

Foreign Ownership and Wages:
Results from Matched Worker – Firm Data

Patrik Gustavsson^{*}

Fredrik Heyman^{**}

Fredrik Sjöholm^{*}

Abstract

It is well documented that foreign firms tend to pay higher wages than local firms do. However, it does not necessarily imply that the individual worker's wage increase with foreign ownership of the firm. Employees differ in many respects such as age, education and previous work experience, which have an impact on wages. It is plausible that workers in foreign and local firms differ in such aspects. This paper combines data on a large sample of Swedish employees with data on all Swedish firms to construct an employer-employee panel data set, which is used to examine the effect of inward FDI on Swedish wages. Our approach allows us to examine the effect of foreign ownership on wages for individual workers after controlling for various worker and firm characteristics.

DRAFT 2004-08-31

JEL: F23, J31, C23

Keywords: FDI, Foreign ownership, Wages, Matched Employer-Employee Data, Propensity score matching.

^{*} Stockholm School of Economics

^{**} Trade Union Institute for Economic Research

I. Introduction

The amount of 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 do domestically owned firms.¹ Part of this wage premium is caused by foreign firms locating in high wage sectors and localities, but the premium exist even within industries and regions and after controlling for firm characteristics and the average educational level of the labour force (Aitken *et al.* 1996; Lipsey and Sjöholm, 2002, 2004). 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 labour turnover by paying a wage premium; the wage premium might be caused by rent-sharing arrangements among foreign firms (Budd *et al.* 2002); by a higher labour demand volatility in foreign plants (Fabri *et al.* 2003); or as compensation for a higher foreign closure rate (Bernard and Sjöholm, 2003).

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, and previous work experience, which have an impact on wages. It is plausible that the foreign wage premium is caused by such worker characteristics rather than by the ownership of the firm. To examine if foreign firms pay a relatively high wage for a given quality of employees ideally asks for a change of the unit of observation: from the firm or plant level to the individual worker. In addition, detailed information on individuals' characteristics is necessary

¹ See for instance Lipsey (2004) for a survey of the literature on FDI and wages.

to control for differences in human capital. Such an analysis has previously been constrained by the scarcity of data that combines information of individual employees with information of their employers. One exception is Bora and Wooden (1998) who find individuals' wages to be relatively high in foreign-owned Australian firms. This contrasts the results in Martins (2004) who find no effect on individual wages after foreign acquisition of Portuguese manufacturing plants.

This paper combines data on a very large sample of over 2 million Swedish employees with data on all private sector Swedish firms and establishments to construct a matched employer-employee panel data set. The data on firms and establishments cover the period 1990-2000 while individual information is available for 1996-2000. The matched data contains detailed information on firm and worker characteristics, which allows us to examine the effect of foreign ownership on wages for individual workers after controlling for such characteristics. We use techniques to control for possible unobservable differences between employees in foreign and domestically owned firms, and matching techniques to control for possible differences between foreign and domestic firms.

Our result shows foreign owned firms to pay higher wages than domestically owned firms. However, this wage differences seems to be caused by differences in worker and firm characteristics. Controlling for worker characteristics substantially reduces the wage premium, and controlling for worker characteristics and differences in firm characteristics makes the foreign wage premium disappear.

II. Foreign Ownership in the Swedish Industry

Swedish industry changed substantially during the 1990s. Firstly, the number of firms increased more than twofold from around 2,640 in 1990 to around 6,659 in 2000

(Update). Secondly, the relative size of manufacturing decreased, especially in terms of employment, and the relative size of the service sector increased (to be included).

Figure 1 about here.

There was also a substantial increase of foreign ownership of the Swedish industry during the first half of the 1990s. As seen in Figure 1, the foreign share of value added increased from about 15 percent in 1990 to about 21 percent in 1996, a share that has remained relatively stable since.² The same pattern is seen for the foreign share of employment, although with slightly smaller shares, which suggest that labour productivity is higher in foreign firms. Finally, the foreign share of the number of firms is substantially smaller, showing foreign firm to be larger than the average Swedish-owned firm. The increased foreign share of Swedish industry corresponds to a similar development in most countries, but it might have been comparably large in Sweden. There are several reasons to this development. For instance, the Swedish deregulation of capital and foreign exchange markets in the late 1980s enhanced inflows of FDI. Moreover, two other important factors were the Swedish membership in the European Union and the large currency crisis in 1992. The latter factor reduced the cost of Swedish assets and the cost of locating production in Sweden.

Table 1 about here.

A comparison of domestic- and foreign owned firms in Sweden is seen in table 1. Wages are about 20 percent higher in foreign- as compared to domestically owned Swedish firms. Foreign firms locating in high-wage sectors do not seem to cause the high foreign wage; foreign firms pay higher wages in all sectors in 1990 and in all

² Own calculations on data provided by Statistics Sweden. Note that the figures refer to firms with more than 20 employees in the private sector. See section III for a detailed description of the data.

sectors except in Electronics and transport equipment in 2000. The difference in wages is especially large in Retail trade, about one third higher in 1990 and 43 percent higher in 2000.

The higher wages in foreign-owned firms might be caused by firm characteristics. For instance, skilled individuals are likely to have comparably high wages, and large firms tend to pay higher wages than small firms. Table 1 includes comparison of these factors in foreign- and domestically-owned firms. High skill is measured as the share of the workforce with tertiary education. Foreign-owned firms have a relatively well educated workforce; the share of workers with tertiary education is twice as high as in domestically-owned firm in 1990, which decrease 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 large differences between the two years.

III. Data and Empirical Set-Up

DATA

Our empirical analysis is based on three data sets provided by Statistics Sweden. The included identification codes enable us to link firms and individuals and to trace them over time.

Firstly, the financial statistics (FS) contains detailed information on all Swedish firms over the period 1990-2000 with at least 20 employees. There are 2,640 firms in 1990, 290 of them being foreign-owned, and 6,659 firms in 2000, out of which 886 being foreign-owned. Examples of variables included are value added,

investment, capital stock (book value), firm-age, number of employees, total wages ownership, sales, profits, geographic location, intermediate inputs, and a sector code.

Secondly, the Regional labor market statistics (RAMS) contains data on all firms and plants spanning the period 1990-2000. RAMS adds information on the composition of the labor force with respect to the age and educational level of the workforce.

Thirdly, the wage statistics database (LS) contains similar information as the RAMS but on the individual level. One main advantage of LS is that wages are reported as full time equivalent. The LS spans the period 1996-2000 and has approximately 2 million observations per year, which is roughly 50 percent of the Swedish labor force.

Hence, the nature of the datasets implies that the firm level estimations will be on data for 1990-2000, while individual level analysis use our matched employer-employee data set for the period 1996-2000.

The firms' size restriction remains unchanged at 20 employees. Moreover, for Swedish firms acquired by a foreign owners at period (t), we only consider firms that is Swedish owned at (t-1) and remain foreign owned at year (t+1) and (t+2). Hence, once foreign owners acquire a firm, it never returns to the sample with a Swedish identity. With this restriction we can study firms' that is acquired 1997 or 1998. In the matching process (see below) we make the same survival criterion for the control group of non-acquired Swedish firms. Finally, we only consider individuals that remain at the same firm year (t-1) to (t+2).

(TABLE WITH NO FIRMS, WORKERS, TAKEOVERS FOR 1990;1996-2000 to be included)

EMPIRICAL SET-UP

Firm-level analysis

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

$$\ln(wage)_{jt} = f(\text{ownership, employee characteristics, firm characteristics})_{jt}$$

where wage is the average wage at firm j at time t . Ownership is captured by a dummy variable for foreign ownership, defined as 1 if at least 50 percent of the equity is foreign owned. Worker characteristics include the skill- and gender composition at the firm. Firm characteristics include firm size, profits per employee, capital intensity, export intensity, labor productivity, and industry affiliation. A more detailed description of the variables is found in Table A1 in the appendix.

Individual-level analysis

Next we turn to estimate individual wage equations using our matched panel of firms and individuals, covering the period 1996-2000. By estimating the effect of ownership on micro data on individuals and firms instead of aggregation at the firm level, we are able to take into account within firm variation and worker heterogeneity. We use the following empirical specification in the individual-level analysis:

$$\ln w_{ijt} = \beta_0 + \beta_1 O_{jt} + X'_{ijt} \beta_2 + F'_{jt} \beta_3 + S'_{jt} \beta_4 + \alpha_i + \eta_j + \varepsilon_{it}$$

where w_{it} is the full-time equivalent monthly wage for worker i at time t ; O is a foreign ownership dummy for firm j that employs worker i at time t ; X is a vector with individual characteristic variables including gender, education, labor market

experience, and occupation; F contains firm level variables such as (log) firm size, profits per employee, capital intensity, export intensity, labor productivity and industry affiliation. The S vector captures the skill composition of the firms' labor force by including educational attainment and gender. Finally, α_i and η_j are fixed individual- and firm-effects, respectively and ε_{it} is the error term.

Propensity score matching

An econometric problem when estimating the causal effect of foreign ownership on wages concerns the endogeneity of firms becoming foreign owned. In other words, it is not random which firms that are acquired. If firms that become foreign owned exhibit characteristics that systematically differ from domestic firms it is plausible that these characteristics might also be important in determining the wages. Analogous to the problem in the evaluation literature of non-random treatment groups, the characteristics of the firms that become foreign owned might be such that they in any case would develop differently than their non-acquired counterparts. This, in turn, means that estimates on outcome variables (such as wages, employment or productivity) become biased. In the case of foreign ownership and wages, the non-random sample of foreign firms can lead to an upward bias of the effect of foreign ownership on wages. We approach this problem by way of propensity score matching combined with the more general difference-in-differences (d-i-d) technique. The goal of the matching procedure is to find a group of non-acquired firms that display the same characteristics as the group of treated (acquired) firms. This is in essence the aim of the matching model. The advantage of matching compared to standard OLS is that we can relax a number of assumptions that may influence the estimated effect of an acquisition, such as the assumption that the coefficients on the variables are

assumed to be common across acquired and non-acquired firms (see e.g. Griffith *et al.* 2001). Finally, to evaluate the impact of foreign acquisition we combine the matching procedure with difference-in-difference (d-i-d) techniques, which may significantly improve non-experimental evaluation results (Blundell and Costa Dias, 2000).

IV. Results

We follow previous literature at the firm level and start by examining the average level of wages per employee 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. However, domestic and foreign owned firms differ in several respects, which might also affect wages. The rest of Table 2 tries to control for such differences in worker and firm characteristics. 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 increase the R-square value substantially and reduces the wage premium in foreign owned firms to about 12 percent. This means that the impact of foreign ownership on wages can to a large extent be explained by worker characteristics, suggesting the importance in controlling for worker heterogeneity. Moreover, a high share of female workers decrease average wages and a high share of high-skilled workers has a positive, albeit small, effect on average wages. 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, and so do capital-intensive firms. The coefficient for *Profits per employee* is positive and statistically significant but of a rather small size, which suggest that rent-sharing is not important in determining Swedish wages

Both human-capital and firm characteristics are included in column 4. The estimated coefficient on the foreign ownership variable, 0.12, is identical to the one in column 2, indicating that employee characteristics are more important than firm characteristics in explaining the foreign wage premium. Estimation 5, finally, includes a number of other factors that might be important to control for when studying the impact of foreign ownership on wages: the firm's export orientation, the degree of market competition, and labour productivity. Export and productivity have statistically significant coefficients but the economic significance is very small. Including all control variables in estimation 5 reduces the wage premium in foreign owned firms to about 11 percent.

Most previous studies at the firm or plant level have examined ownership and wages in developing countries. Some of the few studies on developed countries find a wage premium in foreign-owned firms of similar size as the 11 percent we have found in the Swedish industry.³ For instance, the wage premium, after controlling for various factors affecting the wage, is about 10 percent in the UK (Girma et al, 2001). FLER?? However, Feliciano and Lipsey (1999) did not find any wage difference between domestic and foreign owned firms in the US, after controlling for various firm characteristics.⁴

Table 3 about here.

³ Most studies on ownership and wages are on developing countries and tend to find a larger wage premium in foreign-owned firms.

As described above, there are reasons why an analysis at the individual level rather than at the firm level is more suitable when studying the effect of ownership on wages. Table 3 show results from estimating individual wage equations. The wage premium in foreign owned firms is substantially reduced compared to the estimations with average wages at a firm level in Table 2. More specifically, estimation 6 shows the wage premium to be around 4 percent but the effect decrease to about 3 percent after inclusion of worker characteristics and to 2 percent after inclusion of both worker and firm characteristics.

The estimated coefficients of the other variables suggest that female wages are about 14 percent lower than male wages and that blue-collar workers have wages about 11 percent lower than white-collar workers. Moreover, wages increase with experience, as measured by years after entering the labour market. Regarding the firm characteristics, it is seen that only capital intensity has an economically significant effect on wages; size, profits, and the average skill level of workers are statistically significant but with very small coefficients.⁵ Hence, size has, unlike in the firm estimations as well as in most other studies, no major impact on wages.

As seen in the estimations above in tables 2 and 3, the wage premium at a firm level is about 11 percent, but only about 2 percent when individual wages are used as dependent variable. One plausible explanation to the different results between firm and individual level estimations is that the former might not fully control for the size difference between domestic and foreign firms.⁶ A firm with 1,000 employees has the same effect on the results as a firm with 20 employees in the firm level estimations,

⁴ They did, however, find a foreign wage premium of about 9 percent in non-manufacturing.

⁵ The average skill level of employees aims at capturing complementarities with the individual's wage. Hence, the individual's wage could, for instance, have been positively correlated with the share of high skilled workers in the firm through externalities.

⁶ The different results are not caused by different time periods. Running the estimations on a firm level for the period 1996-2000 had only minor effect on the results.

but comes up 50 times more often in the data in the individual level estimations. Moreover, large firms tend to pay relatively high wages and foreign-owned firms tend to be relatively large. Hence, it is possible that the firm-level estimations compares relatively small (on average) domestically-owned firms with relatively large foreign-owned firms and that this exaggerates the wage-premium in the latter group.

At least two types of factors might bias the results above. The first could be that we are still not fully capturing the quality of the workforce and that this affects the estimated wage difference between employees in domestically- and foreign-owned firms. Hence, there might be unobservable effects that affect our results. One way to control for this problem is to look at the effect on an individual's wage after a foreign acquisition of the firm.⁷ If foreign ownership causes high wages, we would assume that a foreign takeover of a firm increase the workers' wages. However, we would not expect any effect of foreign takeovers if it is unobserved attributes of the workers that cause their higher wages.

Another possible bias could be that foreign- and domestically-owned firms differ substantially in various observable characteristics (Heckman et al, 1997). OLS assumes that the variable coefficients are equal across firms with different characteristics. One way to control for this problem is, again, to create a sample of similar foreign and domestically owned firms using a matching technique.

We address the first type of problem, unobservable characteristics, by looking at ownership changes and by including fixed effect estimates in Table 4. The variable *foreign* captures the change in ownership from domestic to foreign. One should note that we are now only looking at a subset of foreign firms, namely those that are foreign acquisitions and not foreign greenfield investments. Foreign takeovers of

⁷ This approach is similar to Conyon *et al* (2002), and Lipsey and Sjöholm (2002) who look at average plant-level wages after a change in ownership from domestic to foreign.

domestically-owned Swedish firms increase individual wages with about 3 percent, even after controlling for worker characteristics. The effect is reduced, but still positive, after controlling for firm characteristics. The estimations are similar to the firm level estimations in Table 4. However, estimation 10 tries to further control for unobservable effects by fixed-effect estimations. Since we have restricted the sample to workers remaining at the same firm across the entire period, we obtain within individual and within firm effect 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 wage premium, which becomes negative and statistically significant. Hence, when we compare individuals' wages within a firm that is taken over by foreign owners, it is higher during domestic ownership than during foreign ownership.

Again, one possible source of bias is if foreign takeovers are not a random process. Targeted firms might differ from firms that remain domestically-owned, and this could affect the results. One way to try to control for this is to compare the effect of takeovers for a sample of similar firms that remains domestically-owned. The design of the matching procedure is important since the success of overcoming the OLS bias hinges on that we are able to identify the characteristics that determines which firms that becomes acquired using observable information (Heckman et al. (1998), Becker and Ichino (2002)). The acquisition logit model is presented in Table A2 in the Appendix. In implementing the matching procedure, we use the algorithms provided by Becker and Ichino (2002) and Sianesi (2001). Table A2 show the estimated logit-model of being acquired by a foreign owner, conditional on a variety of covariates that are important in explaining acquisitions. The propensity score is estimated with the Nearest-Neighbour method without replacements. The balancing

property of the propensity score is tested and satisfied in all estimations.⁸ Since we have a panel of firms and individuals over time, the matching of firms are first calculated year-by-year using lagged covariates. We thereafter use the matched firms in the analysis to create a panel of firms and individuals.

There are no positive effects on wages from foreign takeovers in the matched sample as seen in estimations 11-13 in Table 4. There is no or a very small effect in estimations 11 and 12 and a small and negative effect in estimation 13. The matching procedure has some effect on the other variables. Most notably, large firms pay comparably high wages.

Another way to control for unobservable effects is to use a d-i-d estimation where the wage growth after foreign takeovers is examined. Unobservable characteristics that might affect wages will then disappear provided that these characteristics do not change over time. The growth in wages in targeted firms (takeovers) is compared to the growth in wages in non-targeted firms (firms that remain domestically owned). Table 5 shows some descriptive statistics on the development of wages in foreign targeted and non-targeted firms.

Table 5 about here.

Wages is one year prior to takeovers higher in targeted firms than in non-targeted firms, irrespective if we use a matched or unmatched sample. Hence, foreign owners acquire high-wage Swedish firms. Wages continue to grow after takeovers but they grow even faster in non-targeted firms: whereas wages remain higher in targeted firms

⁸ To test for this, the sample is split into intervals of the propensity score. Within these intervals, the algorithm tests that the means of the covariates in the probit do not differ between treated and control observations. In testing the balancing property, only observations in the region of common support are included.

the year of takeover and one year after takeover, they are lower than wages in non-targeted firms two years after takeovers.

Hence, the figures in Table 5 do not suggest any positive wage effect of foreign takeovers but the result might be caused by other factors that are not controlled for in the descriptive statistics. We therefore continue in table 6 with a more rigorous d-i-d analysis. The variable *foreign wage level* 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 3 percent higher than individuals in other firms. However, the wage growth is higher in non-takeovers, as seen from the variable *wage growth after foreign takeover*. The coefficient suggests that wages grow 2 percent slower for individuals in firms taken over by foreign owners compared to wages for individuals in other firms.

The results from our analysis suggest that a large share of observed differences in wages between foreign and domestic firms can be attributed to differences in observable and unobservable characteristics of firms and workers. Foreign firms do not seem to pay higher wages than domestic firms do for identical types of workers.

V. Concluding Remarks

We have in this paper examined the effect of ownership on wages. More precisely, we have used a large data set on Swedish workers and firms to address the question 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 positively answered: foreign firms tend to pay higher wages than domestically-owned firms. However, there is much less support for

the notion that foreign firms pay higher wages for identical workers. Instead, it seems that higher wages in foreign-owned firms is caused by differences between domestic- and foreign-owned firms, in particular, by differences between workers in domestic- and foreign-owned firms.

Foreign firms tend, for instance, to be larger than domestically-owned firms. Controlling for such differences in firm characteristics reduce the wage premium in foreign-owned firms. It might be important to note that from a host-country policy perspective, it will not matter that such firm characteristics causes the higher wages in foreign-owned firms. Foreign-owned firms tend to be larger than domestically-owned firms in all countries, and do not make the impact on wages less positive. However, and perhaps more importantly, it seems that workers in foreign-owned firms tend to have higher human-capital, which explains most, if not all, of the differences in wages.

References

- Aitken, Brian, Anne E. Harrison and Robert E. Lipsey (1996), "Wages and Foreign Ownership: A Comparative study of Mexico, Venezuela, and the United States", *Journal of International Economics*, Vol. 40, pp. 345-71.
- Bernard, Andrew B. and Fredrik Sjöholm (2003), "Foreign Owners and Plant Survival", National Bureau of Economic Research Working Paper No. 10039.
- Bora, Bijit and Mark Wooden (1998), "Human Capital, Foreign Ownership and Wages", mimeo, Flinders University.
- Budd, John W., Josef Konings and Matthew J. Slaughter (2002), "International Rent Sharing in Multinational Firms", National Bureau of Economic Research Working Paper No. 8809.
- Fabbri, Francesca, Jonathan E. Haskel and Matthew J. Slaughter (2003), "Does Nationality of Ownership Matter for Labor Demands?", *Journal of the European Economic Association*, Papers and Proceedings, Vol. 1, pp. 698-707.
- Feliciano, Zadia, and Robert E. Libsey (1999), "Foreign Ownership and Wages in the United States, 1987-1992", Cambridge, MA, NBER Working Paper No. 6923.
- Girma, Sourafel, David Greenaway, and Katherine Wakelin (2001), "Who Benefits from Foreign Direct Investment in the UK?", *Scottish Journal of Political Economy*, Vol. 48, No. 2, pp. 119-133.

Griffith, R., Simpson, H., and Windmeijer, F. (2001), “Understanding Productivity Differences Between Foreign and Domestic Firms”, Draft, presented at CEPR/ESRC conference 11 oct 2001.

Heckman, J., Ichimura, H., Smith, J., and Toff, P. (1998), “Characterizing Selection Bias Using Experimental Data”, *Econometrica*, 66(5), pp. 1018-1098.

Lipsey, Robert E. (2004), “Home- and Host-Country Effects of Foreign Direct Investment,” in Robert E. Baldwin and L. Alan Winters, Editors, Challenges to Globalization, Chicago, University of Chicago Press, forthcoming.

Lipsey, Robert E. and Fredrik Sjöholm (2002), “Foreign Firms and Indonesian Manufacturing Wages: An Analysis with Panel Data”, National Bureau of Economic Research Working Paper No. 9417.

Lipsey, Robert E. and Fredrik Sjöholm (2004), “Foreign Direct Investment, Education, and Wages in Indonesian Manufacturing”, *Journal of Development Economics*, Vol. 73, pp. 415-422.

Martins, Pedro S. (2004), “Do Foreign Firms Really Pay Higher Wages? Evidence from Different Estimators”, mimeo, University of St Andrews.

Figure 1. Foreign Shares of Swedish Industry.

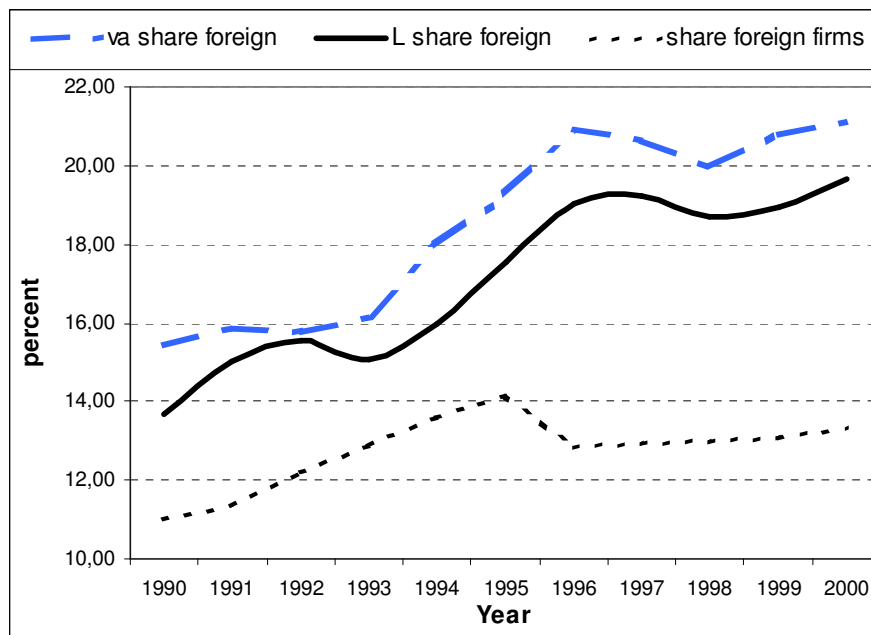


Table 1. Comparisons of foreign and domestically owned firms (Ratios)

Sector		Average Wage		Share of high skilled employees		Size	
	ISIC rev(3)	1990	2000	1990	2000	1990	2000
Total		1.18	1.21	2.01	1.72	1.28	1.60
	1	1.04	1.21	2.12	1.70	1.30	3.51
	2	1.10	1.12	2.48	1.77	2.38	2.12
	3	1.19	0.85	2.94	1.58	1.95	1.28
	4	1.13	1.04	2.20	1.42	1.76	0.96
	5	1.34	1.43	4.26	3.12	1.04	1.31
	6	1.08	1.16	1.37	3.01	0.70	1.31
	7	1.08	1.25	0.88	1.10	0.86	2.01

Note: Size is constructed as the number of employees. Share of skilled employees is constructed as the share of employees with 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
Foreign	0.20 (62.99)***	0.12 (37.42)***	0.19 (50.17)***	0.12 (33.96)***	0.11 (30.38)***
High skill	--	0.01 (58.61)***	--	0.01 (59.04)***	0.01 (55.93)***
Low skill	--	-0.00 (38.53)***	--	-0.00 (41.37)***	-0.00 (39.71)***
Female	--	-0.23 (47.77)***	--	-0.20 (33.66)***	-0.20 (33.90)***
Log Firm size	--	--	0.02 (15.42)***	0.00 (5.20)***	0.00 (0.54)
Profits/Employee	--	--	0.00 (4.49)***	0.00 (4.54)***	0.00 (4.64)***
Capital intensity	--	--	0.04 (17.47)***	0.03 (16.21)***	0.03 (14.25)***
Export share	--	--	--	--	0.00 (12.32)***
Herfindahl index	--	--	--	--	0.00 (1.27)
Labor productivity	--	--	--	--	0.00 (14.84)***
Time dummies	included	included	included	included	included
Industry. Dum.	included	included	included	included	included
Adj. R-sq.	0.19	0.41	0.23	0.43	0.45
No.of obs.	61,520	61,520	60,670	60,670	60,670

Note: t-statistics within brackets. * - significant at a 10 percent level; ** - significant at a five percent level; *** - significant at a one percent level.

Table 3. The effect of foreign ownership on wages. Individual level estimates (dependent variable – log wage).

	6	7	8
Foreign	0.042 (64.69)***	0.03 (51.39)***	0.02 (47.04)***
Female	--	-0.15 (384.49)***	-0.14 (368.56)
Education dummies	--	included	included
Experience	--	0.02 (207.43)***	0.02 (214.04)***
Experience ²	--	-0.00 (168.64)***	-0.00 (173.49)***
Blue-collar	--	-0.13 (296.52)***	-0.11 (250.90)***
Log Firm size	--	--	0.00 (62.12)***
Profits/Employee	--	--	0.00 (21.89)***
High skill	--	--	0.00 (71.82)***
Low skill	--	--	0.00 (62.12)***
Capital intensity	--	--	0.03 (196.09)***
Time dummies	included	included	included
Industry dummies	included	included	included
Adj. R-sq.	0.06	0.42	0.45
No.of observations	1,627,908	1,618,019	1,614,172

Note: t-statistics within brackets. * - significant at a 10 percent level; ** - significant at a five percent level; *** - significant at a one percent level.

Table 4. Wage effects of foreign takeovers of Swedish firms – estimations on individuals 1996-2000 (dependent variable – log wage).

	Unmatched-OLS 8	Unmatched-OLS 9	Unmatched-FE 10	Matched-OLS 11	Matched-OLS 12	Matched-FE 13
Foreign	0.03 (26.27)***	0.02 (14.42)***	-0.04 (46.55)***	-0.00 (0.44)	0.01 (8.36)***	-0.02 (12.79)***
Female	-0.14 (337.47)***	-0.14 (324.58)***	--	-0.12 (73.21)***	-0.13 (81.07)***	--
Education dummies	included	included	--	included	included	--
Experience	0.02 (186.22)***	0.02 (192.86)***	--	0.01 (38.07)***	0.01 (39.87)***	--
Experience ²	-0.00 (150.62)***	-0.00 (155.76)***	--	-0.00 (34.24)***	-0.00 (35.25)***	--
Blue-collar	-0.12 (247.61)***	-0.10 (205.78)***	--	-0.10 (54.78)***	-0.09 (50.42)***	--
Log Firm size	--	0.00 (17.58)***	0.00 (11.61)***	--	0.03 (33.58)***	0.08 (32.61)***
Profits/Employee	--	0.00 (23.57)***	0.00 (18.03)***	--	0.00 (13.92)***	0.00 (27.43)***
High skill	--	0.00 (59.46)***	0.00 (91.49)***	--	0.01 (38.75)***	0.00 (9.40)***
Low skill	--	-0.00 (64.63)***	0.00 (51.39)***	--	0.00 (13.31)***	0.01 (18.60)***
Capital intensity	--	0.03 (180.53)***	-0.01 (25.98)***	--	0.01 (12.58)***	0.03 (17.45)***
Fixed effects	--	--	included	--	--	included
Time dummies	included	included	included	included	included	included
Industry dummies	included	included	--	included	included	--
Adj. R-sq.	0.41	0.43	0.37(within)	0.32	0.35	0.19(within)
No.of observations	1,371,296	1,367,529	1,376,318	98,005	98,005	98,540
No. of groups	--	--	305,720	--	--	24,635

Note: t-statistics within brackets. * - significant at a 10 percent level; ** - significant at a five percent level; *** - significant at a one percent level.

Table 5. Wage growth in foreign takeovers and in non-takeovers (log wage).

		Unmatched	Matched
	Takeovers	Non-takeovers	Non-takeovers
t-1	9.67	9.58	9.62
t	9.71	9.62	9.67
t+1	9.73	9.67	9.69
t+2	9.72	9.73	9.74

Table 6. Wage effects of foreign takeovers of Swedish firms – difference in difference estimations 1996-2000 (dependent variable – log wage).

	Matched 14	Matched 15	Matched 16
Foreign wage level	0.06 (0.00)***	0.02 (0.00)***	0.03 (0.00)***
Wage growth after foreign takeover	-0.02 (0.00)***	-0.02 (0.00)***	-0.01 (0.00)***
Female	--	-0.13 (0.00)***	-0.14 (0.00)***
Education dummies	--	included	included
Experience	--	0.02 (0.00)***	0.02 (0.00)***
Experience ²	--	-0.00 (0.00)***	-0.00 (0.00)***
Blue-collar	--	-0.09 (0.00)***	-0.08 (0.00)***
Log Firm size	--	--	0.03 (0.00)***
Profits/Employee	--	--	0.00 (0.00)
High skill	--	--	0.01 (0.00)***
Low skill	--	--	0.00 (0.00)***
Capital intensity	--	--	0.01 (0.00)***
Time trend	0.08 (0.00)***	0.07 (0.00)***	0.06 (0.00)***
Industry dummies	--	included	included
R-square	0.03	0.33	0.36
No.of observations	49,270	49,014	49,014

Note: Standard Errors within brackets.

Table A1. Variables

<i>Variable</i>	<i>Description</i>	<i>Source</i>
Firm variables		
wage	Average wage compensation per employee, incl payroll tax. 1990 years prices.	FS
Profits	Profit, 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	Deflated value added per employee, 1990 year prices	FS
High Skill	Share of labour force with at least 3 years post secondary education.	RAMS
Low Skill	Share of labour force with at most 9 years elementary education.	RAMS
Foreign ownership	Dummy=1 if more than 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 per employee	Full time equivalent wage per employee	LS
Female	Dummy = 1 if female	LS
Blue-collar	Share blue collar workers	LS
Education dummies	Based on the Swedish education nomenclature (SUN-codes). (1). Elementary school < 9y. (2). Compulsory schhol = 9y. (3). Upper secondary, 2y. (4). Upper secondary, 3y. (5). Upper secondary, 4y. (6). Undergraduate studies, 3y. (7). PhD.	LS
Experience	Age minus number of years of schooling.	LS
Other variables		
Herfindahl index	$H_{mt} = \left\{ \sum_{i=1}^N s_{it}^2 \right\}, \text{ where } s_{it} = \frac{sales_{it}}{\sum_{i=1}^N sales_{it}}$	FS

Note: All data has been provided by Statistics Sweden (SCB). Abbreviations: Financial statistics (FS), Regional labor market statistics (RAMS), Individual wage statistics (LS).

Table A2. Propensity Score Matching

Variables	1997
Log investments over sales (t-1)	-0.00
Log labour productivity	(0.06) 0.23
Log profits over sales	(0.65) 0.03
Log size	(2.20)** 0.32
Log age	(1.94)* -0.35
Log capital per employee	(1.19) 0.25
Share of high-skilled workers	(1.04) -0.01
Share of medium-skilled workers	(0.33) -0.01
Median wage	(0.30) 2.64
Industry dummies	(1.55) included
Number of observations	710
R2	0.20

Note: t-statistics within brackets. * - significant at a 10 percent level; ** - significant at a five percent level; *** - significant at a one percent level.