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Is There Really a Foreign Ownership Wage Premium? Evidence from Matched Employer-Employee Data

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Abstract

Numerous studies on firm-level data have reported higher average wages in foreign-owned firms than in domestically-owned firms. This, however, does not necessarily imply that the individual worker's wage increase with foreign ownership. Using detailed matched employer-employee data on the entire Swedish private sector, we examine the effect of foreign ownership on individual wages, controlling for individual and firm heterogeneity as well as for possible selection bias in foreign acquisitions. We distinguish between foreign greenfields and takeovers and compare foreign owned firms with both domestic multinationals and local firms. Our results show a considerably smaller wage premium in foreign owned firms than what has been found in studies conducted at a more aggregate level. Moreover, foreign takeovers of Swedish firms tend to have no or even a negative effect on wages.

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1. Introduction

Foreign direct investment (FDI) has increased dramatically during the last decades and has arguably benefited both host and home countries. The former group of countries may for instance benefit through inflows of new technology and access to foreign markets. An additional benefit could be a positive effect on host country wages. It is well established that foreign owned firms pay higher average wages than domestically owned firms.[1] Part of this wage premium is caused by foreign firms locating in high wage sectors and localities, but the premium exists even within industries and regions and after controlling for firm characteristics and the average educational level of the labor force. There are several suggestions why foreign firms would pay higher wages than domestic firms. For instance, foreign firms might try to prevent technological spillovers through labor turnover by paying a wage premium (Fosfuri *et al.,* 2001); the wage premium might be caused by rent-sharing arrangements among foreign firms (Budd *et al*., 2005); by compensation for a higher labor demand volatility in foreign plants (Fabri *et al*., 2003); or for a higher foreign closure rate (Bernard and Sjöholm, 2003).

However, although the average wage is relatively high in foreign owned firms, it is still unclear if foreign firms pay higher wages for identical workers. Employees differ in many respects such as age, education, gender and previous work experience, all of which have an impact on wages. It is plausible that the foreign wage premium is caused by such characteristics rather than by ownership of the firm. To examine if

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[1] See e.g. Aitken *et al.* (1996), Bandick (2004), Conyon *et al*. (2002), Doms and Jensen (1998), Driffield and Girma (2002), Girma *et al*. (2001), Griffith (1999), Görg *et al*. (2002), Haddad and Harrison, (1993), Lipsey (1994), Lipsey and Sjöholm (2004), and Sjöholm and Lipsey (2006). In these studies the wage differentials between domestically- and foreign-owned firms range from about 10 to 70 percent. See also Lipsey (2004) for a survey of the literature on FDI and wages.

foreign firms pay a relatively high wage for a given quality of employees calls for a change in the unit of observation: from the firm or plant level to the individual worker. In addition, to control for differences in human capital, detailed information on worker characteristics is necessary. The importance of such analysis has been shown in work on international trade and wages (see e.g. Gaston and Trefler, 1994; Goldberg and Pavcnik, 2005, and Kaplan and Verhoogen, 2006) but few studies use matched employer-employee data to examine the effect of FDI on wages. One exception is a study by Martins (2004), who find no effect on individual wages after foreign acquisition of Portuguese manufacturing firms.

This paper combines data on all Swedish firms spanning the period 1990-2000 with a large sample of more than 2 million Swedish employees covering the period 1996-2000. We contribute to the literature in several respects. First, our matched employer-employee data enable us to analyze the impact of foreign ownership on individual wages, controlling for both firm- and individual heterogeneity. In order to control for unobservable firm and individual characteristics as well as for a possible selection bias in foreign acquisitions, we combine propensity score matching techniques with the more general difference in difference estimator. Second, foreign owned firms might enter the market by a greenfield investment or through an acquisition of a Swedish owned firm. These two modes of entry might have different effects on wages. We therefore compare foreign greenfield investments with foreign acquisitions. Third, to control for the impact of being a multinational firm we compare foreign owned firms with both Swedish multinational firms and Swedish local firms.

In accordance with the previous literature, firm level regressions show that foreign owned firms pay higher wages than domestically owned firms. This wage premium is primarily due to differences between foreign owned firms and Swedish

local firms, suggesting that multinationality – not nationality - is important. Comparing greenfields with foreign takeovers indicates that greenfields tend to pay the highest wage premium.

The estimated wage premium in foreign owned firms is substantially reduced as we change from firm to individual level estimations. Estimating individual wage equations yields a coefficient for foreign ownership that is close to zero. Finally, results from combined matching and difference-in-differences estimations show that the individual worker's *wage level* is 2-6 percent higher in acquired than in similar non-acquired firms, but that *wage growth* is lower in acquired firms. This result is verified further by fixed-effect estimations, which suggest a slight negative impact on individual wages from foreign takeovers of Swedish firms.

The paper is organized as follows. The following section describes the data and provides descriptive statistics. The empirical methodology is presented in Section III. The results are presented in Section IV. Finally, Section V concludes.

2. Data Sources and Description

2.1 Data

The analysis is based on three register-based data sets from Statistics Sweden. First, the financial statistics data (FS) contains detailed information on all Swedish firms for the period 1996-2000. For the period 1990-1995 we have data on all manufacturing firms with at least 20 employees and non-manufacturing firms with at least 50 employees.[2] A large number of variables are included such as value added, capital stock (book value),

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[2] We have a stratified random sample for non-manufacturing firms with less than 50 employees. Data on financial sector firms is not available.

number of employees, total wages, ownership, profits, sales and industry affiliation. A detailed description of the variables is found in Tables A1- A3 in the Appendix.

Second, the Regional labor market statistics (RAMS) includes data on all plants spanning the period 1990-2000. RAMS add plant information on the composition of the labor force with respect to educational level and age structure.[3]

Finally, the individual wage statistics database (LS) contains detailed information from official registers on a very large representative sample of employed individuals. The individual wage statistics is based on Statistics Sweden's annual salary survey and is supplemented by material from a series of official data registers. The LS spans the period 1996-2000 and includes information on approximately 2 million observations per year, which is roughly 50 percent of the Swedish labor force. Examples of variables included are full-time equivalent wages, education, labor market experience, gender, and job type.[4]

The data sets are matched by unique identification codes. The nature of the data sets implies that the firm-level estimations will be based on data for 1990-2000, while the individual-level analysis is based on our matched employer-employee data set for the period 1996-2000 using firms with at least 20 employees.

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[3] The plant level data is aggregated to the firm level.

[4] The sampling frame of the survey consists of firms that are included in Statistics Sweden's firm data base (FS). A representative sample of firms is drawn from FS, stratified according to industry affiliation and firm size (number of employees). The sample size consists of between 8,000 and 11,000 firms for the period 1996-2000. The Central Confederation of Private Employers then provides employee information to Statistics Sweden on all its member firms that have (i) at least ten employees and (ii) are included in the sample. Firms with at least 500 employees are examined with probability one. The final sample includes information on around 50 percent of all employees within the entire private sector.

In the firm-level panel, spanning the period 1990-2000, we restrict our sample in most estimations to firms observed for at least five years. Moreover, for Swedish firms acquired by a foreign owner at period (t), we only consider firms that are Swedish owned at (t-1) and remain foreign owned at year (t+1) through (t+3).

We make similar restrictions in most of the individual-level analysis on matched data for 1996-2000. For this analysis we only consider firms that are observed for four consecutive years. With this restriction we can study firms that are acquired 1997 or 1998. We make the same survival criterion for the control group of non-acquired Swedish firms. As for firms, we restrict our sample of individuals to those who remain in the same firm during the period of observation of the firm. This restriction enables us to control for both individual and firm-specific effects when analyzing the impact of foreign ownership on wages. It also means that we do not have to be concerned about the issue of endogenous job switchers, implying that part of an estimated foreign ownership effect can be due to individuals switching firms through e.g. promotions, which in turn have a separate impact on wages.

To distinguish between different types of firms, we divide our sample into three groups: foreign-owned MNCs, locally-owned MNCs, and locally-owned non-MNCs. A firm is a foreign-owned MNC if, according to information in the financial statistics, more than 50 percent of the equity is foreign owned. We define a locally-owned MNC as a firm reporting positive exports to other firms within the corporation. Finally, firms reporting no such exports are classified as locally-owned non-MNCs.[5]

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[5] Export information is available for firms with at least 50 employees or smaller firms with large sales. There might exist a few small multinationals that are classified as local firms, due to missing information

2.2 Descriptive Statistics

There was a substantial increase of foreign ownership in the Swedish economy during the first half of the 1990s. The share of employees in foreign owned firms in the private sector increased from about 9 percent 1990 to roughly 13 percent 1996 and 18 percent 1999 (ITPS, 2005).

The increased foreign presence corresponds to similar developments in many other countries, but might have been comparably large in Sweden (e.g. OECD, 2001). There are several reasons for this development. For instance, the deregulation of capital and foreign exchange markets in the late 1980s opened up Sweden for inflows of FDI. Two other important factors include the Swedish membership in the European Union in 1995 and the large currency crisis in 1992. The latter event reduced the cost of Swedish assets and the cost of locating production in Sweden.

Table 1 shows a comparison of domestic- and foreign owned firms in Sweden. Wages are about 20 percent higher in foreign than in domestically owned Swedish firms. Foreign firms locating in high-wage sectors do not seem to cause the high foreign wage; foreign owned firms pay higher wages in all sectors in 1990 and in all sectors except in Electronics and Transport Equipment in 2000.

-Table 1 about here-

The higher wages in foreign-owned firms might be caused by firm characteristics. For instance, skilled individuals have comparably high wages, and large firms tend to pay higher wages than small firms. Table 1 includes comparison of these factors in foreign-

on exports. The potential bias is likely to be slight, but it presumably means that the difference between MNCs and non-MNCs could be slightly larger than suggested in Section V.

and domestically-owned firms. High skill is measured as the share of the workforce with at least tertiary education and size as the number of employees. Foreign-owned firms have a relatively well-educated workforce; the share of workers with higher education is twice as high as in domestically owned firm in 1990, but decreases to about 70 percent higher in 2000. The pattern of comparable skilled workers in foreign-owned firms is found in almost all sectors and in both years. Moreover, foreign-owned firms are larger than domestically owned firms, and the difference has increased over the period. However, there are differences between industries and across the two years

III. Empirical Set-Up

Firm-level analysis

We begin our analysis by examining the effect of ownership on wages at the firm level starting from the following expression:

$$\ln w_{jt} = \beta_0 + \beta_1 O_{jt} + F'_{jt}\beta_2 + \eta_j + \lambda_t + \varepsilon_{jt} \tag{1}$$

where w_{jt} is the average wage in firm j at time t. Ownership is captured by O, a dummy variable for foreign ownership, defined as 1 if at least 50 percent of the equity is foreign owned.[6] We will analyze the stock of foreign owned firms, foreign takeovers, as well as greenfield investments.[7] To control for the impact of multinational status, we compare foreign owned firms with both Swedish multinationals and Swedish local

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

[7] We define a greenfield investment as a newly established firm that is foreign owned. A firm is classified as new if it has a new organization number.

firms. *F* is a vector of firm level variables such as (log) firm size, profits per employee, capital intensity, export intensity, categorical variables capturing the educational level of the employees, share of female employees, labor productivity and industry affiliation. Finally, λ_t, and η_j are fixed time- and firm-effects, respectively, and ε_{jt} is the error term.

Individual-level analysis

We continue with estimates of individual wage equations using a panel of matched firm and individual level data.[8] Micro data on individuals allows us to take into account within firm variation and worker heterogeneity. We use the following empirical specification in the individual-level analysis:

$$\ln w_{ijt} = \beta_0 + \beta_1 O_{jt} + X'_{ijt}\beta_2 + F'_{jt}\beta_3 + \alpha_i + \eta_j + \lambda_t + \varepsilon_{ijt} \qquad (2)$$

where w_{ijt} is the full-time equivalent monthly wage for worker *i* in firm *j* at time *t*; *O* is a foreign ownership dummy for firm *j*; X is a vector of individual characteristics including gender, education, labor market experience and job-type; and F contains firm level variables. Finally, α_i, λ_t, and η_j are fixed individual-, time- and firm-effects, respectively, and ε_{ijt} is the error term.

Propensity score matching and difference-in-difference

One problem with estimating the causal effect of an acquisition on wages is the possible endogeneity of firms being acquired. It is not likely to be random which firms are acquired and acquired firms might exhibit characteristics that systematically differ from non-acquired firms. Hence, similar to the problem of non-random treatment groups in

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[8] See e.g. Abowd, Kramarz and Margolis (1999) for techniques on matched data.

the evaluation literature, firms that become foreign owned might be such that they would in any case develop differently than their non-acquired counterparts. This means that estimates on outcome variables (such as wages) become biased if non-randomness is not taken into account.

One often used approach to control for selection-bias is to use an instrumental variable approach (IV). However, instrumental variables are arguably difficult in the context of FDI and wages, since most variables that affect foreign acquisitions also affects wages (see e.g. Girma and Görg (2006), and Sjöholm and Lipsey (2006)).[9] We therefore use an alternative and arguably preferable method, which is propensity score matching (PSM) combined with the more general difference-in-differences (d-i-d) technique, as suggested by e.g. Blundell and Costa Dias (2005). The aim of the matching procedure is to find a group of non-acquired firms that display the same characteristics as the group of acquired firms.

The matching procedure can be described as follows. Let $A \in \{T,C\}$ be an acquisition indicator equal to T for firms being acquired (the treatment group) and equal to C for firms that are not acquired (the control group). $w_{k,t+s}^{T}$ denotes the wage at time t+s for a firm k that has been acquired at time t, and $w_{k,t+s}^{C}$ is the wage that would have been observed if the firm had not been acquired. Obviously, no firm can be

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[9] More specifically, IV estimations require instruments that are highly correlated with the variable of interest – foreign ownership or foreign takeovers – but uncorrelated with the dependent variable – wages. It is often very difficult to find such instruments (Blundell and Costa Dias, 2000). Furthermore, Bound *et al*. (1995) points out that if the instruments are weekly correlated with the endogenous variable, then even a weak correlation between the instruments and the error term in the original equation may lead to a larger inconsistency in the IV-estimates than a simple OLS estimation.

observed in two different states at the same time, so either $w_{k,t+s}^{T}$ or $w_{k,t+s}^{C}$ is missing for

each firm *k*. This fundamental problem of causal inference is sometimes described as

the evaluation problem of missing data. However, under certain assumptions, the

average treatment effect on the treated can be identified as: $E\{w_{t+s}^{T} - w_{t+s}^{C} \mid A = T\}$

$= E\{w_{t+s}^{T} \mid A = T\} - E\{w_{t+s}^{C} \mid A = T\}$. Matching techniques can be used to construct a

sample of non-acquired twin firms to acquired firms and, thus, approximate the non-

observed counterfactual event in the last term.

The underlying identifying assumption behind matching is that treatment

participation and treatment outcome is independent, conditional on a set of observable

characteristics. This assumption is called conditional independence (CIA), also known

as "selection on observables". The CIA implies that treatment status is random

conditional on a set of observed attributes X. In our notation, the CIA is given by (w^{C},

w^{T}) $\perp$ A $\mid$ X.[10] The plausibility of the non-testable CIA depends on the richness of the

available data as discussed by e.g. Gerfin and Lechner (2002) and Sianesi (2004). Our

detailed data-set is in this respect very useful.

To identify the treatment effect, the so called balancing property of the

propensity score must also be fulfilled. This assumption is given by A $\perp$ X $\mid$ p(X),

where p(X) is the propensity score. This means that observations with the same

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[10] For the average effect of treatment on the treated, a weaker version of CIA is given by $w^{C} \perp$ A $\mid$ X.

Note that CIA is stronger than necessary. It is sufficient to identify mean effects given by E(w^{C} $\mid$ X,

A=T) = E(w^{C} $\mid$ X, A=C), called conditional mean independence.

propensity score must have the same distribution of characteristics, independently of treatment status.[11]

The matching procedure in this paper uses the algorithms provided by Becker and Ichino (2002) and Leuven and Sianesi (2003). We use the Nearest-Neighbor without replacement method. In a first step, we calculate the probability of a firm being acquired by foreign owners, using a number of observable characteristics. Each treated (acquired) firm is then matched by an "identical" but non-treated (non-acquired) firm. The balancing property of the propensity score is tested and satisfied in all estimations.[12] We have estimated numerous propensity scores using a variety of covariates but have only considered those that satisfy the balancing property of the propensity score. Our choice of specification was based on high R^2.

Table A4 shows the estimated logit-model of being acquired by a foreign owner, conditional on a variety of covariates that are important in explaining acquisitions. Since there is no common agreement in the literature on the determinants

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[11] Rosenbaum and Rubin (1983) show that treated and non-treated observations with the same propensity score are on average observationally identical, implying that exposure to treatment is random. In other words, the balancing property ensures that sufficiently good matches are found for all treated observations.

[12] The test examines treated and non-treated observations in different sub-samples (blocks) of observations. The number of blocks is determined by data and the estimated score. Within these intervals, the algorithm tests that the means of the covariates in the logit do not differ between treated and control observations. In testing the balancing property, only observations in the region of common support are included. The optimal number of blocks is found to be 2 for 1997 and 3 for 1998. We assume that all important differences between the groups of treated and non-treated observations are captured by their observable characteristics (CIA).

of foreign acquisitions we have been flexible in our choice of covariates. In the first-step logit model that determines the probability of being acquired by a foreign owner we have used a large number of independent variables available in our data. These variables have all been mentioned in the literature as being important in explaining foreign ownership. We did also try to include further moments of firms' characteristics. These are, however, not significant and had no impact on the fit of the specification.

Since we have a panel of firms and individuals observed over time, the matching of firms is implemented year-by-year using lagged covariates. Having obtained a control group of firms, we then proceed to estimate the impact of acquisitions on individual wages by means of combining propensity score matching with the difference-in-difference estimator. This means that we can examine the dynamic effects of takeovers on wages. The difference-in-difference approach compares wage changes for the treated group of acquired firms with the relevant control group of firms that are not acquired. This amounts to estimating $\varphi = (w_{t+s}^{T} - w_{t}^{T}) - (w_{t+s}^{C} - w_{t}^{C})$, where φ is the unknown d-i-d parameter.

The d-i-d estimator will be estimated from the following individual wage equation using data on acquired firms and non acquired twin firms:

$$\ln w_{ijt} = \beta After_{ijt} + \delta T_{ij} + \eta_{t} + \varepsilon_{ijt} \tag{3}$$

where $After_{ijt}$ is a dummy variable that is equal to one for the periods after the firm has been acquired, and zero otherwise. T is a fixed acquisition (group) effect that is equal to one if the firm belongs to the treatment group, and zero otherwise. This dummy variable captures differences in wage levels between acquired and non-acquired firms

before the acquisition. The time effect η_t captures aggregate period effects that are common between the two groups. The estimated d-i-d effect of an acquisition for wages is given by β. All estimated regressions include the same set of individual, firm and industry controls as in equation (2).

IV. Results

Firm-level Analysis

We follow the previous literature and start by examining average wage per employee at the firm level in Table 2.

-Table 2 about here-

Estimation 1 shows that wages are 20 percent higher in foreign-owned firms compared to wages in domestically owned firms, even after controlling for industry and time effects. In all estimations we include 14 industry dummies that are closely related to the different bargaining areas in the Swedish labor market. Using a more disaggregated industry classification with 50 dummies, not shown, leads to a minor decrease in the foreign wage premium, suggesting that some of the premium is caused by a different sector distribution of foreign and local firms. Estimation 2 includes characteristics of the workforce that presumably affect wages: the average skill level of employees and the share of female workers. Including these characteristics increases the R-square value substantially and reduces the wage premium in foreign owned firms to about 11 percent. Moreover, a high share of female workers decreases average wages

and a high share of high-skilled workers has a positive effect on average wages.[13] Estimation 3 includes a set of other firm characteristics that have been found to affect wages in previous studies. Large firms pay relatively high wages, as do capital-intensive firms. The coefficient for profits per employee is positive and statistically significant but of rather small size.

In estimation 4, both human-capital and firm characteristics are included. The estimated coefficient on the foreign ownership variable of 0.105 is close to identical to the one in column 2.

Estimations 5 and 6 compare foreign-owned firms with domestically-owned multinationals and local firms. The results show that the difference is much smaller between foreign-owned and domestically-owned multinationals than between foreign-owned and local firms. Hence, a large part of the difference in wages between foreign- and domestically-owned firms is explained by multinational status alone.[14]

In estimation 7 we include a number of other factors that might affect wages: the firm's export orientation, the degree of market competition, and labor productivity. Export and productivity have statistically significant coefficients but the economic significance is small. Including all control variables in estimation 7 reduces the wage premium in foreign owned firms from 10.5 to about 9.4 percent, which is broadly in line with estimates in previous studies on firm level data for developed countries.[15]

Estimation 8 is conducted on the sub-period 1996-2000. This is to enable a comparison with individual level estimations below that is available only for this period. Results remain robust with respect to the change in time period.

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[13] The group of comparison for the two skill variables is workers with intermediate skills (upper secondary education).

[14] See Bellak (2004) and Doms and Jensen (1998) for a similar discussion.

When estimating the impact of foreign ownership on wages, weighting all firms equally may be improper. Swedish (local) and foreign firms are distributed differently over size categories, and firms of different sizes tend to pay different wages. More precisely, large firms tend to pay relatively high wages and multinational firms (foreign and domestic) tend to be relatively large. Weighing observations by size will increase the importance of large firms. Hence, we would expect weighting of the observations by firm size to reduce the foreign ownership wage premium since it reduces the influence of small local (low-wage) firms. Indeed, we find that weighting observations by employment reduce the foreign ownership wage premium from 11 percent in estimation 4 to 7 percent in estimation 9.[16]

One might argue that the imposed firm survival restriction bias the sample and thereby the results. We relax the survival restriction in estimation 10. The number of observations increases with roughly 50 percent but affect the results only marginally (compare model 10 and 4 in Table 2).[17] Moreover, in Table A2 and Table A3 we show how various restrictions affect sample means. The overall impression is that the imposed restrictions have a small impact on sample means.[18]

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[15] See footnote 1 for references.

[16] The foreign wage premiums are 0.030 and 0.082 compared to Swedish MNEs and local Swedish firms respectively (not shown). Other studies do not apply firm size weighting techniques, which prevent a comparison with these previous studies.

[17] The foreign wage premium compared to Swedish MNEs and local Swedish firms are 0.034 and 0.136 respectively (not shown).

[18] Table A2 includes descriptive statistics for the linked employer-employee data set with the previously discussed restrictions on survival rates and job switching. The second part of Table A2 includes statistics on all firms, not only those where we have information on individual employees. Finally, Table A3 relaxes restrictions on survival rates and job switching. The overall impression is that our survival restrictions, linking, and choice of time period affect the results only marginally.

Foreign firms enter Sweden either by setting up a greenfield investment or by acquiring an existing Swedish-owned firm. It may not be obvious why a foreign acquisition should raise wages for workers that are already employed in the firm, whereas a greenfield investor must attract new workers to the firm. One way to attract workers is to offer high wages. Moreover, a greenfield investor might pay a wage premium due to a lack of knowledge about the local labor market. In Table 3, we present wage regressions where foreign ownership has been divided into greenfield investments and foreign takeovers of Swedish firms. An additional benefit with this distinction is that using foreign takeovers allows us to control for unobservable effects. If high wages in foreign owned firms were caused by unobservable firm specific characteristics, rather than by ownership itself, we would not expect any statistical significant effect of foreign takeovers.

-Table 3 about here-

The wage premium in foreign greenfield investments is similar to the overall effect of foreign ownership on wages while the foreign acquisition premium is well below the greenfield estimates. To be precise, greenfield investors pay about 11 percent higher wages than domestically-owned Swedish firms, 5 percent higher than Swedish MNEs, and 12 percent higher than Swedish locally-owned firms. The corresponding numbers for acquisitions are 7, 2, and 8 percent. Hence, the wage effect of foreign

takeovers is about 50 percent to two third as high as the effect of greenfield investments.[19]

We have also estimated firm-fixed effect models to take into account unobservable effects. Including firm fixed-effects further reduces the coefficient for foreign takeover to 1-2 percent, depending on specification. Comparing foreign takeovers with Swedish multinationals give rise to a non-significant effect (see column 6). Again, this stresses the importance in separating domestic multinationals and domestic local firms.

Individual-level Analysis

As discussed above, an analysis at the individual level rather than at the firm level is suitable when studying the effect of ownership on wages, since it can handle individual heterogeneity. Note also that by estimating individual level regressions we escape wage effects caused by changes in the labor force composition. This could arise if foreign firms replace less productive (low wage) workers with more productive (high-wage) workers. In Table 4 we present results from individual wage estimations.

-Table 4 about here-

One striking result is that the estimated wage premium in foreign owned firms is substantially reduced when we change from firm level to individual level estimations. To be precise, estimation 1 in Table 4 shows that the unconditional wage premium is

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[19] One reason for observing higher wages in foreign greenfield investments than in foreign takeovers could be a difference in the experience of the employees. However, controlling for the age of the firms did not have any significant impact on the results (not shown).

around 4 percent but the premium decreases to about 2.6 percent after inclusion of worker characteristics and to 2.5 percent after inclusion of both worker and firm characteristics.[20] Corresponding figures from the firm level analysis were 20, 11 and 11 percent. Moreover, there is no difference in wages between employees in foreign-owned firms and in domestically-owned multinational firms. Hence, our previous conclusion remains: multinationality is more important for wages than the nationality of the firm.[21]

As previously mentioned, we have a survival criterion on firms in the individual level analysis. To eliminate the impact of job switching on wages we have also imposed a no firm switching restriction on individuals. One might argue that these restrictions lead to a selection of firms and workers with certain properties that affect the results. In estimation 6 we therefore re-estimate estimation 3, relaxing the restrictions on firm survival and job switching. Relaxing these restriction increases the number of observations by more than 300 percent: from 1.6 million observations to almost 5 million observations. The impact on the foreign wage premium is relatively modest with a decline from 2.5 to 2.0 percent.[22] Comparing descriptive statistics in Table A2 and Table A3 indicate that relaxing the restrictions brings many small firms in to the data, which might explain some of the increased wage premium.

In estimation 7 we aggregate data back to the firm level and re-run estimation 4 (full model) of Table 2 but on the same set of observations as in the individual-level

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[20] Expanding the number of industry dummies to 50 do not affect the results (not shown).

[21] Lipsey (2004) argues that the comparison of foreign- and domestically owned MNEs might be biased since the latter group includes headquarter services, with comparable high wages. It is likely that at least some of this bias is controlled for by our detailed information on worker characteristics.

[22] The foreign wage premium was -0.003 and 0.041 for Swedish owned MNEs and Swedish local firms, respectively (not shown).

regressions. This operation allows us to analyze how the different samples (matched data vs. only firm data) affect the results. Changing the sample pushes down the estimated foreign ownership wage premium from 10.5 percent to 7.4 percent, which remains high above the individual level estimate of 2.5 percent.[23] Again, the imposed restrictions excludes mostly small firms, which might explain why the wage premium estimated at the firm level in Table 4, model 7, is lower than the firm level estimate found in model 4 of Table 2.

The results above suggest that firm size and weighting of observations matters for the results. It also underlines the importance of individual level data and to control for individual level heterogeneity. By taking individual heterogeneity into account the estimated foreign ownership wage premium almost vanish.[24]

The other estimated coefficients in Table 4 suggest that female wages are about 14 percent lower than male wages and that blue-collar workers have about 11 percent lower wages than white-collar workers. Moreover, wages and experience follow the classical inverted U-shaped pattern. Regarding firm characteristics, it is seen that capital intensity and the average skill level of workers has an economically significant effect on wages.[25] Moreover, size and profits per employee are statistically significant but with small coefficients.

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[23] See also Table A2 where it is shown how aggregation affects data. Aggregation has an impact on the figures but it seems to be relatively modest.

[24] See Blundell and Stoker (2005), who discuss how aggregation affects data.

[25] The average skill level of employees aims at capturing complementarities with individual wages: individual wages might be positively correlated with the share of high skilled workers in the firms through externalities.

Finally, we have re-estimated all equations, controlling for within-firm error correlations, to take into account that observations might be correlated within firms. This did not upset the significance of our results.[26]

Individual wages, mergers and acquisitions

In the previous section we analyzed differences between foreign- and domestically owned firms. If there is a positive effect of foreign ownership on wages received by individual workers, we expect this to show up in an analysis of foreign acquisitions. However, we would not expect any effect of foreign acquisitions if it is unobserved attributes of the workers that cause their higher wages.

Moreover, foreign acquisitions may be non-random. For instance, high wage firms may be acquired more frequently than low wage firms. This suggests, as previously discussed, that matching techniques may improve the estimates. Table 5 presents results on both our matched and unmatched sample.

-Table 5 about here-

Results from models 1 and 2 in Table 5 suggest a foreign ownership wage premium in acquired firms comparable with individual level estimates previously obtained for the whole stock of foreign owned firms. Columns 4-6 present results from the matched sample of firms. Taking selection bias into account, the estimated impact of foreign ownership almost disappears, indicating that for individual workers there is no foreign wage premium.

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[26] Results are available on request.

However, the wage premium may also be affected by unobservables. In models 3 and 6 we control for unobservables by estimating individual fixed-effect models. Since we have restricted the sample to workers remaining in the same firm the entire period of observation of the firm, we obtain within individual and within firm estimates. This means that we control for both time invariant individual- and firm-specific effects, thus accounting for a systematic sorting of individuals across firms.

The inclusion of fixed-effects has a large impact on the foreign ownership wage premium. This is especially true for the unmatched sample where the fixed-effect estimation reduces the wage premium from two to minus four percent. Finally, in column 6 we estimate a fixed-effect model on our matched sample, taking into account both unobservables and selection bias. The results show a foreign acquisition wage premium of minus two percent.

To see whether it is nationality or change of ownership that drives the results we also looked at previously foreign-owned Swedish firms that become Swedish owned. Estimating the same full model specification as in column 2, Table 5, the estimated impact of becoming Swedish owned is slightly negative in all estimations. This suggests that the impact of foreign and domestic acquisitions differs only marginally.[27]

To visualize how wages evolve after an acquisition we depict wage trajectories for acquired and non-acquired firms (see Figure 1).

-Figure 1 about here-

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[27] Results are available on request.

Figure 1 indicates that foreign owners target high-wage firms and that the wage actually decreases (increases but at a lower rate) after the change of ownership. This is seen by converging wage trajectories of acquired and non-acquired firms.[28]

We now proceed to study wage dynamics for individuals in acquired and non-acquired firms by means of combining matching and difference-in-difference techniques. Blundell and Costa Dias (2000) show that such approach may improve non-experimental evaluation results significantly. As described previously, the purpose of the matching procedure is to take into account the endogeneity of foreign acquisitions and possible selection bias. Combining matching with difference-in-difference analysis allows us to follow the wage dynamics over time, comparing wage growth between acquired and non-acquired control firms.[29]

Results from the difference-in-difference regressions are presented in Table 6. The growth rate of wages in targeted firms one respectively two years after acquisition is compared to the year prior to acquisition.[30]

-Table 6 about here-

Results confirm the picture given in Figure 2: the *wage level* is higher in acquired firms than in the group of matched non-acquired firms, and the *wage growth*

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[28] Acquisitions at time t occur in 1997 or 1998. Wages in non-acquired firms at time t is defined as average wages in non-acquired firms for the period 1997-1998. For subsequent periods we calculate a moving average.

[29] We have also run difference-in-difference estimations at the firm level on a matched sample of firms. The results, available upon request, are in accordance with the individual level results shown below.

[30] These effects refer to (t+1) – (t-1) and (t+2) – (t-1) in Table 6.

in acquired firms is lower than in firms that do not become foreign owned. More specifically, the variable *Foreign* captures the wage difference between individuals in firms that are taken over by foreign owners and individuals in firms that remain domestically owned. The coefficients suggest that individuals in takeovers have a wage level that is about 2-6 percent higher than individuals in other firms. However, the wage growth is higher in non-takeovers, as seen from the variable *foreign takeover*. The estimated coefficient, examining both the effect t+1 and t+2, suggests that wages grow slower for individuals in firms taken over by foreign owners compared to wages for individuals in other firms. This effect is stronger after two years than after one year (compare columns 3 and 6) perhaps indicating that restructuring of the firm and negotiation of new contracts is a gradual process.

V. Concluding Remarks

We have examined the effect of ownership on wages. More precisely, we have used a large matched employer-employee data set to address the question of whether foreign-owned firms pay higher wages than domestically owned firms and whether foreign-owned firms pay higher wages for identical workers? The first question can without any doubt be answered positively: foreign-owned firms pay higher wages than domestically-owned firms. However, there is no evidence that foreign firms pay higher wages for identical workers. Instead, higher wages in foreign-owned firms are caused by differences in firm and worker characteristics.

Moreover, the results suggest that the difference between multinational and non-multinational firms, rather than between domestic- and foreign-owned firms, is important. Foreign-owned firms tend to pay higher wages than domestically-owned

firms without foreign affiliates, but do not pay higher wages than domestically-owned multinational firms.

We also find a large difference in results between firm-level and individual-level data. Firm level results tend to overestimate the wage premium in foreign-owned firms. Weighting suggest that part of the overestimation is caused by foreign- and domestically-owned firms being distributed differently over size categories.

Changing the unit of observation to wages at the individual-level makes the foreign ownership wage premium almost disappear. The foreign ownership wage premium is then only two percent and the difference between foreign and Swedish owned MNEs is almost zero.

To deal with unobservable factors driving foreign acquisitions and (unobserved) individual heterogeneity, we analyze takeovers, combining matching techniques with difference-in-differences estimations. The results suggest that foreign owners target high-wage firms and that, compared to non-targeted firms, wages increase at a lower rate after the change in ownership. Hence, for an individual worker, if anything, foreign acquisition implies a reduced wage growth.

Our results have some important implications. Firstly, previous firm-level studies on ownership and wages presumably exaggerate the foreign wage premium. Secondly, the main difference is not between Swedish and foreign owned firm but rather between MNEs and local firms. Thirdly, our results show that when using firm level data, it might be desirable to consider employment weighted regression techniques. Finally, worker heterogeneity and selection bias in foreign acquisitions are important issues to consider for properly determine the size of the foreign ownership wage premium. Controlling for these factors result in no systematic wage differences between employees in domestic and foreign-owned firms.

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Tables and Figures

Table 1. Comparisons of foreign and domestically owned firms, (Ratios foreign/domestic).

Industry	Mean wage		Share of skilled employees		Firm size	
	1990	2000	1990	2000	1990	2000
Total	1.18	1.21	2.02	1.72	1.28	1.59
Simple manufacturing (1)	1.04	1.21	2.12	1.70	1.30	3.52
Wood and metals (2)	1.10	1.12	2.49	1.77	2.38	2.11
Electronics,transp. eq. (3)	1.19	0.85	2.94	1.58	1.95	1.28
Energy (4)	1.13	1.04	2.19	1.42	1.76	0.96
Retail trade (5)	1.34	1.43	4.27	3.12	1.04	1.31
Transport services (6)	1.08	1.16	1.37	3.01	0.70	1.31
Real estate (7)	1.08	1.25	0.88	1.10	0.86	2.01

Note: Share of skilled employees is constructed as the share of employees with at least tertiary education.

Table 2. The effect of foreign ownership on wages. Firm-level estimates 1990-2000 (dependent variable – log wage per employee)

	1	2	3	4	5	6	7	8	9	10
	vs. All	vs. All	vs. All	vs. All	vs. Swe. MNEs	vs. Swe. Local	vs. All	vs. All *1996-00*	vs. All *weighted*	vs. All *Unrestrict*
Foreign	0.204*** (0.003)	0.112*** (0.003)	0.190*** (0.004)	0.105*** (0.003)	0.045*** (0.004)	0.118*** (0.004)	0.095*** (0.003)	0.113*** (0.005)	0.065*** (0.000)	0.123*** (0.000)
High skilled	--	0.761*** (0.010)	--	0.728*** (0.010)	0.753*** (0.021)	0.708*** (0.010)	0.70*** (0.010)	0.735*** (0.012)	0.585*** (0.000)	0.716*** (0.000)
Low skilled	--	-0.131*** (0.009)	--	-0.159*** (0.009)	-0.208*** (0.039)	-0.161*** (0.010))	-0.149*** (0.009)	-0.186*** (0.014)	-0.368*** (0.001)	-0.317*** (0.000)
Female	--	-0.242*** (0.005)	--	-0.209*** (0.006)	-0.158*** (0.017)	-0.212*** (0.006)	-0.211*** (0.006)	-0.203*** (0.008)	-0.293*** (0.000)	-0.203*** (0.000)
Ln Firm size	--	--	0.017*** (0.001)	0.006*** (0.001)	-0.003* (0.002)	1.4E-04*** (0.001)	0.004** (0.001)	0.003* (0.001)	0.006*** (0.000)	0.015*** (0.000)
Profits/L	--	--	0.004*** (0.000)	0.003*** (0.000)	0.002*** (0.001)	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)
Ln Cap. int.	--	--	0.033*** (0.002)	0.032*** (0.002)	0.040*** (0.007)	0.032*** (0.002)	0.029*** (0.002)	0.039*** (0.003)	0.043*** (0.000)	0.043*** (0.000)
Export int.	--	--	--	--	--	--	4.3E-04*** (0.000)	--	--	--
Herfindahl	--	--	--	--	--	--	-6.4E-06*** (0.000)	--	--	--
Labor - productivity	--	--	--	--	--	--	0.001*** (0.000)	--	--	--
Time dum.	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Ind. dum.	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Adj. R-sq.	0.19	0.41	0.24	0.44	0.46	0.44	0.46	0.40	0.52	0.36
No. of obs.	61,469	61,469	60,619	60,619	13,654	54,886	60,619	36,351	n.a [A]	99,102

Notes: Robust standard errors within brackets (.). *, **, *** - significant at the one five and ten percent level respectively. Industry dummies correspond to 14 industries.
A - The reported number of observations becomes irrelevant when using weighted regression techniques.

Table 3. The effect of greenfields and foreign takeovers on wages. Firm-level estimates 1990-2000 (dependent variable – log wage per employee).

	1	2	3	4	5	6	7	8	9
	vs. All			vs. Swedish MNEs			vs. Swedish Local		
Greenfield	0.105***	--	--	0.047***	--	--	0.118***	--	--
	(0.005)			(0.005)			(0.005)		
Foreign Takeover	--	0.066***	0.012*	--	0.022***	0.009	--	0.079***	0.015*
		(0.008)	(0.007)		(0.008)	(0.012)		(0.01)	(0.009)
Firm characterist.	yes	yes	yes	yes	yes	yes	yes	yes	yes
Firm fixed-effects	--	--	yes	--	--	yes	--	--	yes
Time dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes
Hausman	--	--	2836***	--	--	185***	--	--	2339***
Adj. R-sq.	0.44	0.41	0.27	0.42	0.45	0.27	0.41	0.40	0.26
No. of obs.	57,661	54,590	54,590	10,706	7,432	7,432	51,928	48,740	48,740

Note: Robust standard errors within brackets (.). * - significant at a ten percent level; ** - significant at a five percent level; *** - significant at a one percent level. Firm characteristics include profits per employee, log firm size, capital intensity, employee skill dummies and the share of women at the firm. Industry dummies correspond to 14 industries. R^2 in the fixed-effects estimations are within figures.

Table 4. The effect of foreign ownership on wages. Individual level estimates 1996-2000 (dependent variable – log full time equivalent monthly wage).

	1	2	3	4	5	6	7 [A]
	vs. All	vs. All	vs. All	vs. Swe. MNEs	vs. Swe. Local	vs. All unrestricted	vs. All Firm aggregated
Foreign	0.043***	0.026***	0.025***	0.004***	0.049***	0.020***	0.074***
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.006)
Female	--	-0.148***	-0.142***	-0.143***	-0.145***	-0.144***	-0.239***
		(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.013)
Education dum.	--	yes	yes	yes	yes	yes	----
Experience	--	0.016***	0.016***	0.018***	0.015***	0.019***	----
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
Experience^2	--	-2.5E-04***	-2.5E-04***	-2.8E-04***	-2.3E-04***	-3.1E-04***	----
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	
Blue-collar	--	-0.129***	-0.113	-0.117***	-0.122***	-0.125***	----
		(0.000)	(0.000)***	(0.001)	(0.001)	(0.000)	
Log Firm size	--	--	1.7E-04	-0.008***	-1.3E-04	-3.4E-04	0.006***
			(0.000)	(0.000)	(0.000)	(0.000)	(0.002)
Profits/Employee	--	--	3.5E-04***	9.3E-04***	2.6E-04***	3.0E-04***	0.003***
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
High skilled	--	--	0.101***	0.168***	0.081***	0.250***	0.676***
			(0.002)	(0.002)	(0.002)	(0.002)	(0.030)
Low skilled	--	--	-0.109***	-0.052***	-0.091***	-0.128***	-0.285***
			(0.002)	(0.004)	(0.002)	(0.003)	(0.033)
Capital intensity	--	--	0.031***	0.038***	0.021***	0.024***	0.025***
			(0.000)	(0.000)	(0.000)	(0.000)	(0.002)
Time dummies	yes	yes	yes	yes	yes	yes	yes
Industry dummies	yes	yes	yes	yes	yes	yes	yes
Adj. R-sq.	0.06	0.42	0.45	0.47	0.44	0.47	0.47
No. of obs.	1,624,056	1,614,255	1,610,408	837,970	1,069,333	4,997,334	5,547

Notes: Robust standard errors within brackets (.). * , **, *** corresponds significance at the one, five and ten percent significance level. Industry dummies correspond to 14 industries. [A] Dependent variable - average firm-level wage (FS).

Table 5. Wage effects of foreign takeovers of Swedish firms. Individual level estimates 1996-2000 (dependent variable – log full time equivalent monthly wage).

	1	2	3	4	5	6
	Unmatched sample of firms			Matched sample of firms		
Foreign Takeover	0.031***	0.016***	-0.041***	0.015***	9.7E-04***	-0.017***
	(0.000)	(0.001)	(0.000)	(0.002)	(0.002)	(0.002)
Ind. characteristics	yes	yes	yes	yes	yes	yes
Firm characteristics	no	yes	yes	no	yes	yes
Fixed effects		--	yes	--	--	yes
Time dummies	yes	yes	yes	yes	yes	yes
Industry dummies	yes	yes	--	yes	yes	--
Hausman			17,235***			451***
Adj. R-sq.	0.41	0.43	0.36	0.37	0.41	0.18
No. of observations	1,367,459	1,363,692	1,372,393	67,438	67,426	67,576

Note: Robust standard errors within brackets (.). * - significant at a ten percent level; ** - significant at a five percent level; *** - significant at a one percent level. Individual and firm characteristics correspond to the same set of controls as in Table 3. In the fixed-effects estimations (columns 3 and 6) only time-varying variables are included. Industry dummies correspond to 14 industries. R^2 in the fixed-effects estimations are within figures.

Figure 1. Wage growth for individuals in firms that are acquired by a foreign owner and in firms that remain domestically owned.
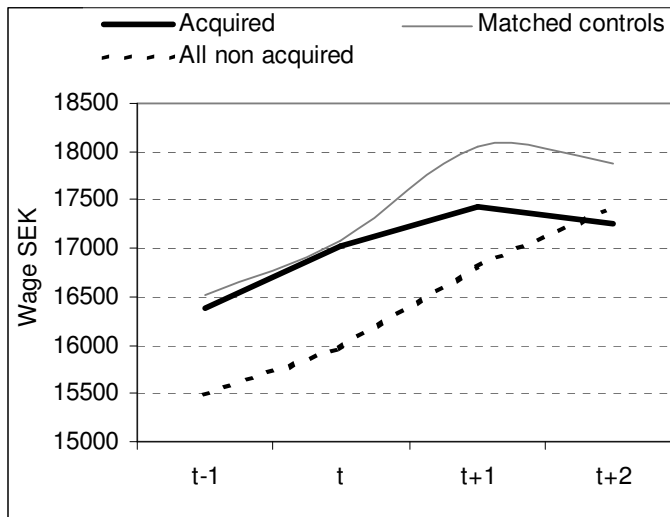
Table 6. Wage effects of foreign takeovers of Swedish firms – difference in difference estimations on the matched sample 1996-2000 (dependent variable – log monthly wage).

	1	**2**	**3**	**4**	**5**	**6**
	(t+1) – (t-1)			(t+2) – (t-1)		
Foreign takover$_{t+1}$	-0.039***	-0.031***	-0.007			
	(0.007)	(0.00)	(0.005)			
Foreign takeover$_{t+2}$				-0.087***	-0.079***	-0.063***
				(0.007)	(0.005)	(0.005)
Foreign	0.033***	0.056***	0.023***	0.033***	0.053***	0.030***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Ind. characteristics	no	yes	yes	no	yes	yes
Firm characteristics	no	no	yes	no	no	yes
Time trend	0.100***	0.083***	0.065***	0.142***	0.120***	0.108***
	(0.006)	(0.004)	(0.004)	(0.006)	(0.004)	(0.004)
Industry dummies	--	yes	yes	--	yes	yes
R-square	0.02	0.37	0.41	0.03	0.41	0.41
No. of observations	33,794	33,720	33,720	33,794	33,716	33,704

Note: Robust standard errors within brackets (.). * - significant at a ten percent level; ** - significant at a five percent level; *** - significant at a one percent level. Individual and firm characteristics correspond to the same set of controls as in Tables 3 and 4. Industry dummies correspond to 14 industries. (t+1) – (t-1) refers to the difference between one year after foreign takeover compared to one year prior to takeover. (t+2) – (t-1) corresponds to the effect two years after foreign takeover.

Appendix

Table A1. Variables.

Firm variables		**Source**
Wage	Average wage per employee, incl. payroll tax, 1990 year prices.	FS
Profits	Profits, net of financial deduction, 1990 year prices.	FS
Capital Intensity	Capital stock per employee, 1990 year prices.	FS
Export share	(Export/sales)*100.	FS
Labor productivity	Sales per employee, 1990 year prices	FS
High Skilled	Share of labor force with at least 3 years post-sec. education.	RAMS
Medium skilled	Share of labor force with 1-2 years of upper sec. education.	RAMS
Low Skilled	Share of labor force with at most 9 years elementary education.	RAMS
Foreign ownership	Dummy=1 if > 50 percent of a firm's votes is foreign owned.	FS
Size	Number of employees.	FS
Female-share	Share of female employees.	RAMS
Individual variables		
Wage	Full time equivalent monthly wage, 1990 year prices.	LS
Female	Dummy = 1 if female.	LS
Blue-collar	Dummy = 1 if blue-collar worker.	LS
Education dummies (Based on the Swedish edu. nomenclature)	(1). Elementary school < 9 years (2). Compulsory school = 9 y. (3). Upper secondary, 2 years (4). Upper secondary, 3 years (5). Upper secondary, 4 years (6). Undergraduate studies, 3 y. (7). PhD.	LS
Experience	Age minus number of years of schooling - seven.	LS
Other variables		
Herfindahl index	$H_{it} = \left\{ \sum_{i=1}^{N} s_{it}^2 \right\}, \text{ where } s_{it} = \dfrac{sales_{it}}{\sum\limits_{i=1}^{N} sales_{it}}$	FS

Note: Abbreviations: Financial statistics (FS), Regional labor market statistics (RAMS), Individual wage statistics (LS).

Table A2. Descriptive statistics, linked firm-worker data (1996-2000).

	Domestic-owned non-MNCs		Domestic-owned MNCs		Foreign-owned MNCs	
Worker characteristics	Individual level data	Aggr. to firm level	Individual level data	Aggr. to firm level	Individual level data	Aggr. to firm level
Monthly average wage	15.9	15.6	17.3	16.8	17.2	17.4
Elementary School <9	0.11	0.14	0.10	0.14	0.12	0.11
Compulsory School =9	0.13	0.15	0.12	0.15	0.14	0.14
Upper Secondary School <3	0.38	0.37	0.37	0.34	0.33	0.34
Upper Secondary School =3	0.16	0.16	0.17	0.16	0.18	0.19
Upper Secondary School =4	0.13	0.10	0.13	0.11	0.12	0.13
University undergraduate	0.08	0.07	0.10	0.09	0.09	0.09
University graduate	0.01	0.00	0.01	0.00	0.01	0.00
Experience	26.2	25.2	23.7	24.7	25.0	24.4
Age of employees	44.3	43.1	42.0	42.6	43.1	42.5
Share female	0.42	0.33	0.27	0.26	0.30	0.32
Share blue collar	0.39	0.50	0.47	0.52	0.51	0.45
Firm characteristics						
Wage incl. soc.	24.0	22.9	26.4	24.8	26.4	26.3
Firm size	8 117	372	7 334	945	1 499	573
Export ratio	8.46	6.95	48.8	42.1	39.6	33.1
Share women	0.42	0.33	0.28	0.28	0.31	0.32
Share of high-educated	0.24	0.19	0.26	0.21	0.24	0.24
Share of med-educated	0.54	0.53	0.53	0.51	0.51	0.52
Share of low-educated	0.22	0.27	0.21	0.28	0.25	0.24
log capital intensity	0.66	0.63	1.01	0.67	0.89	0.60
Profits per employee	1.57	1.08	2.81	1.97	1.34	1.08
Sales per employee	15.4	15.8	22.8	17.3	18.0	21.9
Herfindahl index	2.41	5.82	1.81	3.90	2.68	3.54
No of observations	743 952	3 567	542 011	1 031	296 960	1 010

Firm level statistics - not restricted by being linked to individual worker data.

	1990-2000	1996-2000	1990-2000	1996-2000	1990-2000	1996-2000
Wage incl soc	20.3	22.1	23.3	24.6	26.0	27.9
Firm size	115	98	443	405	214	208
Export ratio	3.48	3.47	39.6	39.1	20.6	21.3
Share women	0.30	0.31	0.28	0.27	0.31	0.31
Share of high-educated	0.15	0.16	0.20	0.21	0.26	0.27
Share of med-educated	0.54	0.56	0.51	0.53	0.51	0.52
Share of low-educated	0.31	0.28	0.29	0.26	0.23	0.21
log capital intensity	0.09	0.07	0.37	0.39	0.18	0.23
Profits per employee	0.87	0.83	1.30	1.53	1.04	1.09
Sales per employee	16.4	16.9	18.8	20.	28.2	31.2
Herfindahl index	297	285	296	287	245	243
No of obs.	46 965	28 100	5 733	3 482	7 921	4 769

Notes : Firm level statistics on workers education stem from the data reported by the firm. Data on individual workers' education stem from individual register data on education. Wages are in 1,000 Swedish Kronor. Share female is based on individual level data. Share women is firm averages as reported by firms. Firm level wage data include social costs which vary over time and across firms, typically social cost increases wage cost by a factor of 1.45. Restrictions on job switching and firm survival are imposed.

Table A3. Descriptive statistics. No restrictions on firm survival, job switching and worker survival.

	Domestic-owned non-MNCs		Domestic-owned MNCs		Foreign-owned MNCs	
Firm level data 1900-2000. Individual level data 1996-2000.						
Worker characteristics	Individual level data	Firm level data	Individual level data	Firm level data	Individual level data	Firm level data
Monthly average wage	15.3	-	17.0	-	16.4	-
Elementary School <9	0.10	-	0.09	-	0.10	-
Compulsory School =9	0.13	-	0.12	-	0.14	-
Upper Secondary School <3	0.36	-	0.33	-	0.32	-
Upper Secondary School =3	0.27	-	0.29	-	0.30	-
Upper Secondary School =4	0.05	-	0.04	-	0.04	-
University undergraduate	0.08	-	0.11	-	0.10	-
University graduate	0.00	-	0.00	-	0.01	-
Experience	23.2	-	22.1	-	21.8	-
Age of employees	42.3	-	40.4	-	39.8	-
Share female	0.39	-	0.28	-	0.30	-
Share blue collar	0.47	-	0.50	-	0.53	-
Firm characteristics						
Wage incl. soc.	-	20.9	-	23.5	-	25.9
Firm size	5 944	95	6 013	399	1 979	193
Export ratio	10.9	2.43	53.1	38.3	40.0	17.8
Share women	0.39	0.33	0.29	0.29	0.30	0.32
Share of high-educated	0.11	0.08	0.15	0.11	0.13	0.14
Share of med-educated	0.63	0.60	0.60	0.58	0.60	0.61
Share of low-educated	0.26	0.31	0.25	0.31	0.27	0.25
log capital intensity	0.25	-0.05	0.95	0.32	0.46	0.22
Profits per employee	3.32	0.73	2.65	1.18	1.77	0.09
Sales per employee	5.76	2.61	2.63	19.3	4.57	27.0
Herfindahl index	6.27	428	4.12	500	2.68	424
No of observations	2 049 588	79 255	1 193 187	7 371	991 126	12 476

Notes : Firm level statistics on workers education stem from the data reported by the firm. Data on individual workers' education stem from individual register data on education. Wages are in 1,000 Swedish Kronor.

Table A4. Propensity Score matching. 1:st step logit. Dependent variable, Foreign ownership.

	1997	1998
Profits/sales	0.00 (0.00)	0.03 (0.02)**
Log firm size	0.21 (0.22)	0.28 (0.17)*
Log firm age	0.61 (0.52)	-0.31 (0.29)
Log capital per employee	0.00 (0.00)**	0.00 (0.00)
Low skilled	-0.01 (0.03)	-0.01 (0.02)
Log labor productivity	-0.79 (0.60)	0.18 (0.01)
Export share	0.03 (0.01)**	0.02 (0.01)**
Industry dummies	included	included
Number of firms	468	713
Pseudo R^2	0.17	0.20

Note: Robust standard errors within brackets. * - significant at a 10 percent level; ** - significant at a five percent level; *** - significant at a one percent level. All explanatory variables are lagged one year. The 1997 specification also include an insignificant effect of logged investment over sales. See Section III for information on how the matching procedure was implemented.