level of education).[28]

[24] Using the shorter time period and a more detailed industry classification gives similar result.
[25] 461 treated units are matched to 450 control units.
[26] For developed countries, e.g. Feliciano and Lipsey (1999), the US, and Girma et al. (2001), the UK, and for developing countries, e.g. Aitken, Harrison and Lipsey (1996), Mexico and Venezuela, and Lipsey and Sjöholm (2001), Indonesia.
[27] By using matched employer-employee data Heyman et al. (2004) estimate a lower wage premium in foreign-owned firms in Sweden than I obtain. However, their results are not fully comparable with mine since their analysis includes both manufacturing and services and is carried out for a shorter period of time (1996-2000).
[28] Head (1998)

Foreigners selecting high-wage Swedish firms for acquisition could explain the higher wages in foreign owned firms. Since many manufacturing Swedish MNEs have been the target in foreign takeovers in the 1990s this is a well-founded supposition. My analysis confirms that wages are significantly higher in Swedish firms selected for acquisition. This applies to targeted Swedish MNEs and, yet surprisingly, also to targeted Swedish non-MNEs.

I use three different approaches to investigate the development of wages in Swedish manufacturing firms taken over by foreigners. The result shows that the ex-post wage growth has not been better in targeted firms than in firms that continued to be Swedish owned. Hence, the higher wages in foreign-owned firms in Swedish manufacturing seems to be a result of selection and not caused by foreign ownership per se.[29]

[29] This contrasts sharply to the findings in Lipsey and Sjöholm (2002) for Indonesia.

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Figure 1 Employment share of foreign-owned firms in Swedish manufacturing, 1986-2000.

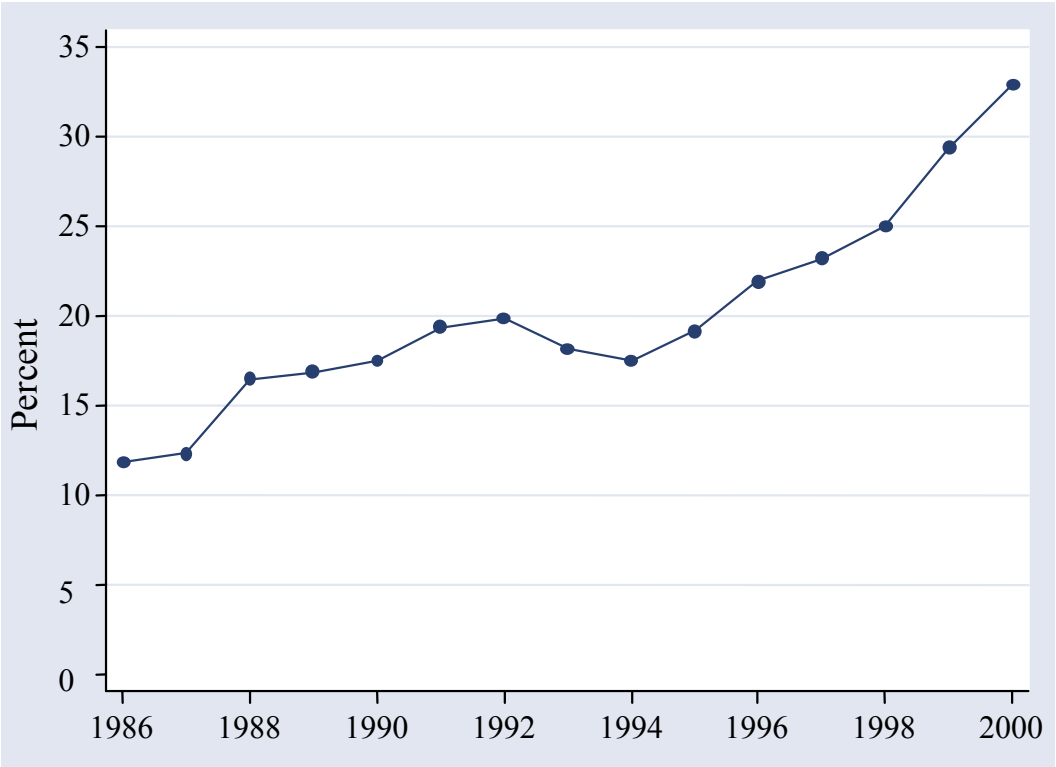

Table 1 Number of foreign firms and frequency of international ownership changes.

Number of firms			International ownership changes				
Year	Foreign-owned (percent)*	Total no of firms	Year	Domestic to foreign (percent)**	Foreign to domestic (percent)**	All international ownership changes	
						Number	Percent*
1986	341 (8.6)	3972					
1987	376 (9.5)	3962	1986/1987	22 (91.7)	2 (8.3)	24	0.6
1988	431 (10.6)	4085	1987/1988	58 (93.5)	4 (6.5)	62	1.5
1989	445 (10.8)	4134	1988/1989	20 (74.1)	7 (25.9)	27	0.7
1990	445 (11.0)	4056	1989/1990	41 (62.1)	25 (37.9)	66	1.6
1991	487 (12.1)	4021	1990/1991	53 (81.5)	12 (18.5)	65	1.6
1992	483 (13.5)	3578	1991/1992	24 (92.3)	2 (7.7)	26	0.7
1993	413 (12.5)	3295	1992/1993	26 (34.2)	50 (65.8)	76	2.3
1994	436 (13.1)	3331	1993/1994	51 (73.9)	18 (26.1)	69	2.1
1995	485 (13.6)	3555	1994/1995	67 (90.5)	7 (9.5)	74	2.1
1996	530 (13.8)	3845	1995/1996	98 (66.7)	49 (33.3)	147	3.8
1997	561 (14.4)	3892	1996/1997	51 (68.9)	23 (31.1)	74	1.9
1998	601 (14.8)	4058	1997/1998	50 (67.6)	24 (32.4)	74	1.8
1999	636 (15.8)	4013	1998/1999	64 (69.6)	28 (30.4)	92	2.3
2000	636 (16.2)	3923	1999/2000	60 (71.4)	24 (28.6)	84	2.1
Average 1986-1994				35 (75.6)	15 (24.4)	50	1.3
Average 1994-2000				63 (72.7)	25 (27.3)	88	2.3

Notes: * Share of all manufacturing firms with 20 employees or more. ** Share of all changes.

Table 2 Characteristics of foreign-owned and domestically owned firms, 1986 and 2000.

Variables	1986			2000		
	Foreign	Domestic	Difference (t-ratio)	Foreign	Domestic	Difference (t-ratio)
Average wage (financial)	219	202	17/(8.34)	316	280	36/(9.55)
Average wage (rams)	136	126	10/(6.55)	199	178	21/(10.87)
Wages: skilled (rams)	203	182	21/(5.55)	261	221	40/(11.91)
Wages: less-skilled (rams)	130	122	8/(5.16)	183	170	13/(10.00)
Share of female workers	31.1	33.0	-1.9/(-0.12)	25.9	24.7	1.2/(1.60)
Medium-skill intensity	8.4	6.2	1.2/(4.59)	19.5	14.0	5.5/(9.25)
High-skill intensity	3.6	2.5	1.1/(1.84)	8.2	5.1	3.1/(7.80)
Capital-labor ratio	105	85	20/(3.19)	349	255	94/(5.07)
Employment	242	183	59/(1.13)	305	121	184/(7.63)
Shipment	251	142	109/(2.36)	614	228	386/(2.93)
Shipment/employee	745	407	338/(9.28)	1236	552	684/(14.16)
Value added/employee	277	254	23/(3.11)	455	378	77/(6.38)
Number of firms	341	3631		636	3287	

Notes: Wages, shipment and value added are in 1990 prices. Wages are from two different sources: the firms' financial accounts, average wage (financial), and the tax register, average wage (rams). More precisely, average wage (financial) is labor costs, including social security costs, per employee and average wage (rams) is annual earnings per employee. Wages, capital-labor ratios, value added and shipment per employee are in thousands SEK and shipment in millions SEK. Skill intensities are in percentages. The t-statistics tests the null hypothesis of equality between foreign-owned firms and domestically owned firms.

Figure 2 Employment share of foreign-owned firms and of Swedish MNEs in Swedish manufacturing, 1993-2000.

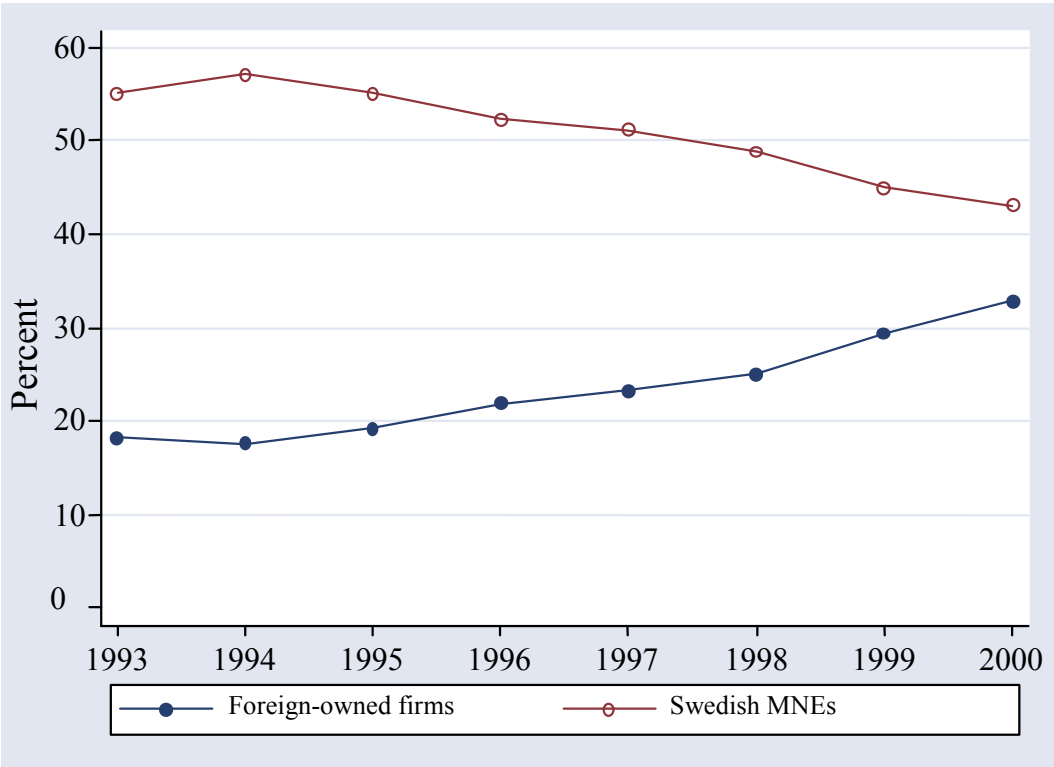

Table 3 Foreign ownership wage premium, 1986-2000.

Variables	(1) Average wage	(2) Average wage	(3) Average wage	(4) Skilled wage	(5) Less-skilled wage
Foreign ownership *FO*	0.094 [40.88]***	0.076 [33.99]***	0.041 [21.91]***	0.101 [23.94]***	0.043 [20.44]***
Capital-labor ratio $\ln(K/L)$			0.022 [25.38]***	0.027 [14.39]***	0.020 [21.01]***
Share of female workers *Female/L*			-0.009 [-3.10]***	-0.019 [-4.62]***	-0.002 [-1.22]
Medium-skill intensity *MS/L*			0.661 [25.00]***		
High-skill intensity *HS/L*			0.853 [32.04]***	0.518 [4.65]***	
Size $\ln(employment)$			0.015 [22.58]***	0.062 [39.17]***	0.016 [23.74]***
Year dummies	Yes	Yes	Yes	Yes	Yes
Industry dummies	No	Yes	Yes	Yes	Yes
$\overline{R}^2$	0.273	0.407	0.559	0.149	0.427
Observations	50,325	50,325	50,325	50,325	50,325

Notes: The dependent variable in this table and in the tables below is average wage (rams). Replacing that with average wage (financial) does not affect the interpretation of the results. The number of industries is 20 (see Table A2 in Appendix). Square brackets give White's heteroskedasticity-consistent t-statistics. ***, **, * indicate significance at 1, 5 and 10 percent levels, respectively.

Table 4 Frequency of ownership changes from Swedish MNEs to foreign MNEs, 1993-2000.

Year	Ownership changes from Swedish MNEs to foreign MNEs	
	Number	Percent*
1993/1994	3	5.9
1994/1995	12	17.9
1995/1996	49	50.0
1996/1997	10	19.6
1997/1998	12	24.0
1998/1999	27	42.2
1999/2000	9	15.0
1993-2000	17	27.0

Notes: * share of all changes from domestic to foreign ownership (see Table 1).

Table 5 Characteristics of MNEs (foreign and Swedish) and non-MNEs in Swedish manufacturing 2000.

Variables	2000				
	Foreign MNEs	Swedish MNEs	Difference foreign MNEs and Swedish MNEs (t-ratio)	Non-MNEs	Difference Swedish MNEs and non-MNEs (t-ratio)
Average wage (financial)	316	313	3/(0.59)	269	44/(12.89)
Average wage (rams)	199	197	2/(0.75)	172	24/(14.72)
Wages: skilled (rams)	261	253	8/(1.80)	209	44/(14.30)
Wages: less-skilled (rams)	183	180	3/(2.05)	166	14/(10.99)
Share of female workers	25.9	26.4	-0.5/(-0.54)	24.0	2.4/(3.22)
Skill intensity	195	18.5	1.0/(1.28)	12.4	6.1/(11.48)
High skill intensity	8.2	7.9	0.3/(0.55)	4.1	3.8/(10.79)
Capital-labor ratio	349	327	22/(0.70)	229	98/(5.82)
Employment	305	298	7/(0.16)	58	240/(13.55)
Shipment	616	719	-103/(-0.40)	54	665/(5.57)
Shipment/employee	1238	1062	176/(2.50)	374	688/(16.83)
Value added/employee	455	410	45/(2.34)	367	43/(4.10)
Number of firms	650	849		2424	

Notes: Foreign MNEs are firms where foreign investors possess more than 50 percent of the voting rights. Swedish MNEs are domestically owned firms that have at least one affiliate abroad or are part of an enterprise group that have affiliates abroad. The remaining Swedish firms are classified as non-MNEs. The notes in Table 1 contain variable definitions. The t-statistics test the null hypotheses of equality between foreign MNE and Swedish MNEs, as well as equality between Swedish MNEs and non-MNEs.

Table 6 MNE (foreign and Swedish) wage premium in Swedish manufacturing, 1993-2000.

Variables	(1) Average wage	(2) Average wage	(3) Skilled wage	(4) Less-skilled wage
Foreign ownership *FO*	0.047 [21.52]***	0.066 [27.58]***	0.138 [24.52]***	0.070 [25.78]***
Swedish MNE *SMNE*		0.041 [20.23]***	0.095 [20.15]***	0.045 [20.37]***
Capital-labor ratio $\ln(K/L)$	0.016 [13.82]***	0.015 [13.62]***	0.020 [8.58]***	0.013 [12.35]***
Share of female workers *Female/L*	-0.391 [-53.13]***	-0.398 [-54.31]***	-0.204 [-10.74]***	-0.431 [-57.23]***
Medium-skill intensity *MS/L*	0.368 [19.18]***	0.348 [18.20]***		
High-skill intensity *HS/L*	1.148 [36.70]***	1.121 [36.59]***	1.185 [33.25]***	
Size $\ln(employment)$	0.019 [20.63]***	0.012 [12.96]***	0.042 [21.21]***	0.013 [13.30]***
Year dummies Industry dummies	Yes Yes	Yes Yes	Yes Yes	Yes Yes
$\beta_1 = \beta_2$		0.025 [10.51]***	0.043 [8.31]***	0.025 [9.40]***
$\overline{R}^2$	0.611	0.617	0.230	0.490
Observations	27,411	27,411	27,411	27,411

Notes: In contrast to Table 3 here I am able to control for 99 industries on SNI92 3-digit level.
***, **, * indicate significance at 1, 5 and 10 percent levels, respectively.

Table 7 Foreign ownership and selection of high-wage firms, 1993-2000.

Variables	(1) Average wage	(2) Average wage	(3) Skilled wage	(4) Less-skilled wage
Foreign ownership FO_{jt}	0.031 [5.92]***	0.041 [6.83]***	0.044 [3.23]***	0.034 [5.72]***
Swedish MNE $(SMNE)_{jt-1}$		0.034 [15.50]***		
$FO_{jt} \times (SMNE)_{jt-1}$		-0.012 [-1.00]		
Capital-labor ratio $\ln(K/L)_{jt-1}$	0.017 [13.25]***	0.016 [13.05]***	0.021 [7.12]***	0.015 [12.10]***
Share of female workers $(Female/L)_{jt-1}$	-0.412 [-47.90]***	-0.419 [-48.83]***	-0.224 [-9.40]***	-0.444 [-50.58]***
Medium-skill intensity $(S/L)_{jt-1}$	0.348 [15.38]***	0.328 [14.49]***		
High-skill intensity $(HS/L)_{jt-1}$	1.159 [26.45]***	1.127 [25.25]***	1.400 [27.80]***	
Size $\ln(employment)_{jt-1}$	0.021 [18.80]***	0.015 [12.18]***	0.064 [27.02]***	0.023 [21.20]***
Year dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
$\overline{R}^2$	0.603	0.608	0.197	0.499
Observations	17,799	17,799	17,799	17,799

Notes: I employ dummies for 99 industries on SNI92 3-digit level. ***, **, * indicate significance at 1, 5 and 10 percent levels, respectively.

Table 8 Wages in targeted firms (and indigenous Swedish MNEs) relative to indigenous non-MNEs the year before foreign takeover.

Type of firm	Average wage	Skilled wage	Less-skilled wage
All targeted firms	3.1 % [5.92]	4.4 % [3.23]	3.4 % [5.72]
Targeted Swedish MNEs	2.9 % [3.01]	3.1 % [1.62]	3.0 % [2.83]
Targeted Non-MNEs	4.1 % [6.83]	7.2 % [4.08]	4.5 % [6.53]
Indigenous Swedish MNEs	3.4 % [15.50]	7.9 % [14.17]	3.8 % [15.80]

Notes: Square brackets give White's heteroskedasticity-consistent t-statistics.

Table 9 Annual wage growth after changes to foreign ownership.

Variables	Change in average wage 1986-2000
Foreign ownership FO_{jt}	0.0003 [0.237]
Change in capital-labor ratio $\Delta \ln(K/L)_{jT}$	0.011 [7.19]***
Change in female worker share $\Delta(Female/L)_{jT}$	-0.006 [-0.54]
Change in medium-skill share $\Delta(MS/L)_{jT}$	0.405 [10.68]***
Change in high-skill share $\Delta(HS/L)_{jT}$	0.517 [11.07]***
Size $\ln(employment)_{jt-1}$	-0.016 [-3.37]***
Year dummies Industry dummies	Yes Yes
$\overline{R}^2$ Observations	0.224 19,110

Notes: I use dummies for 20 industries (see Table A3 in Appendix).

Table 10 Firm-fixed effect model

Variables	(1) Average wage 1986-2000	(2) Average wage 1993-2000	(3) Skilled wage 1993-2000	(4) Less-skilled wage 1993-2000
Foreign ownership *FO*	-0.003 [-1.38]	0.003 [1.02]	0.010 [1.12]	0.002 [0.86]
Swedish MNE *SMNE*		0.003 [1.65]*	0.015 [2.39]**	0.003 [1.68]*
Capital-labor ratio $\ln(K/L)$	0.009 [13.24]***	0.009 [9.98]***	0.011 [3.60]***	0.008 [8.65]***
Share of female workers *Female/L*	-0.008 [-4.41]***	-0.215 [-17.45]***	-0.291 [-7.09]***	-0.252 [-19.02]***
Medium-skill intensity *MS* / *L*	0.443 [41.71]***	0.256 [15.13]***		
High-skill intensity *HS* / *L*	0.577 [51.73]***	0.741 [37.25]***	0.552 [8.34]***	
Size $\ln(employment)$	-0.024 [-17.37]***	-0.017 [-8.31]***	0.014 [2.02]**	-0.014 [-6.08]***
Year dummies	Yes	Yes	Yes	Yes
Breusch Pagan Hausman-Wu Bhargava-DW	78337*** 1385*** 1.12	28329*** 1787*** 1.34	14024*** 346*** 1.27	30184*** 624*** 1.36
$\overline{R}^2$ *-overall* *-within* *-between*	 0.391 0.622 0.358	 0.432 0.632 0.392	 0.121 0.151 0.100	 0.254 0.567 0.167
Observations	50,325	27,413	27,413	27,413

Table 11 Determinants of foreign acquisitions, 1986-2000.

Variables	Probit 1986-2000
Log average wage $\ln w_{jt-1}$	0.720 (5.71)***
Capital-labor ratio $\ln(K/L)_{jt-1}$	0.016 (0.90)
Female worker share $(Female/L)_{jt-1}$	0.018 (1.13)
Medium-skill share $(MS/L)_{jt-1}$	-0.635 (-2.33)**
High-skill share $(HS/L)_{jt-1}$	-0.503 (-1.64)
Size $\ln(employment)_{jt-1}$	0.167 (11.46)***
Year dummies	Yes
Industry dummies	Yes
Pseudo $\overline{R}^2$	0.085
Observations	33,936

Notes: I use dummies for 20 industries (see Table A3 in Appendix). z-statistics is in parentheses. ***, **, * indicate significance at 1, 5 and 10 percent levels, respectively.

Appendix: Data description

Table A1 Panel information.

Years in the panel	No of firms		Year	No of firms
15	870		1986	3972
14	340		1987	3962
13	276		1988	4085
12	248		1989	4134
11	268		1990	4056
10	270		1991	4021
9	302		1992	3578
8	362		1993	3295
7	519		1994	3331
6	651		1995	3555
5	720		1996	3845
4	869		1997	3892
3	1015		1998	4058
2	1301		1999	4013
1	1822		2000	3923
Total number of firms: 9833			Total number of firm-years: 57720	

Notes: The dataset includes all manufacturing firms with 20 employees or more

Table A2 The 20 manufacturing industries: Linking SNI69 with SNI92.

No	SNI92	SNI69	Industry
1	15+16	31	Food, beverages and tobacco
2	17+18+19	32	Textiles, apparel and leather
3	20	331	Wood products
4	21	341	Paper and paper products
5	22	342	Printing and publishing
6	23+24-244	(351/354)-3522	Chemicals
7	244	3522	Drugs and medicines
8	25	355+356	Rubber and plastics
9	26	36	Non-metallic mineral products
10	27	371+372	Basic metals
11	28	381	Metal products
12	29+30	382	Non-electrical machinery
13	31	383-3832	Electrical machinery
14	32	3832	Telecommunication
15	33	385	Professional goods
16	34	3843	Motor vehicles
17	351	3841	Shipbuilding
18	353	3845	Aircraft
19	352+354+355	3842+3844+3849	Other transport equipment
20	36	39+332	Other manufacturing