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**Foregin Ownership and Wages in
Swedish Private Service Sector**

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Foreword

In both academic research and in the economic-political debate, the service sector has been given increasing attention. As the economic structure changes, more of value added and employment originates from a variety of service industries. The service sector is also getting increasingly internationalized, both in terms of international trade and foreign direct investment.

Foreign direct investment in the manufacturing industries has been shown to result in many positive benefits for the host country, for example higher productivity, wages and positive technology transfer. The effects of foreign direct investments on productivity and wages in the service sector is much less clear, since data limitations often make research on the service sector difficult.

The aim of this study is to shed more light on the impact of foreign direct investment on the service sector in Sweden through an investigation of the effects of foreign ownership on wages. The report is written by Sha Sha and Ying He, Örebro University. The study was made within the framework of the ITPS project “The internationalization of the Swedish service sector”, which is supervised by Pär Hansson, ITPS.

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Peter Vikström

Director Growth Analysis and Statistics

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Summary

Unlike the numerous studies on manufacturing this paper examines the effect of foreign ownership on wages in private service sector in Sweden. We estimate a large wage premium in multinational enterprises (MNEs) – foreign MNEs as well as Swedish MNEs – using firm-level data and a lower, but not unimportant, wage premium in MNEs using individual-level data. In particular, skilled labor appears to benefit from working in MNEs. The higher wages in foreign MNEs may be due to foreign firms acquiring high-wage domestically-owned firms or to that the acquired firms have a more favorable wage growth than non-acquired firms. We find strong support for that foreign firms cherry-pick high-wage Swedish firms. Using a fixed-effect model indicates a small, positive impact on wages in acquired firms, especially for less-skilled labor. However, we fail to find any evidence on post-acquisition wages via a matching approach.

1 Introduction

A substantial growth in foreign ownership is a striking feature in the Swedish business sector in the 1990s.¹ The effects on wages and productivity of the increasing foreign ownership in Swedish manufacturing have already been studied by, e.g. Bandick (2008) and Karpaty (2005), but the impact in the private service sector is mainly unexplored.² Also, internationally there are almost no studies on how foreign ownership affects private service sector.

Even though multinational enterprises (MNEs) are not as dominating employers as in Swedish manufacturing almost half of the employment in the Swedish private service sector is in MNEs and, in 2005, a majority of those who worked in MNEs are employed in foreign owned firms.³ Furthermore, the number of employees in MNEs is larger in the private service sector than in manufacturing.⁴ Consequently, the importance of multinationals and the growing number of foreign owned firms in the private service sector merit a closer inspection. In this paper we focus on the relationship between foreign ownership and wages in the private service sector in Sweden during the period 1996 and 2005.

There is a well-established fact that foreign-owned firms in manufacturing tend to pay higher average wages than other firms controlling for observable firm and industry characteristics.⁵ Here, we investigate whether MNEs (foreign and Swedish MNEs) pay higher wages than non-MNEs for similar types of workers in private service sector. This is important because from a theoretical point of view the essential difference goes between MNEs and non-MNEs, i.e. between foreign-owned firms and Swedish MNEs, on the one hand, and other Swedish firms, on the other.

The reason is that MNEs are supposed to possess firm-specific assets – unique products and production processes or intangibles, such as trademarks or reputation for quality – that give rise to productivity and profitability gaps between MNEs and other firms. Due to these firm-specific assets MNEs are able to pay higher wages. The economic rationale behind such a behavior might be to reduce turnover costs, increase the workers' motivation and effort and enhance their loyalty to the employer, and give the firm better opportunity to select workers with high quality.

As we pointed out above the vast majority of the previous studies examines the relationship between foreign ownership and wages on firm level. Since we have access to a dataset on employees, which includes data on wages, education and gender that can be linked to information on their employers we carry out our analysis on firm- as well as on individual level.

¹ See Figure 2.6 in Hansson et al. (2007)

² Heyman et al. (2007) analyse Swedish manufacturing and private service sector together but never separately.

³ See table 2-1 below.

⁴ See ITPS (2007) Table 2a.

⁵ The cross-sectional relationship between foreign ownership and wages in manufacturing has been examined for many countries. See e.g. Aitken et al. (1996) for Mexico, Venezuela and the US, Girman et al. (2001) for the UK and Lipsey and Sjöholm (2004) for Indonesia. Lipsey (2004) contains a survey of the literature.

There are two recent studies on foreign ownership and wages using similar datasets to ours, namely Bandick (2008) and Heyman et al. (2007). However, our analysis deviates from theirs in various respects. Bandick (2008) is on Swedish manufacturing between 1993 and 2002, whereas Heyman et al. (2007) investigates the whole Swedish business sector between 1990 and 2000. While in Heyman et al. (2007) there is a cut-off limit for including all firms in non-manufacturing of 50 employees our study covers all private service sector firms with 10 employees or more. Furthermore, we use a measure of MNEs that comprise all firms irrespective of size and we take into account that the individual data is stratified, i.e. individuals working in smaller firms have lower probabilities of being selected.

To preview our results we find employing data for the private service sector in 2005, that the average wages controlling for firm heterogeneity are 22.7 per cent higher in foreign-owned firms and 15.2 per cent higher in Swedish MNEs than in Swedish non-MNEs. Using individuals as the unit of observations and also taking individual characteristics into account reduces the wage premium in foreign-owned firms to 8.8 per cent and to 5.5 per cent in Swedish MNEs.

Self-selection might be one explanation for the higher wages in foreign-owned firms. Foreign MNEs cherry-pick Swedish firms with employees having good properties (unobserved to an econometrician) that already pay higher wages before the takeover. Consistent with self-selection we find that Swedish firms in the private service sector acquired by foreigners between 1996 and 2005 have higher wages than non-acquired firms before the acquisition.⁶

However, the direction of causality between foreign ownership and wages might as well run the other way around. Transfers of foreign MNEs' firm-specific assets to the acquired Swedish firms may lead to better ex-post performance, e.g. in a more favourable wage growth in acquired firms relative to firms that continue to be domestically owned. To examine the effects of foreign acquisitions on the targeted firms' wages we utilize two methods. Firstly, we estimate a firm-fixed effect model, and secondly, we combine propensity score matching with a difference-in-difference estimator to compute the average effect of treatment on treated (ATT). The results from the fixed-effect model indicate that there is a small positive effect on wages after foreign acquisitions in targeted firms, in particular for less-skilled labor. However, when we use matching techniques we find no impact on post-acquisition wages in firms acquired by foreigners.⁷

The paper is structured as follows. Section 2 presents the data and how employment and foreign ownership in Swedish private service sector have developed over the period studied. Also in this section, descriptive statistics in foreign MNEs, Swedish MNEs and non-MNEs are summarized to see to what extent they differ. In section 3, we estimate the wage premium for both skilled and less-skilled labor in foreign MNEs and Swedish MNEs relative to non-MNEs on firm and individual levels. In section 4, we examine whether the

⁶ Also, our results are similar to the previous Swedish studies, Heyman et al. (2007) and Bandick (2008), and many other studies using panel data to analyse the relationship between foreign ownership and wages, e.g. Almeida (2007) for Portugal.

⁷ Conyon et al. (2002) and Lipsey and Sjöholm (2002) report significant post-acquisition wage effects in the UK 1989-1994 and in Indonesia 1975-1999 by using firm-fixed effect models. Our results are in line with the finding in Bandick (2008) while in opposition to the one in Heyman et al. (2007) that are carried out on Swedish manufacturing and on the whole Swedish business sector respectively, employing matching techniques.

positive relationship between foreign ownership and wages is caused by cherry-picking high-wage firms or is due to a favourable wage growth after the foreign acquisition. Finally, section 5 summarizes and concludes.

2 Data and description

The dataset we employ in this study is provided by Swedish Institute for Growth Policy Studies (ITPS), and is a panel of firms that consists of all firms in private service sector with 10 employees or more for the period 1996 to 2005.⁸ Three different databases have been matched together to construct this dataset, the financial statistics, with information at firm level on wages, employment, capital stocks and production; the regional labor market statistics (RAMS), containing detailed information on wages and employment for skilled workers defined as employees with post-secondary education; and ITPS statistics, from which we are able to classify firms into foreign MNEs, Swedish MNEs and non-MNEs. Foreign MNEs are defined as firms for which at least 50 per cent of equity is owned by foreign parties, Swedish MNEs are domestically owned firms that are part of an enterprise with at least one affiliate and one employee abroad.⁹ Finally, non-MNEs are the remaining firms which are neither foreign MNEs nor Swedish MNEs.

The constructed panel includes 40,750 unique firms and 6,104 firms are in the panel the whole ten-year period.¹⁰ In contrast to the previous Swedish studies our analysis also include smaller firms (less than 50 employees), which is important in an investigation of the private service sector since the element of small firms is larger there than in manufacturing. In 2005 around 86 per cent of the firms in our panel are small firms (between 10 and 49 employees) and they cover almost 33 per cent of the employment. Moreover, a large percentage of these smaller firms are non-MNEs (about 84 %).¹¹

Our panel covers 10 consecutive years right after Sweden became a member of the European Union (EU) in 1995. During this period, a continuing increase in the number of foreign MNEs and a corresponding decrease in the number of Swedish MNEs in private service sector have been observed.¹² Table 2-1 illustrates how the employment shares have developed for the various types of firms, foreign and Swedish MNEs and non-MNEs, in the private service sector between 1996 and 2005.¹³

⁸ Data on firms in banking and insurance (SNI 65-67) is not available

⁹ Our definition of Swedish MNEs differs from Heyman et al. (2007). In their study Swedish MNEs are firms that report positive exports to other firms within the corporation. As shown by Bandick (2008) such a measure has several drawbacks. Firstly, firms might be MNEs even though they are not exporting to their affiliates abroad. Most likely, this problem is more serious in the private service sector than in manufacturing because it is reasonable to expect less of exporting within corporations in the private service. Secondly, only firms with 50 employees or more (or with large sales) have information on exports within the corporation.

¹⁰ See Appendix Table A-1.

¹¹ See Appendix Table A-2.

¹² See Appendix Table A-3.

¹³ Table A-3 in Appendix shows the share of firms in each group, where we observe a similar, but not as pronounced, pattern as in table 2-1.

Table 2-1 Employment in foreign MNEs, Swedish MNEs and non-MNEs in private service sector (SNI 40-74) firms with 10 employed or more 1996–2005.

	Foreign MNEs		Swedish MNEs		Non-MNEs		All firms
	Number	Percent	Number	Percent	Number	Percent	Number
1996	120 394	15.7	253 721	33.2	390 849	51.1	764 964
1997	128 847	15.2	283 118	33.4	436 331	51.4	848 296
1998	147 203	16.4	275 655	30.7	473 805	52.8	896 663
1999	178 795	19.4	264 525	28.6	480 438	52.0	923 758
2000	195 463	19.9	264 543	27.0	521 354	53.1	981 360
2001	245 720	24.3	266 225	26.3	500 534	49.4	1 012 479
2002	253 318	25.1	247 179	24.5	507 607	50.4	1 008 104
2003	272 792	28.0	164 693	16.9	536 620	55.1	974 105
2004	266 079	27.7	157 884	16.4	535 996	55.8	959 959
2005	278 412	28.1	160 939	16.2	552 640	55.7	991 991

Notes: Employment is from firms' financial accounts (balance sheets).

At first, we observe that the employment has increased in the private service sector during the late 1990s (peaked in around 2002). In contrast to manufacturing the private service sector appears to have been growing. Within the private service sector there is an increase in the employment share in non-MNEs after 2002. However, the most pertinent change over the studied period is that the employment share in foreign MNEs has increased at the expense of the employment share in Swedish MNEs. The employment share in foreign MNEs has risen from 16 per cent to 28 per cent, whereas the employment share in Swedish MNEs has fallen sharply from 33 per cent to only 16 per cent. Moreover, the majority of the international ownership changes are from Swedish owned firms to foreign MNEs and not the other way around.¹⁴ In other words, we notice a similar development in the private service sector in the late 1990s and the beginning of 2000s as Bandick (2008) found for the manufacturing sector during that same period of time.

The large increase in foreign ownership can be explained by that many obstacles foreigners faced to acquire Swedish firms were abolished in the 1990s. Golub (2003) finds that the reductions of barriers towards inward foreign investments in the private service sector have been larger in Sweden than in many other OECD countries. During the studied period there has also been a general trend of more international mergers and acquisitions in most industrial countries. Furthermore, due to the Swedish membership in the EU it became more inviting to acquire Swedish firms.

MNEs are at inherent disadvantages when they invest abroad since domestic firms have better knowledge about the conditions in their home market. To compensate for these MNEs need to have specific advantages to give them an edge to enable them to establish in another country. Therefore, foreign-owned firms and Swedish MNEs might differ from non-MNEs and a simple way of investigating that is to compare various characteristics of MNEs and non-MNEs. Table 2-2 shows the differences between foreign-owned firms, Swedish MNEs and non-MNEs in 2005.

¹⁴ See table A-4 in Appendix.

Table 2-2 Characteristics of MNE and non-MNE firms in private service sector (SNI 40-74) 2005.

Variables	Foreign MNEs	Swedish MNEs	Non-MNEs
Average wage (financial)	385	379	278
Average wage (rams)	368	350	251
Average wage: skilled	440	414	289
Average wage: less-skilled	344	327	245
Labor productivity	756	726	544
Capital-labor ratio	462	489	782
Skill intensity	22.3	25.5	9.9
Share of female workers	37.3	34.4	30.3
Employment (financial)	114	109	35
Employment (rams)	119	117	36
Number of firms	2 448	1 479	15 923
Percent	12.3	7.5	80.2
Employment (financial)	278 412	160 939	552 640
Percent	28.1	16.2	55.7

Notes: All firms are in the private service sector and have 10 employees or more. Average wage (financial) and average wage (rams) are wages from the firms' financial accounts and the tax register, respectively. More precisely, average wage (financial) is labor costs per employee, including social security costs, while average wage (rams) is annual earnings per employee. Employees with more than 12 years of education are skilled labor. Skill intensity and share of female workers are in percentage. Labor productivity is measured by value added per employee. All wages, capital-labor ratios and labor productivity are in thousand SEK.

Not surprisingly, the summary statistics in table 2-2 indicates that there exist substantial differences in characteristics between MNEs and non-MNEs. Foreign MNEs and Swedish MNEs pay higher wages, have higher productivity and higher shares of female workers, are more skill intensive and are larger than non-MNEs. On the other hand, non-MNEs have higher capital-labor ratios than MNEs.

Differences in capital and skill intensities may explain why wages are higher in MNEs than in non-MNEs. Moreover, it is well-known that larger firms tend to pay higher wages¹⁵ This implies that to determine whether MNEs pay higher wage we must rely on regression analysis where we control for variations among firms in, e.g. factor intensities and size.

¹⁵ See Oi and Idson (1999) for a survey of that literature.

3 Is there a MNE wage premium in private service sector?

3.1 Firm-level analysis

To analyze whether there is a differential in average wages on firm level between MNEs (foreign-owned and Swedish MNEs) and non-MNEs we estimate the following model:

$$\ln w_{it} = \alpha + \beta_1 FO_{it} + \beta_2 SMNE_{it} + \delta Firm_{it} + \theta_1 Industry_{it} + \theta_2 Year_{it} + \varepsilon_{it} \quad (3.1)$$

The dependent variable w_{it} is the average wage in firm i at time t . In some specifications, we divided wage into skilled labor wage, w_{it}^s , and less-skilled labor wage, w_{it}^u . FO_{it} is a dummy variable for foreign ownership, defined as 1 if firm i is foreign-owned at time t , and $SMNE_{it}$ is a dummy variable for Swedish MNE. $Firm_{it}$ is a vector of firm specific characteristics, such as the share of female employees, skill intensity, logarithm of capital-labor ratio and firm size (logarithm of total employment).¹⁶ $Industry_{it}$ and $Year_{it}$ are industry and time dummies. Finally, ε_{it} is an error term. The coefficients β_1 and β_2 tell us whether foreign-owned firms and Swedish MNEs pay higher wages than non-MNEs. Table 3-1 presents our estimates of equation (3.1).

¹⁶ Unlike Heyman et al. (2007) we are not including labor productivity among our set of control variables. The firm specific assets of MNEs give them advantages which allow MNEs to pay higher wages than non-MNEs. These advantages may be reflected in higher productivity but we refrain from controlling for that in our wage regressions since our intention is that this will be picked up by the coefficients β_1 and β_2 .

Table 3-1 MNE (foreign firm and Swedish MNE) wage premium in Swedish private service sector (SNI 40-74). Firm level estimates, 2005.

Variables	(1)	(2)	(3)	(4)	(5)
	All	All	All	Skilled	Less-skilled
Foreign MNE	0.357	0.264	0.227	0.362	0.266
FMNE	[16.46]***	[11.47]***	[9.29]***	[13.65]***	[11.00]***
Swedish MNE	0.320	0.195	0.152	0.270	0.187
SMNE	[11.77]***	[6.89]***	[5.10]***	[8.46]***	[6.33]***
Female			-0.378	-0.260	-0.365
			[-9.96]***	[-5.52]***	[-9.62]***
Skill intensity			0.837		
			[17.00]***		
Capital-labor ratio			0.014	0.029	0.009
ln(K/L)			[3.10]***	[5.07]***	[1.98]**
Size			-0.015	0.008	-0.019
ln(employment)			[-1.74]*	[0.77]	[-2.19]**
Industry dummies	No	Included	Included	Included	Included
R-square	0.133	0.407	0.559	0.274	0.436
Observations	19 850	19 850	19 269	11 776	19 269

Notes: Industries are defined at the SNI92 3-digit level. ***, **, * indicate significance at 1 per cent, 5 per cent, and 10 per cent levels, respectively. White's heteroskedasticity-consistent t-statistics are in square brackets.

At first, in column (1), we run the regression without any control variables. Average wages are more than 30 per cent higher in MNEs than in non-MNEs. Taking into account, in column (2), that MNEs are more common in high-wage industries by including industry dummies reduces the difference in average wages between MNEs and non-MNEs to around 20 per cent. Finally, by adding firm control variables, in column (3), we get a wage differential between foreign MNEs and non-MNEs of 22.7 per cent and a wage differential between Swedish MNEs and non-MNEs of 15.2 per cent.

Columns (4)¹⁷ and (5) indicate that MNEs pay a higher wage premia for skilled labor than for less-skilled labor, for instance, the skilled labor wage differential between foreign MNEs and non-MNEs is 36,2 percent, whereas the less-skilled labor wage differential is 26.6 per cent. One reason for MNEs to pay higher wages for skilled labor is to reduce labor turnover since skilled workers tend to have more on-the-job training. Moreover, skilled workers usually acquire more knowledge of the MNEs' superior technologies than less-skilled labor and accordingly they will create more knowledge spillovers if they move to a competitor.

If we compare our result for the private service sector with the estimates of Bandick (2008) for manufacturing it seems that the MNE wage premia is higher in the private service sector.¹⁸ Furthermore, we notice that the coefficients on capital-labor ratio, skill intensity and

¹⁷ The number of observations in column (4) is much smaller owing to the large number of small firms in our panel with no skilled workers at all.

¹⁸ Note that Bandick (2008) estimates a slightly different specification on a different time period (1993–2002).

the share of female workers have the expected signs and are strongly significant. That is, a large portion of skilled labor and a high level of capital-labor ratio are positively related and a high share of female workers is negatively related to average wages. The estimates on firm size vary between the different specifications.

3.2 Individual-level analysis

In the firm-level analysis, we examine differences in wages only focusing on firm characteristics. However, there are differences among employees within firms, such as gender, educational level and previous working experience, all of which may also have impacts on wages. Therefore, we match individual data on wages and worker characteristics from Statistics Sweden's (SCB's) annual survey on wages and salaries with the firm data into a matched employer-employee dataset and estimate the following wage equation on individual level:

$$\ln w_{ijt} = \alpha + \beta_1 FO_{it} + \beta_2 SMNE_{it} + \delta_1 Firm_{it} + \delta_2 Individual_{it} + \theta_1 Industry_{it} + \theta_2 Time_t + \varepsilon_{it} \quad (3.2)$$

w_{ijt} is the full-time equivalent individual monthly wage for employee i in firm j at time t , which has advantages over the wage measure we use on firm level above.¹⁹ $Individual_{ijt}$ is a vector of individual characteristics, such as gender, levels of education and working experience.

SCB's annual study includes around 50 per cent of the individuals in the private business sector.²⁰ Each year a new sample is drawn and the sample is stratified, where larger firms have a larger probability of being sampled. This means that small firms and individuals working in smaller firms are underrepresented²¹ and thus an argument for weighing the regressions. As in Bandick (2008), but unlike Heyman et al. (2007), we weigh the regression in equation (3.2) by the inverse of the probabilities that different individuals have to be sampled. Furthermore, to make our result at individual level comparable with our estimations at firm level, we limit the analysis to all individuals working in firms with 10 employees or more. Table 3-2 shows the results:

¹⁹ One big advantage is that wages are corrected for part-time employment.

²⁰ A detailed description of the data is given in SCB (2006).

²¹ Some summary statistics for the individuals included in the sample are shown in table A-5 and for the firms included in the sample in table A-6 in Appendix. If we compare the descriptive statistics for the SCB sample and for all firms in the private service sector in table 2-2, clearly, large firms and MNEs are overrepresented in the SCB sample and, apparently, indicate that the regressions on individual level ought to be weighted.

Table 3-2 MNE (foreign firm and Swedish MNE) wage premium in private service sector. Individual level estimates, 2005.

Variables	(1)	(2)	(3)	(4)
	All Weighted	All Unweighted	Skilled Weighted	Less-skilled Weighted
Foreign MNE	0.088	0.050	0.157	0.081
FMNE	[14.23]***	[13.13]***	[12.58]***	[11.77]***
Swedish MNE	0.055	0.058	0.112	0.050
SMNE	[6.37]***	[13.42]***	[6.45]***	[6.62]***
Female	-0.219	-0.221	-0.237	-0.176
	[-22.89]***	[-20.93]***	[-9.51]***	[-18.73]***
Experience	0.021	0.023	0.030	0.018
EXP	[43.17]***	[48.84]***	[18.75]***	[33.41]***
(EXP) ² /100	-0.033	-0.034	-0.043	-0.026
	[-30.45]***	[-34.57]***	[-9.68]***	[-23.25]***
Education level dummies	Included	Included	Included	Included
Capital-labor ratio	0.011	0.016	0.019	0.007
In (K/L)	[10.87]***	[18.03]***	[6.97]***	[7.56]***
Medium-skill intensity	0.277	0.164		
	[10.40]***	[7.36]***		
High-skill intensity	0.522	0.414	0.543	
	[27.13]***	[28.84]***	[19.64]***	
Size	-0.009	-0.007	-0.006	-0.007
In (employment)	[-5.60]***	[-6.70]***	[-1.69]*	[-4.50]***
Industry dummies	Included	Included	Included	Included
R-square	0.431	0.428	0.438	0.258
Observations	460 054	464 490	132 284	327 770

Notes: Industries are defined at the SNI92 3-digit level. ***, **, * indicate significance at 1 per cent, 5 per cent, and 10 per cent levels, respectively. White's heteroskedasticity-consistent t statistics are in square brackets.

One striking outcome is that carrying out the estimations on individual level greatly reduces the wage premium in foreign and Swedish MNEs. To be precise, in column (1), where we control for both individual and firm characteristics and weigh the observations, the estimated wage premiums are 8.8 per cent in foreign MNEs and 5.5 per cent in Swedish MNEs. Not weighing the observations, in column (2), further reduces the wage differential between foreign MNEs and non-MNEs to 5 per cent and increases it slightly to 5.8 per cent between Swedish MNEs and non-MNEs.²² In addition, we find the same pattern as at the firm level when we divide individuals into skilled and less-skilled workers. Skilled workers are paid 11 to 16 per cent higher wages in MNEs than in non-MNEs, whereas less-skilled workers only have around 5 to 8 per cent higher wages. Finally, we notice that, except for firm size, all coefficients on the control variables have the expected sign and are significant.

²² Heyman et al. (2007) estimate similar unweighted regression where they define Swedish MNEs as Swedish owned firms exporting to other firms within the corporation.

In sum, we conclude from the results in tables 3-1 and 3-2 that there are wage premiums in MNEs in the Swedish private service sector, and the estimated wage premiums are lower when individuals are used as the unit of observation.

4 Cherry-picking or wage growth

As documented in section 3, in the private service sector, not only foreign firms but also Swedish MNEs pay higher wages than the other domestically-owned firms. Meanwhile, over the studied period from 1996 to 2005, we have observed in table 2-1 that the foreign MNEs' employment share has increased at the same time as the employment share in Swedish MNEs has fallen. Therefore, one plausible explanation for this positive relationship between wages and foreign ownership might be the fact that many Swedish MNEs, through international mergers and acquisitions, have turned into foreign MNEs, i.e. firms already paying high wages, e.g. Swedish MNEs, have been acquired by foreign-owned firms. Nevertheless, another possible causality is that firms that have become foreign owned have better wage growth than firms that continue to be domestically owned. Yet one should be aware that these two hypotheses are not mutually exclusive.

To determine the causality between foreign ownership and wages we need to employ panel data. Heyman et al. (2007) construct a panel of individuals by restricting their analysis to individuals working in firms with 20 employees or more in the private business sector (manufacturing and private service sector) and are in the samples of SCB's survey of wages for four consecutive years, 1996 to 2000. Unfortunately, this gives a panel where individuals working in large firms are heavily overrepresented.²³ Moreover, in contrast to the cross-sectional analysis on individual level we carried out above it is hard to find out how to weigh the observations to correct for that in such a panel. This means that like in most other similar studies as well as in our panel analysis we need to utilize a firm panel and analyze average wages instead of using a panel of individuals and study individual wages.

4.1 Do foreigners cherry-pick high wage firms?

To answer whether foreign firms pay higher wages simply because they acquire high-wage domestically-owned firms, we estimate the regression model below.

$$\ln w_{it-1} = \alpha + \beta FO_{it} + \delta Firm_{it-1} + \theta_1 Industry_{it-1} + \theta_2 Year_{t-1} + \varepsilon_{it-1} \quad (4.1)$$

In other words, we regress firm average wage level in year $t-1$ w_{it-1} on the ownership status in year t FO_{it} and the same set of wage determinants in year $t-1$ as in equation (3.1) above, $Firm_{it-1}$. Here, firms that are Swedish-owned, i.e. Swedish MNEs and non-MNEs in the beginning of the studied period are selected and we have excluded firms that are foreign-owned over the whole period and firms that switch between being Swedish-owned and foreign-owned more than once. FO_{it} takes the value 1 the year a firm is acquired and 0 when it is Swedish-owned. A positive coefficient β indicates that firms taken over by foreign MNEs, on average, have a higher wage level one year before the acquisition compared to those firms not being acquired, controlling for other factors affecting wages. Table 4-1 reports the results.

²³ The reason is that in SCB's annual survey on wages and salaries each year a new sample is drawn. Larger firms have higher probability of being sampled, which in turn implies that individuals working in large firms are sampled more often. This pattern is reinforced by the condition in Heyman et al. (2007) that firms and individuals included in their analysis have to be in SCB's samples in four consecutive years. See Bandick (2008) for further details.

Table 4-1 Foreign ownership and selection of high-wage firms in private service sector 1996–2005.

Variables	(1)	(2)	(3)
	All	Skilled	Less-skilled
FMNE _{it}	0.148 [6.94]***	0.205 [8.55]***	0.170 [7.96]***
Female _{it-1}	-0.371 [-24.68]***	-0.263 [-12.43]***	-0.378 [-25.13]***
(Skill intensity) _{it-1}	0.951 [42.28]***		
Capital-labor ratio	0.019	0.045	0.016
ln (K/L) _{it-1}	[10.16]***	[16.79]	[8.39]***
Size	0.007	0.047	0.009
ln (employment) _{it-1}	[2.08]**	[10.75]***	[2.63]***
Time dummies	Included	Included	Included
Industry dummies	Included	Included	Included
R-square	0.578	0.214	0.464
Observations	126 943	60 872	126 943

Notes: Industries are defined at the SNI92 3-digit level. ***, **, * indicate significance at 1 per cent, 5 per cent, and 10 per cent levels, respectively. White's heteroskedasticity-consistent t statistics are in square brackets.

In all specifications above, the β coefficients are positive and strongly significant. The β coefficient in column (1) indicates that one year before the foreign acquisition takes place the average wage level in targeted Swedish-owned firms is 14.8 per cent higher than in firms that remain to be Swedish-owned. The corresponding figures for skilled and less-skilled labor, in columns (2) and (3), are 20.5 per cent and 17.0 per cent, which suggest that the wage differential between targeted and non-targeted firms is larger for skilled labor than the wage differential for less-skilled workers. In addition, we notice that all coefficients on the firm characteristics we control for are significant and have the expected sign. Hence, we conclude that there is evidence for cherry picking, i.e. that foreign firms are more likely to acquire Swedish firms with high wages.

4.2 Do foreign takeovers affect wages in acquired firms?

4.2.1 Fixed-effect regression model

Ideally, a rich set of controls for firm characteristics could reduce some bias caused by selecting firms with high wages to acquire, but unfortunately, results could still be biased due to some unobservable firm characteristics related to wage and foreign ownership. Therefore, using a fixed-effect model, where time invariant permanent firm characteristics could be absorbed, would be a good choice to examine ex-post acquisition effects on wages. To estimate ex-post wage effect, we run the following model:

$$\ln w_{it} = \alpha + \sum_{j=0}^3 \beta_j FO_{i,t+j} + \delta Firm_{it} + \theta Year_t + f_i + \varepsilon_{it} \quad (4.2)$$

where f_i is a time-invariant firm-specific fixed effect. The usual vector of firm characteristics, $Firm_{it}$, are added and year dummies, $Year_t$, control for cyclical factors.

Besides, $FO_{i,t+j}$ takes the value of 1 when a firm that has been acquired is foreign-owned at $t + j$. Consequently, the positive coefficients β_0 , β_1 , β_2 and β_3 dynamically signify a higher wage level in firms that switch to foreign ownership within the acquisition year, one year after acquisition, two years after acquisition and three years after acquisition. This means that we will be able to see whether wage effects of foreign acquisition happen immediately or after some adjustment period.

In our estimations we exclude firms that are foreign-owned the whole studied period. Moreover, we do not include firms that are in the sample less than five years and firms that switch between domestic and foreign ownership more than once. Since we want to follow three post-acquisition years, we also drop acquired firms that only survive two years or less after the takeover. Table 4-2 presents the results.

Table 4-2 Impact on wages of foreign acquisitions in firms taken over in private service sector in Sweden 1996–2005. Firm-fixed effect model.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	All	Skilled	Less-skilled	All	Skilled	Less-skilled
FMNE_{it+s}	0.008 [3.50]***	0.002 [0.22]	0.016 [6.62]***			
FMNE_{it}				0.009 [2.81]***	0.015 [1.33]	0.012 [3.58]***
FMNE_{it+1}				0.005 [1.52]	0.024 [1.95]**	0.008 [2.18]**
FMNE_{it+2}				0.009 [2.39]**	0.008 [0.61]	0.014 [3.42]***
FMNE_{it+3}				-0.004 [-1.06]	-0.004 [-0.30]	0.010 [2.16]**
Firm controls	Included	Included	Included	Included	Included	Included
Time dummies	Included	Included	Included	Included	Included	Included
R-square within	0.462	0.042	0.435	0.462	0.042	0.435
R-square between	0.365	0.027	0.025	0.364	0.026	0.024
R-square overall	0.341	0.000	0.093	0.340	0.000	0.092
Observations	126 995	64 562	126 995	126 995	64 562	126 995

Notes: ***, **, * indicate significance at 1 per cent, 5 per cent, and 10 per cent levels, respectively. White's heteroskedasticity-consistent t statistics are in square brackets.

According to column (1) foreign acquisitions appear to have a small, positive effect on wages in acquired firms. The wages are 0.8 per cent higher in firms taken over by foreigners. When we estimate our model separately for skilled and less-skilled labor, in columns (2) and (3), we observe that this effect seems to be driven by a positive impact of foreign acquisitions on the wages of less-skilled labor.

Columns (4) to (6) report the post-acquisition effects on average wages for four consecutive years starting right from the year the change in ownership has happened. The same pattern as in the previous three estimations is discovered. The result indicates that foreign acquisitions have a significant, but small, effect on average wages in the year immediately

after the acquisition (0,9 %).²⁴ Yet we fail to observe any evidence for a trend in wage growth. During the entire period we follow here, less-skilled workers in acquired firms earn significantly more than workers in firms that remain domestically owned. These positive wage effects are far more pronounced for less-skilled workers than for skilled workers and appear to be strongest in the second year after acquisition (1,4 %).

4.2.2 Matching approach

Methodology

A crucial question for us is if there are any effects on wages in acquired (treated) Swedish-owned firms after they have been acquired by foreign firms. This is to evaluate whether there is a casual effect of foreign acquisition on wages Y in the targeted firm. If our observational data are not generated by mechanism of randomized experiment, as our regression model in equation (4.2), FO_{it} will be correlated with the error term ε . The result will be inconsistent and biased with the treatment effect β . We define the causal effect on wages of foreign acquisition of firm i at time t as:

$$Y_{it+s}^1 - Y_{it+s}^0 \quad (4.3)$$

Y_{it+s}^1 is the wage of acquired firm at $t + s$, $s \geq 0$ denotes year after acquisition. Y_{it+s}^0 is the wage of acquired firm if it had not been acquired at t . However, the problem here is that Y_{it+s}^0 is unobservable. Based upon the microeconomic literature²⁵ we define the average effect of foreign acquisitions of the acquired firms as:

$$E\left(Y_{it+s}^1 \mid AF_{it} = 1\right) - E\left(Y_{it+s}^0 \mid AF_{it} = 1\right) \quad (4.4)$$

$AF_{it} \in \{0, 1\}$ indicates whether firm i is acquired by a foreign firm at time t ; $AF_{it} = 1$ if the firm is acquired, $AF_{it} = 0$ otherwise. The problem here is that we cannot get the observation of the acquired firm's counterfactual, i.e. what would the wages have been if the firm had not been acquired.

We could solve this problem by using the average wage of firms that continue to be domestically owned, $E\left(Y_{it+s}^0 \mid AF_{it} = 0\right)$. Unfortunately, there are strong reasons to believe that AF_{it} , whether a firm i is acquired or not at time t , is endogenously determined and is affected by contemporaneous effects. This has to be taken into account otherwise the estimates of the causal effect will be biased. However, there is another method to solve this problem and that is matching.

Rosenbaum and Rubin (1983) developed the propensity score matching method. This technique has the advantage of summarizing all observables X into a single index variable. Besides, he also uses this method to get the weighted mean of counterfactuals, which eliminates the bias of temporarily-invariant (i.e., the time trend) to make the estimation more robust. To implement propensity score matching we begin by estimating the probability (or propensity score) of being acquired by a foreign firm using a probit model

²⁴ Huttunen (2007) finds that there is no post-acquisition wage effect immediately after the acquisition, but a positive effect after that, using a panel on Finnish manufacturing establishments.

²⁵ See e.g. Heckman et al (1997).

$$p(AF_{it} = 1) = F(X_{it-1}, D_j, D_t) \quad (4.5)$$

where $AF_{it} = 1$ when a domestically-owned firm in year $t-1$ becomes foreign-owned in year t . X_{it-1} is a vector of relevant firm specific characteristics in year $t-1$ that may affect the firm's probability of being acquired in year t , e.g. the firm's productivity, skill intensity or capital-labor ratio. D_j are industry dummies and D_t are time dummies.²⁶

After we have obtained the propensity scores we need to choose a method to do the matching. We will use the nearest neighbour matching

$$C(p_i) = \underset{j}{\text{min}} |p_i - p_j| \quad j \in I_0 \quad (4.6)$$

where p_i is the propensity score of a treated (acquired) firm and p_j is the propensity score of a (non-acquired) control firm. If p_j is close enough to p_i , the non-acquired (non-treated) firm j will be matched to the acquired (treated) firm i .

We can then use our matched sample to estimate the average effect of foreign acquisitions (treatment) on wages (outcome variable) in the acquired (treated) firms, the Average effect of Treatment on the Treated (ATT). The estimated ATT can be written as:

$$\widehat{ATT} = \sum_{i \in T \cap S_p} \frac{1}{N^T} \left[Y_i^1 - \sum_{j \in C \cap S_p} \omega_{ij} Y_j^0 \right] \quad (4.7)$$

where Y_i^1 is the treatment outcome, Y_j^0 is the non-treatment outcome and N^T is the number of treated firms. T stands for treated firms and C for control firms. ω_{ij} is the weights of the control firms matched to the treated firms. S_p is the common support, which means that the propensity score of the control firms are within a range of support to match the treated firms.

An advanced way to compute the average effect of treatment on treated is to use the difference-in-differences matching estimator.²⁷ The estimator compares the difference in the outcome (average wages) of the treated (acquired) firms T before $t-1$ and after the treatment (acquisition) $t+s$, where $s \geq 0$, with our control group of non-treated firms C. It has the additional advantage of controlling for the possible outcome bias that is due to selection on unobservables that the standard matching estimator in (4.7) fails to eliminate. Formally, the estimated ATT can be expressed as:

$$\widehat{ATT} = \sum_{i \in T \cap S_p} \frac{1}{N^T} \left[(Y_{it+s}^1 - Y_{it-1}^1) - \sum_{j \in C \cap S_p} \omega_{ij} (Y_{jt+s}^0 - Y_{jt-1}^0) \right] \quad (4.8)$$

²⁶ When selecting firm specific variables that may affect a firm's probability of being acquired, we avoid variables that have endogenous problems or have high correlations with others.

²⁷ See Wooldridge (2002).

where $(Y_{it+s}^1 - Y_{it-1}^1)$ is the difference in wages before and after acquisitions in the treated group and $(Y_{jt+s}^0 - Y_{jt-1}^0)$ is the difference in the control group.²⁸

The matched sample and matching results

In sum, we need to construct a sample of non-acquired (non-treated) firms with similar pre-acquisition characteristics as the acquired (treated) firms. This group of firms should constitute the counterfactual outcome, i.e. what would the outcome be in the acquired firms if they had never actually been acquired? To generate such a sample, first of all, we employ the propensity score matching method described above and estimate the conditional probability of being acquired by a foreign firm by using the probit model in equation (4.5).

Also, we put some restriction on our sample of firms. The treatment group consists of firms that were acquired in year $T = 0$ and are observed one year before acquisition, that is $T = -1$, and at least three year after acquisition, that is $T = 1, 2, 3$. The control group is made up of firms that are Swedish owned at least five years. In other words, all the firms in the matched sample have to had a history of more than five years. Moreover, firms that switch from being a foreign firm to a domestic firm are dropped out. Before we estimate the probit model let us in table 4-3 compare the difference in some important characteristics between foreign-acquired firms and non-acquired firms in pre- and post-acquisition years.

²⁸ *Combining propensity score matching with difference-in-difference estimation is a method suggested by, e.g. Blundell and Costas Dias (2000).*

Table 4-3 Differences in means between foreign-acquired firms and non-acquired firms in pre- and post-acquisition years. Unmatched firms.

Variables	Unmatched firms				
	Target vs. non target firms				
	T=-1	T=0	T=1	T=2	T=3
	Difference	Difference	Difference	Difference	Difference
	(t-ratio)	(t-ratio)	(t-ratio)	(t-ratio)	(t-ratio)
Average wage (financial)	71 (21.45)***	82 (24.24)***	86 (24.29)***	86 (24.10)***	91 (24.45)***
Average wage (rams)	82 (27.67)***	86 (28.19)***	88 (27.89)***	93 (28.85)***	91 (26.45)***
Wages: skilled (rams)	182 (24.98)***	185 (24.88)***	185 (24.45)***	196 (25.44)***	181 (23.07)***
Wages: less-skilled (rams)	68 (26.36)***	71 (26.67)***	76 (27.48)***	81 (28.59)***	80 (26.27)***
Share of female worker	5.0 (4.87)***	5.1 (4.92)***	5.0 (4.87)***	5.3 (5.11)***	5.2 (5.03)***
Skill intensity	9.1 (16.11)***	9.3 (16.03)***	9.5 (15.99)***	10.0 (16.19)***	10.7 (16.78)***
Capital-labor ratio	-405 (-2.36)**	-480 (-2.76)***	-487 (-2.77)***	-549 (-2.99)***	-538 (-2.76)***
Employment	48 (2.91)***	56 (3.55)***	63 (3.98)***	68 (4.44)***	73 (4.90)***
Labor productivity	80 (3.06)***	85 (3.33)***	94 (3.87)***	123 (4.54)***	120 (4.18)***
Observations					
Target	639	639	639	639	639
Non-target	55 531	55 531	55 531	55 531	55 531

Notes: All wages, capital-labor ratio and labor productivity are in thousand SEK. Skill intensity is measured by the share of employees with post-secondary education and is in percentage. The acquisitions happen between T=-1 and T=0, therefore, T=-1 means one year before acquisition and T=3 means three year after acquisition.

Firms taken over by foreigners in the private service sector differ from non-target firms in many respects. In the first column, which describes the situation one year before acquisition ($T = -1$), we can see that employment is significantly higher in acquired firms. Moreover, they are more skill intensive and have higher labor productivity, which might explain why these firms also pay higher wages. On the other hand, the capital-labor ratio is higher in non-acquired firms. The results in the first column thus provide us with some evidence of “cherry-picking”, i.e. that firms with good characteristics and performance are more likely to be targeted for acquisitions by foreigners. Furthermore, the difference between acquired and non-acquired firms seems to be persistent for the next four periods after acquisition, as can be seen from the other columns in table 4-3.

To determine the firm specific characteristics that may affect a firm’s probability of being acquired we notice that there is no consensus about what actually causes a foreign acquisition, neither in the theoretical nor in the empirical literature. Therefore, in the probit model we include observable characteristics same as the variables in table 4-3. Moreover, some other explanatory variables are also included, e.g. firm age and a dummy variable

indicating whether the firm is a Swedish MNE or not. Table 4-4 shows the result from the estimation of the probit model.

Table 4-4 Probit model to estimate propensity score.

Variables	Probability of foreign acquisition
Labor productivity	0.000 (7.80)***
Share of female workers	0.337 (8.60)***
Skill intensity	0.925 (19.43)***
Capital-labor ratio	-0.000 (-4.52)***
Log (Employment)	0.258 (33.29)***
Age	-0.189 (-6.53)***
Age ²	0.018 (3.86)***
SMNE	-1.147 (-25.98)***
Year dummy	Yes
Industry dummy	Yes
LR chi2(31)	4906.66
Pseudo R-square	0.140
Observations	280 683

Notes: The dependent variable $AF_{it} = 1$ if a domestically-owned firm i in year $t-1$ becomes foreign owned in year t . z-statistics are within parentheses. The explanatory variables are. Share of female is the ratio of female worker in the total employment. Skill intensity is the share of employees with post-secondary education at the firm level. Capital-labor ration is the logarithm of capital-labor ratio. Log (employment) is the logarithm of firm employment relative to mean firm employment at the industry level. Labor productivity is value added per employee. Age is the age of the firm and Swedish MNE is a dummy variable indicating whether the firm is a Swedish MNE firm or not.

We notice that large, skill intensive firms with high productivity (and a high share of female workers) have been more likely to be acquired by foreign firms in the private service sector in Sweden. Furthermore, older (non-linear relationship) firms of Swedish MNEs with high capital-labor ratios appear to have had lower probabilities to be targeted by foreign firms.

To obtain the matched data of treated and control group firms we use the PSMATCH2 routine in STATA described in Leuven and Sianesi (2003). Eventually, we end up with a matched sample of 639 treated firms and 617 control firms.

Since the purpose of the matching procedure is to find a group of non-acquired firms that displays the same characteristics as the group of acquired firms we evaluate how adequate this has been by reporting, in table 4-5, once again differences in means with respect to size, productivity, factor intensities and wages, but this time for the acquired and non-acquired firms that were successfully matched together.

Table 4-5 Differences in means between foreign-acquired firms and non-acquired firms in pre- and post-acquisition years. Matched firms.

Variables	Matched firms				
	Target vs. non target firms				
	T=-1	T=0	T=1	T=2	T=3
	Difference	Difference	Difference	Difference	Difference
	(t-ratio)	(t-ratio)	(t-ratio)	(t-ratio)	(t-ratio)
Average wage(financial)	36 (5.96)***	71 (10.90)***	46 (6.74)***	49 (7.42)***	55 (6.89)***
Average wage(rams)	52 (8.51)***	53 (8.93)***	55 (8.89)***	60 (9.11)***	57 (8.45)***
Wages: skilled(rams)	89 (7.33)***	96 (8.21)***	94 (8.24)***	103 (8.71)***	91 (8.13)***
Wages: less-skilled(rams)	47 (8.97)***	46 (8.87)***	51 (9.00)***	55 (9.39)***	52 (8.64)***
Share of female workers	-0.4 (-0.33)	-0.5 (-0.39)	-0.7 (-0.55)	-0.4 (-0.32)	-0.8 (-0.61)
Skill intensity	-4.4 (-0.38)	-1.0 (-0.84)	-1.3 (-1.05)	-1.1 (-0.90)	-0.3 (-0.26)
Capital-labor ratio	110 (1.09)	58 (0.61)	66 (0.71)	24 (0.29)	54 (0.49)
Employment	13 (0.60)	22 (0.92)	26 (1.09)	31 (1.25)	36 (1.36)
Labor productivity	29 (1.02)	12 (0.38)	-13 (-0.30)	48 (1.28)	40 (0.84)
Observations					
Target	639	639	639	639	639
Non-target	617	617	617	617	617

Notes: The same notes as in table 4-3.

Compared to the unmatched sample in table 4-3, though wages are still significantly higher in targeted firms both before and after acquisition, the matching procedure has substantially reduced the differences between acquired and non-acquired firms. Regarding firm size, labor productivity, the share of female workers, skill and capital intensities, the differences are no longer significant.

To examine whether foreign acquisitions of Swedish owned firms have any effects on wages in post-acquisition years we estimate the Average effect of Treatment on the Treated (ATT), described in equation (4.7), for various types of wages at firm level in logs. The results are reported in table 4-6.

Table 4-6 Effects of foreign acquisitions on average wages. Difference-in-difference estimates.

All	t-(t-1)	(t+1)-(t-1)	(t+2)-(t-1)	(t+3)-(t-1)
ATT	0.003	-0.004	-0.003	-0.009
T	(0.50)	(-0.51)	(-0.39)	(-0.87)
No of treated	639	639	639	639
No of controls	622	617	617	616
Skilled				
ATT	-0.167	-0.088	-0.101	-0.156
T	(-1.87)*	(-0.82)	(-0.90)	(-1.27)
No of treated	639	639	639	639
No of controls	626	616	616	614
Less-skilled				
ATT	0.009	0.012	0.020	-0.017
T	(0.82)	(1.55)	(1.56)	(-0.90)
No of treated	639	639	639	639
No of controls	626	616	616	614

Notes: Time t means the year of acquisition, $t-1$ is one year before acquisition, $t+1$ is one year after acquisition, correspondingly. For every period, the matched treated and control group is not exactly the same, but the matched control group is between 614 and 626 observations. The outcome of each matching is measured by $\{\ln(\text{averagewage})_t - \ln(\text{averagewage})_{t-1}\}$.

We find no impact of foreign acquisition on wages. The ATT estimates are all insignificant, with the exception of skilled labor wages that are lower in targeted firms immediately after the acquisition. However, this estimate is only significant on 10 per cent level.

5 Summary and conclusions

Our paper has documented that MNEs – foreign-owned firms and Swedish MNEs – in Swedish private service sector pay higher wages than non-MNEs. The result is in line with the conjectures that MNEs have the ability and are willing to pay higher wages than the other firms. The wage premium is higher for skilled labor than for less-skilled labor, which is consistent with our expectations that MNEs are especially keen to reduce labor turnover among skilled labor. The MNE wage premium is substantially lower, yet not unimportant, if it is estimated on individual level, which is more appropriate than the more common approach to estimate the wage premium on firm level.

Firms acquired by foreign firms appear to have considerably higher wages than non-acquired firms before takeovers. Also, we detect a small, positive impact on post-acquisition wages, mainly driven by wages for less-skilled labor, using a firm-fixed effect model. Yet we fail to find any effects on wages after foreign acquisitions using matching techniques. The higher wages in foreign MNEs seems chiefly to be an outcome of foreign firms cherry-picking high-wage Swedish firms than of a more favorable wage growth in firms acquired by foreign firms.

References

- Aitken, B, Harrison, A. and Lipsey, R. (1996), Wages and foreign ownership. A comparative study of Mexico, Venezuela, and the United States. *Journal of International Economics*, 40, 345–371.
- Almeida, R. (2007), The labor market effects of foreign owned firms. *Journal of International Economics*, 72, 75–96.
- Bandick, R. (2008), Is it profitable to work for multinationals in Sweden? In Bandick, R. *Multinationals, employment and wages*. Örebro Studies in Economics.
- Becker, S. and Ichino, A. (2002), Estimation of average treatment effects based on propensity scores. *The Stata Journal*, 2, 358–377.
- Blundell, R. and Costas Dias, M. (2000), Evaluation methods for non-experimental data. *Fiscal Studies*, 21, 427–468.
- Canyon, M, Girma, S, Thomson, S. and Wright, P. (2002), The productivity and wage effects of foreign acquisition in the United Kingdom. *Journal of Industrial Economics*, 50, 85–102.
- Girma S. and Görg H. (2007), Evaluating the foreign ownership wage premium using a difference-in-differences matching approach, *Journal of International Economics*, 72, 97–112.
- Golub, S. (2003), Measures of restrictions on inward foreign direct investment for OECD countries. *OECD Economic Studies*, 36, 86–116.
- Hansson, P, Karpaty, P, Lindvert, M, Lundberg, L, Pohldal, A. and Yun, L. (2007), *Svenskt näringsliv i en globaliserad värld. Effekter av internationaliseringen på produktivitet och sysselsättning*. ITPS A2007:004.
- Heckman, J., Ichimura, H. and Todd, P. (1997), Matching as an economic evaluation estimator: evidence from a job training program, *Review of Economics and Statistics*, 64, 605–654.
- Heyman, F, Sjöholm, F. and Gustavsson Tingvall, P. (2007), Is there really a foreign ownership wage premium? *Journal of International Economics*, 73, 355–376.
- Huttunen K. (2007), The effect of foreign acquisition on employment and wages: evidence from Finnish establishments, *Review of Economics and Statistics*, 89, 497–509.
- ITPS (2007), *Strukturstudie av näringslivet i Sverige 2004*. ITPS S2007:001.
- Karpaty, P. (2005), *Does foreign ownership matter? Multinational firms, productivity and spillovers*. Örebro Studies in Economics.
- Leuven, E. and Sianesi, B. (2003), "PSMATCH2: Stata module to perform full Mahalanobis and propensity score matching, common support graphing, and covariate imbalance testing.
Downloadable at:<http://ideas.repec.org/c/boc/bocode/s432001.html>. Version 1.2.3.

- Lipsey, R. (2004), Home and host country effects of FDI. In Baldwin, R. and Winters, A. (eds.) *Challenges to globalization*. Chicago: Chicago university press.
- Lipsey, R. and Sjöholm, F. (2004), Foreign direct investment, education and wages in Indonesian manufacturing. *Journal of Development Economics*, 73, 415–422.
- Martins, P. (2004), Do foreign firms really pay higher wages? Evidence from different estimators. *IZA Discussion Paper 1388*.
- Oi, W. and Idson, T. (1999), Firm size and wages, in Ashenfelter, O. and Card, D. (eds.) *Handbook of labor economics Volume 3B*. Amsterdam: North-Holland.
- Rosenbaum, P. and Rubin D.B. (1983), The central role of the propensity score in observational studies for causal effects. *Biometrika*, 70, 41–55.
- SCB (2006), *Lönstrukturstatistik, Privat sektor (SLP) 2005* (Wage structure statistics, Private business sector (SLP) 2005). Downloadable at: http://www.scb.se/statistik/AM/AM0103/_dokument/AM0103_DO_2005.pdf
- Wooldridge, J.M. (2002), *Econometric analysis of cross section and panel data*. Cambridge: MIT press.

Appendix

Table A-1 Panel information

Years in Panel	Number of firms
10	6 104
9	1 991
8	1 736
7	2 081
6	2 534
5	3 329
4	3 597
3	4 375
2	5 606
1	9 397
Total	40 750

Table A-2 Firm size distribution among foreign and Swedish MNEs and non-MNEs 2005.

Size group	Foreign MNEs			
	Firms		Employment	
	Number	Share	Number	Share
10–49	1 652	8.3	36 304	3.7
50–199	546	2.8	51 278	5.2
200–499	158	0.8	49 321	5.0
500–	92	0.5	141 509	14.3
Total	2 448		278 412	

Size group	Swedish MNEs			
	Firms		Employment	
	Number	Share	Number	Share
10–49	1 008	5.1	22 863	2.3
50–199	325	1.6	30 148	3.0
200–499	90	0.4	27 263	2.8
500–	56	0.3	80 665	8.1
Total	1 479		160 939	

Table A-2 Continued.

Size group	Non-MNEs			
	Firms		Employment	
	Number	Share	Number	Share
10-49	14 406	72.6	264 291	26.6
50-199	1 346	6.8	114 968	11.6
200-499	114	0.6	33 243	3.4
500-	57	0.3	140 138	14.1
Total	15 923		552 640	

Table A-3 Foreign MNE, Swedish MNE and non-MNE firms in private service sector (SNI 40-74) with 10 employed or more 1996–2005.

	Foreign MNEs		Swedish MNEs		Non-MNEs		All firms
	Number	Percent	Number	Percent	Number	Percent	Number
1996	1 161	7.5	1 470	9.4	12 934	83.1	15 565
1997	1 272	7.5	1 720	10.1	14 000	82.4	16 992
1998	1 407	7.7	1 651	9.1	15 163	83.2	18 221
1999	1 511	8.2	1 684	9.1	15 298	82.7	18 493
2000	1 779	9.1	1 640	8.4	16 153	82.5	19 572
2001	2 288	11.4	1 628	8.1	16 082	80.4	19 998
2002	2 309	11.6	1 533	7.7	16 135	80.8	19 977
2003	2 336	12.0	1 335	6.9	15 774	81.1	19 445
2004	2 304	12.0	1 319	6.8	15 649	81.2	19 272
2005	2 448	12.3	1 479	7.4	15 923	80.2	19 850

Table A-4 Frequencies of international ownership changes 1996–2005.

Year	Swedish MNEs to foreign MNEs	Swedish non-MNEs to foreign MNEs	Foreign MNEs to domestic
1996/1997	27	65	51
1997/1998	11	130	34
1998/1999	92	87	31
1999/2000	21	313	72
2000/2001	29	435	52
2001/2002	16	197	82
2002/2003	10	238	103
2003/2004	6	150	132
2004/2005	22	206	102
Total	234	1821	659

Table A-5 Characteristics (means) of individuals included in SCB's survey on wages working in service (SNI 40-75) firms with 10 employees or more divided into foreign MNEs, Swedish MNEs and non-MNEs 2005.

Variables	Foreign MNEs	Swedish MNEs	Non-MNEs
Monthly wage:			
All workers	26 483	28 913	24 390
Skilled workers	32 914	34 257	29 697
Less-skilled workers	23 939	25 843	22 532
Female	0.388	0.306	0.416
Experience	20.0	21.2	22.3
Education level:			
Elementary school < 9 years	0.039	0.034	0.046
Compulsory school = 9 years	0.109	0.080	0.109
Gymnasium ≤ 2 years (Upper secondary school)	0.263	0.258	0.317
Gymnasium = 3 years (Upper secondary school)	0.304	0.266	0.267
University < 3 years (Post-secondary education)	0.144	0.168	0.133
University ≥ 3 years (Post-secondary education)	0.134	0.184	0.121
Graduate studies	0.002	0.009	0.004
Number of individuals	168 275	104 687	199 612
Percent	35.6	22.2	42.2

Notes: The sample includes all individuals in SCB's annual survey on wages and salaries working in private service sector firms with 10 employees or more in year 2005. Experience is defined as age minus number of years of schooling. Less-skilled means that individuals have 12 years of education or less.

Table A-6 Characteristics (means) of private service firms with 10 employees or more included in SCB's survey on wages divided into foreign MNEs, Swedish MNEs and non-MNEs 2005.

Variables	Foreign MNEs	Swedish MNEs	Non-MNEs
Average wage (financial)	361	371	290
Labor productivity	802	885	2,405
Capital-labor ratio	551	697	1,729
Skill intensity	34.7	36.4	20.3
Share of female workers	38.8	30.6	41.6
Employment (financial)	439	404	137
Number of firms	393	261	1510
Percent	18.2	12.1	69.7
Employment (financial)	172 527	105 444	206 870
Percent	35.6	21.7	42.7

Notes: See table 2-2.

ITPS, Institutet för tillväxtpolitiska studier, är en statlig myndighet med uppdrag att bidra med kunskapsunderlag för tillväxtpolitiken.

ITPS har definierat fyra tillväxtpolitiska utmaningar för Sverige:

- Globalisering och internationalisering
- Regional tillväxt
- Näringslivets dynamik
- Teknisk utveckling

Verksamhet och arbetsuppgifter är fördelade inom tre avdelningar och tre kunskapsområden:

- Avdelningen för tillväxtanalys och statistik beskriver och analyserar tillväxten och dess drivkrafter i Sverige.
- Avdelningen för utvärdering redovisar resultatet av den politik som genomförs.
- Avdelningen för omvärldsanalys bevakar och analyserar händelser i omvärlden som kan komma att få betydelse i Sverige.

Uppdragsgivare är regeringen. I uppdraget ingår att sprida kunskapen till nationella, regionala och lokala tillväxtpolitiska aktörer.

ITPS har sitt huvudkontor i Östersund och verksamhet i Stockholm, Peking, Tokyo, New Delhi, Los Angeles/San Francisco, Washington och Bryssel.