

***FOREIGN FIRMS AND INDONESIAN MANUFACTURING  
WAGES: AN ANALYSIS WITH PANEL DATA***

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**FOREIGN FIRMS AND INDONESIAN MANUFACTURING WAGES: AN  
ANALYSIS WITH PANEL DATA**

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## ABSTRACT

Wages in domestically- owned Indonesian manufacturing plants taken over by foreign firms increased sharply between the year before takeover and two years after takeover, relative to plants remaining in domestic ownership. Blue- collar wage levels in these plants had been less than 10 per cent above and white- collar wages more than 10 per cent below those in their industries a year before takeover. Two years after takeover both were more than 50 per cent above average. Wages in foreign plants taken over by domestic owners tended to rise less than average for their industries, although they remained above the domestic average. Thus, foreign firms did not select particularly high- wage plants to take over and it was foreign takeovers, rather than takeovers in general, that led to large wage increases and high wages.

An econometric analysis of the whole panel found that both foreign ownership throughout the period and foreign takeover resulted in higher wages relative to domestically- owned plants. The wage effects for white- collar employees were typically around twice those for blue- collar employees. Foreign takeovers were associated with large increases in blue- collar employment and both foreign and domestic takeovers with declines in white- collar employment. However, the employment changes were not strongly related to the wage changes.

Key words: FDI, Foreign ownership, Indonesia, Wages

JEL codes: O12, F23, J31

## **Introduction**\*

Many studies have found that affiliates of foreign firms pay higher wages than locally- owned firms in their host countries. That is generally true in both developed and developing host countries.<sup>1</sup> In most cases, some margin in favor of employees of foreign-owned firms remains even after industry, location, and establishment characteristics are taken into account. In one of the few cases in which labor quality could be taken into account, beyond the distinction between production and non- production workers, it still seemed clear that foreign firms in Indonesia paid a wage premium in 1996 (Lipsey and Sjöholm, 2002).<sup>2</sup>

While the existence of higher wages in foreign- owned plants is typical, the differentials may not be caused by foreign ownership. They might be simply the result of the selection of high- wage establishments for acquisition by foreign firms, or the selection of high- wage industries or regions for acquisition or the establishment of new plants by foreign owners. Analysis of cross sectional data within regions or industries, or within industries within regions, can eliminate some of these selectivity biases. Data on worker quality, in the rare cases where they are available, can eliminate others. However, one other possible source of bias remains. That is that there may be unmeasured characteristics of individual firms or establishments that are associated with both high wages and foreign ownership.

We attempt here to deal with this possibility in several ways. One is to use a long panel data set in a model with individual establishment fixed effects. Any permanent characteristics of individual establishments are absorbed by the fixed effects and do not

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<sup>1</sup> See for instance Aitken et al (1997), Doms and Jensen (1998), Feliciano and Lipsey (1999), and Girma et al (1999).

appear as the consequence of foreign ownership. Another is by following plants that changed ownership from domestic to foreign or foreign to domestic to see if the change caused increased wages relative to the plants' industries, regions, or industries within regions.<sup>3</sup>

### **Panel data on Indonesian manufacturing**

We analyze Indonesian manufacturing data supplied by the Indonesian Statistical Office. The data include all manufacturing plants with more than 20 employees in any of the years 1975-1999. Inclusion of plant identification codes enables us to construct a panel and follow the plants over time. The number of plants in the Indonesian manufacturing sector increased from 7,355 in 1975 to 22,041 in 1999 and the number of plants with foreign ownership from 263 to 1,710.<sup>4</sup> The foreign share of Indonesian manufacturing employment and value added is shown in table 1. The foreign share was rather low until 1985, about ten percent of employment and 21 percent of value added. However, an economic crisis in the mid 1980s, caused by falling prices of oil and other raw materials, forced Indonesia to liberalize its FDI regime from around 1986. The result has been a sharp increase in the relative importance of FDI, which amounts to about 21 percent of employment and 36 percent of value added in 1999. The foreign presence is relative low in Food products, Wood products, and Paper and Pulp, and relative high in Basic Metal Industries, Fabricated Metal Products and Other Industries.

The wage ratios between foreign owned and private-domestically owned plants are shown in table 2. In 1975; wages were about three times as high in foreign- owned plants as in private domestic plants. The wage differences have gradually decreased over time and were in 1999 about 44 percent for blue-collar workers and 68 percent for white-collar

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<sup>2</sup> See Lipsey (2002) for a summary of the literature on FDI and wages.

<sup>3</sup> See Conyon et al (1999).

<sup>4</sup> A foreign plant is defined as one with any foreign ownership. Most foreign plants are joint ventures with a majority foreign ownership.

workers. The difference in blue collar- wages has been high in Food products, Paper and Pulp, Chemicals and Non-Metallic Minerals, and in white-collar wages in Food products, Non-Metallic Minerals, Fabricated Metal Industries, and Other Industries. White-collar wages have been higher in private domestic than in foreign- owned plants in Basic Metal Products.

A frequently mentioned source of selectivity bias is foreign takeovers of high-wage domestically- owned plants. If foreign firms tended to take over the plants with the highest average wage, either nationally, within industries, within regions, or within industries within regions, a cross- section analysis would find that foreign- owned establishments paid higher wages than domestically- owned establishments. However, increases in foreign shares would have no effect on average wages and would be associated with lower wages in domestically- owned plants.

The best way to judge the effects of foreign ownership is to follow cases in which takeovers took place. We first examine wage levels in target plants before takeovers to learn whether it is the selection of domestic firms for takeover that produces the higher wages observed in foreign- owned plants. We then calculate the changes in wage levels that followed takeovers, relative to wage changes in domestically- owned Indonesian manufacturing plants, to see whether differential wage changes could account for the higher wages in foreign- owned plants.

Table 3 shows the number of domestic takeovers of foreign plants and the number of foreign takeovers of domestic plants from 1975 to 1999. Fewer than one percent of the total number of plants changed ownership from domestic to foreign or from foreign to domestic in each year. However, the number increased over time, especially foreign takeovers. They grew from an average of 23 per year between 1975-1989 to 90 per year between 1990-1999. The sharp increase in foreign takeovers was caused by the previously mentioned

liberalization of the FDI regime that has taken place in Indonesia since the mid 1980s.

Domestic takeovers of foreign plants also increased, but not as much, from 29 per year in the first period to 64 per year in the 1990s.

Takeovers in both directions, foreign of domestic plants and domestic of foreign plants, were larger, on average, than existing domestic plants, overall and in almost every industry group in each period. However, takeovers in both directions were considerably smaller than existing foreign plants. Foreign takeovers were, on average larger than domestic takeovers, but the margin was small overall and not consistent among industry groups. Thus, with respect to size, takeovers were not a random selection among domestic plants or foreign plants. Foreign takeovers were biased toward the larger domestic plants and domestic takeovers toward the smaller foreign plants.

Table 4 answers the question as to whether foreign firms pay high wages on average simply because they took over high-wage local firms. The table shows the wages one year and two years before a foreign takeover of a private-domestically plant relative to wages in private domestically-owned plants. It also shows the same information for foreign-owned plants that were taken over by domestic owners.

Plants taken over by foreigners paid blue collar wages somewhat above the average in all privately owned plants. The differentials were in the range of 10 to 20 per cent, far below the differential in table 2. For white-collar employees, the contrast was even more striking. While existing foreign plants paid more than 50 per cent more to such employees, the target firms, before takeover, had been paying them about average wages for privately -owned plants. Thus there is no evidence that the differentials in existing plants resulted from selective acquisition of high- wage domestic plants.

The evidence for selectivity relative to domestic wage levels (but not foreign- owned plant wage levels), is stronger for domestic takeovers of foreign-owned plants. White-collar

wages in domestic takeovers were at about average for domestically -owned plants, but blue-collar wages were about 30 per cent higher. Domestic firms were acquiring foreign-owned plants with blue-collar wage levels well above average domestic levels, but not as much above as in the average foreign plant. Thus, domestic takeovers of foreign- owned plants were of plants that paid relatively low wages for foreign- owned plants, particularly relatively low white- collar wages.

Taken together, the two sets of averages suggest, first, that the tendency of foreign takeovers of domestic plants to be biased toward high-wage domestic plants did not account for most of the differentials found in existing plants between foreign and domestic owners. Second, the fact that domestic takeovers of foreign-owned plants were biased toward plants with higher wages than existing domestic plants tended to reduce the wage differential between foreign-owned and domestically-owned plants.

Given the starting point for foreign takeovers described in Table 4, we can observe the events that followed for the target plants in Table 5. For manufacturing as a whole, domestic plants taken over by foreign firms enjoyed large wage increases relative to existing domestically- owned plants. Blue-collar wages, which had been about 20 per cent above average, unweighted, before takeover, increased by 25 percentage points relative to average domestic plant wages, averaging almost 50 per cent higher after 2 years of foreign ownership. Weighted by sector employment, they had been only 5- 10 per cent above average before foreign takeover but were 64 per cent higher two years after takeover. White- collar wage levels, had been close to average before takeover, unweighted, and about 10 per cent below, weighted. They rose even faster after takeover than blue- collar wages. After 2 years of foreign ownership, wages in the target plants were 80 per cent higher than average white-collar wages, unweighted, and 64 per cent higher, weighted.



There is a lot of variation among the five industry groups for which there are sufficient numbers of observations. However, blue-collar wages increased relative to industry average wages in four of the five and white-collar wages in all five. After two years of foreign ownership, outside of industry group 33, wages in foreign-owned target plants ranged from 30 to more than 100 per cent above the average in private domestic plants.

The story was very different in plants that passed from foreign to domestic ownership. Blue-collar wages, which had been about 30 per cent above the average in private domestic plants when these plants were foreign-owned, rose more slowly than average and after two years of domestic ownership were only 15 per cent above average, both weighted and unweighted. White-collar wages rose, according to the unweighted comparisons, and remained the same in relative terms according to the weighted calculations. After two years of domestic ownership, they were still somewhat above domestic average wages, but by nowhere near as much as the wages in the plants moving into foreign ownership or the plants in foreign ownership throughout our period. In the five industry groups, six out of 10 comparisons show declines in wage levels relative to the averages. Four out of the ten showed these plants to have lower than average wage levels after a period of domestic ownership.

One reason for comparing foreign takeovers with takeovers by domestic firms is to test whether the wage increases we see in the former group are the result simply of takeovers, regardless of ownership. The results indicate that change of ownership itself is not the source of the wage increases. It is the change to foreign ownership that produced rapid wage growth and high wage levels.

## Econometric Estimations

The previous discussion suggests that foreign plants pay relative high wages and that foreign takeovers of domestic plants raise both blue- and white-collar wages. Moreover it seemed that high wages in domestic plants taken over by foreigners explain only a very minor part of the higher wages in foreign plants. We continue with an econometric analysis to further examine the wage difference by estimating different variations of the following equation:

$$\ln W_{it} = \beta \text{ownership}_{it} + \lambda \ln X_{it} + \text{Sector} + \text{Region} + \text{Time} + \sigma_{it} + \varepsilon_{it}. \quad (1)$$

where  $i$  and  $t$  index plants and years respectively.  $W$  is average wage, and *ownership* is a dummy variable for foreign or government ownership.  $X$  is a vector with plant specific characteristics such as size, and the use of electricity and other inputs. Sector dummy variables, at a 2-digit level of ISIC, regional dummy variables, and time dummy variables control for sector, regional or time specific wage effects.  $\sigma$  is a time invariant plant specific effect, which will be estimated both as a random and as a fixed effect.

The effect of foreign ownership on wages is seen in table 6. The results, in the first two columns, within industries, regions, and years, show that foreign- owned establishments paid 67 per cent more for blue- collar workers and 90 per cent more for white- collar workers. Some of that difference is associated with the characteristics of the individual plants, such as their size and their inputs of energy, as a proxy for capital intensity, and other intermediate inputs, all of which are correlated with their ownership. If we include these characteristics as explanatory variables, thus attributing the association with wages to them, rather than to foreign ownership, the differential is much reduced, to 29 per cent for blue- collar workers and 43 per cent for white- collar workers (columns 2 and 3). Using a robust (cluster) estimation of the standard errors, to control for the possibility that the standard errors are not independent within plants, does not have much effect on the results. The random effect

estimates include plant specific effects in the error term and use variation both between and within plants. One common problem with the random effect model is that the error term might be correlated with the independent variables, which we test for with a Hausman specification test. The random effects estimations reduce the effect of foreign ownership on wages to about 17 percent for blue-collar workers and 25 percent for white-collar workers. However, the assumption of no correlation between the error term and the independent variables is strongly rejected by the Hausman test. Finally, the fixed effect examines variations within plants and variables that do not change over time will be fully absorbed by the plant specific fixed effect. If plant fixed effects are introduced, as in the last two columns, the remaining differentials are 10 per cent and 21 per cent. The fixed effect estimation is a very conservative estimate of the effect of foreign ownership because it represents wages only in the foreign ownership period of plants that changed ownership, and these wage levels are compared with each plant's wages over the whole period, including the years of foreign ownership. Any wage differences from domestic plants in plants that were always under foreign ownership disappear into the fixed effects.

In table 7, we divide foreign plants into greenfield investments, plants that have been foreign owned throughout the period they are in our data, and foreign takeovers, plants that have previously been domestically owned during the period. The greenfield category includes plants established as foreign- owned during our period and never taken over by domestic firms, but also plants that were established or taken over by foreign firms before 1975, and never changed to domestic ownership.<sup>5</sup> The first four columns are without plant specific effects. It is seen that foreign takeovers as well as greenfield investments pay comparatively high wages. The wage premium in foreign takeovers is about 60 percent for blue-collar wages and 87 percent for white-collar wages, broadly in line with the results in Table 6 for

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<sup>5</sup> We experimented with excluding plants with foreign ownership in 1975 since we cannot be sure they haven't been taken over in a previous year. The exclusion did not have much effect on the results.

foreign ownership in general. Some of the increased wages following a foreign takeover may be explained by increased size, capital intensity, or use of intermediate inputs. This explains why the wage differences decrease to about 28 percent for blue-collar wages and 41 percent for white-collar wages after inclusion of the control variables. The coefficients for *Foreign takeovers* are only marginally smaller than for *greenfield* which suggest that wages in formerly domestic-private plants converge towards wages in established foreign plants after the domestic plants are taken over by foreign firms. The coefficient for *Domestic takeover* is positive and statistically significant. This does not mean that wages increase after a domestic takeover but instead that they remain higher than in other private-domestic plants. More specifically, the coefficient for foreign ownership was found in table 6 to be about 0.29 for blue-collar wages and 0.43 for white-collar wages. Hence, wages seems to decline after a domestic takeover of a foreign plant but they still remain about 6 percent higher for blue-collar wages and 10 percent higher for white-collar wages than in the average private-domestic plant.

Foreign greenfield investments have been excluded from the fixed effect estimations since their foreign ownership is constant over time and since we want to compare the takeovers with private-domestic plants. The fixed effect estimates reduce the apparent effect of foreign takeovers but not the coefficient for domestic takeovers. Foreign takeovers seem to increase blue-collar wages by about 17 percent and white-collar wages about 33 percent.

Since most takeovers are concentrated in a few sectors, we run the estimations at a sector level in table 8. There are positive effects of foreign takeovers on wages in all five sectors, ranging between 11 and 23 percent for blue-collar wages and between 23 and 50 percent for white-collar wages. The result for domestic takeovers is less clear, with a positive and statistically significant coefficient for both blue- and white-collar wages in three sectors, and a negative and statistically significant coefficient for blue-collar wages in one sector.

Hence, it seems that foreign takeovers have a substantial positive effect on average wages across the whole range of industries. Moreover, plants that have had foreign ownership continue to pay higher wages than average private-domestic plants after they are taken over by domestic owners.

This finding that average wages rise does not necessarily imply that individual workers' wages increase with foreign ownership. An increase in the average wage might come, for example, through the dismissal of low-wage workers. We therefore examined changes in employment after takeovers. There were major changes in employment after takeovers, and the changes were strikingly different for blue- and white-collar employees, as seen in table 9. While the number of blue-collar workers increased by 38 percent after foreign takeovers, the number of white-collar employees decreased by 28 percent. The decrease in white-collar employees was even larger after a domestic takeover of a foreign plant, 32 percent. Domestic takeovers had almost no effect on the number of blue-collar workers.

The figures at a sector level confirm that foreign takeovers consistently raised the number of blue-collar workers and reduced the number of white-collar workers. Domestic takeovers of foreign owned plants had a consistent negative effect on the number of white-collar workers and a more uncertain effect on the number of blue-collar workers. Hence, it seems that there were changes in the number of employees that could have had an impact on average wages.

In table 10, we include the growth in numbers of blue- and white-collar workers compared to the previous year as a variable explaining wage levels. Both variables are statistically significant with negative signs. Hence, an increase in employment has a negative effect on average wages, implying that new blue-collar employees had, on average, lower wages than existing employees. By the same argument, the decrease in white-collar workers found in table 9, in combination with the increase in average wages shown in table 7, implies

that those removed were lower- paid than the average. However, including growth in employment in the regressions has only a marginal effect on the coefficient for *Foreign takeovers* and no effect on the coefficient for *Domestic takeovers*. The implication is that the change in employment is not the major explanation for the change in wages following a takeover by foreign firms.

Since there were major changes in employment after takeovers, it is conceivable that there might have been average wage effects from the substitution of more highly educated workers for those with less education. Unfortunately, data on worker education levels are available for only a few years. Within the one and two- year spans covered by the education data, there are no indications of major changes in the education mix of the labor force (not shown). However, we cannot be certain that worker education levels did not change sharply in other periods.

### **Concluding Remarks**

Foreign – owned establishments in Indonesia, as in other countries, pay higher wages than domestically- owned establishments, even when industry, region, plant characteristics, and worker characteristics are taken into account. What has not been so obvious is whether these higher wages are a consequence of foreign ownership itself or are associated with persistent plant characteristics, unknown in nature, but not determined by foreign ownership. This paper examines the question in two ways. The first involves separating firms into those taken over by foreigners from domestic owners, those taken over by domestic owners from foreigners, and those not changing ownership. We examine wage levels in establishments before they are taken over, to learn whether foreign firms select high- wage plants to acquire, and we examine wage changes after takeover. The second method involves an econometric analysis of the relation of average plant wage levels to foreign ownership and changes in

foreign ownership, taking account of other influences on wage levels, such as plant characteristics and changes in employment after takeover.

Foreign firms tended to take over large domestic plants. These plants had relatively high blue-collar wages, although not as high as those in foreign-owned plants in general, by a large margin. These plants paid average white-collar wages. After foreign takeovers, both white collar and blue-collar wages in these plants rose strongly, especially the white-collar wages.

Domestic takeovers targeted relatively small foreign plants with blue- and white-collar wages that were lower than the foreign average but higher than the domestic average. Wages tended to decline after a domestic takeover although they still remained above the private-domestic average. Hence, it was not takeovers themselves that increased wages, but the change in ownership from domestic to foreign.

An econometric analysis of wages using the whole panel of data, found that foreign ownership, in an equation that included time, industry, and region dummies, was associated with blue collar wages two-thirds higher than in domestically-owned private plants, and white-collar wages almost twice as high. Many of these wage differences were associated with plant characteristics, such as size and input use, and when these were introduced, the foreign plant margins were reduced to about 30 and 40 per cent.

A further analysis distinguished plants taken over during the period from those always foreign and from domestic takeovers. It found that both foreign ownership and foreign takeover result in blue-collar wages about 30 per cent above the average for domestically-owned private plants and white-collar wages 40 to 45 per cent higher, even holding constant time, industry, and region. A fixed effect version, which is a conservative measure of the foreign ownership effect, reduced the margins for takeovers to 17 per cent and a third.

We also examined changes in employment after takeovers. There were decreases in numbers of white-collar workers after both foreign and domestic takeovers and a strong increase in blue-collar workers after foreign takeovers. There is a significant negative relationship between employment changes and wage levels. Since blue collar employment increased greatly in foreign takeovers, that negative effect implies that the additional employees were lower paid than the existing employees, and since white collar employment decreased, the negative effect implied that lower paid white collar employees were losing jobs. However, including the change in employment did not substantially affect the impact of the foreign takeovers on wages.

From all of these analyses, we conclude that foreign ownership or acquisition of an Indonesian manufacturing plant results in higher wages for the plant's employees.



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Table 1. The foreign share of Indonesian manufacturing industry between 1975-1999 at a 2-digit level of ISIC (%).

Sector	ISIC	1975		1985		1995		1999	
		Empl.	VA	Empl.	VA	Empl.	VA	Empl.	VA
Total		8.5	22.9	10.0	21.4	17.8	30.5	20.7	35.7
Food proucts	31	4.0	21.4	4.0	11.7	6.2	11.7	8.0	15.5
Textiles	32	7.8	26.5	11.3	29.1	23.5	25.1	24.8	37.5
Wood	33	11.2	23.9	11.7	13.3	8.0	13.2	10.4	20.0
Paper	34	7.1	16.9	5.6	9.6	16.3	32.1	14.3	21.6
Chemicals	35	16.9	28.6	14.0	27.7	16.7	43.0	17.7	45.4
Non-Mettalic Mineral	36	10.3	16.2	8.4	42.0	10.0	25.2	12.7	37.7
Basic Metal Industr.	37	12.7	15.8	20.0	12.8	17.6	41.6	25.2	43.0
Fabricated Metals	38	18.1	22.7	18.2	29.7	34.1	48.4	44.2	57.4
Other Manufacturing	39	4.2	1.6	12.9	41.2	40.0	61.3	44.5	53.9

Note: Empl. – Employment. VA- Value Added.

Table 2. The ratios of average wages in foreign owned and private-domestically owned plants between 1975-1999 at a 2-digit level of ISIC.

Sector	1975		1985		1990		1999	
	Blue-collar	White-collar	Blue-collar	White-collar	Blue-collar	White-collar	Blue-collar	White-collar
Total	2.80	3.11	2.27	1.81	1.67	1.70	1.44	1.68
31	4.10	4.64	3.55	1.98	1.94	1.70	1.70	2.11
32	2.21	3.15	1.46	1.55	1.13	1.28	1.31	1.69
33	1.24	1.24	1.18	1.27	1.23	1.53	1.12	1.49
34	2.56	4.44	1.74	2.42	1.80	1.18	1.79	1.22
35	3.98	2.81	2.98	1.96	1.97	2.24	1.79	1.41
36	4.69	4.75	2.66	2.02	2.63	2.06	2.19	1.71
37	0.86	1.30	1.45	0.69	1.31	1.28	1.04	0.80
38	1.58	1.48	1.85	1.73	1.49	1.54	1.29	1.96
39	0.76	1.00	1.61	2.28	1.45	2.16	1.16	2.08

Note: Average wages for domestic-private and foreign plants have been calculated at a 3-digit level of ISIC and aggregated up to a 2-digit level of ISIC using shares of total blue-collar and white-collar employees as weights. See table 1 for sector names

Table 3. The number of takeovers in the Indonesian manufacturing sector 1975-1999.

Sector	No. of Takeovers		Average Size			
			Takeovers		Existing Plants	
	Domestic	Foreign	Foreign	Domestic	Foreign	Domestic
1975-1989						
Total	408	326	250	210	358	103
31	116	92	219	160	303	105
32	96	80	265	243	732	105
33	50	37	290	230	368	136
34	15	6	42	79	263	78
35	47	45	297	309	230	113
36	28	19	192	264	423	54
37	4	1	61	401	477	248
38	48	39	283	150	318	110
39	4	7	124	98	241	69
1990-1999						
Total	637	917	426	418	539	153
31	95	127	316	226	358	119
32	177	226	681	701	1054	210
33	85	92	367	363	471	188
34	16	23	285	795	633	134
35	90	150	281	233	283	158
36	33	44	385	357	447	75
37	8	13	177	224	292	221
38	106	205	379	310	453	135
39	27	37	481	339	568	120

Note: Size is the average number of total employees. Domestic takeovers refer only to takeovers of foreign plants. See table 1 for sector names.

Table 4. Wages in Target Establishments Relative to All Private Establishments

		Foreign takeovers of private-domestic plants		Private-domestic takeovers of foreign plants	
		T-2	T-1	T-2	T-1
Unweighted					
Total	Blue	1.18	1.22	1.30	1.31
Total	White	0.95	0.99	0.98	0.98
Weighted by sector employment					
Total	Blue	1.09	1.06	1.43	1.38
Total	White	0.87	0.91	1.35	1.32
By Sector					
31	Blue	0.99	1.03	2.12	2.08
31	White	0.73	0.72	1.70	1.52
32	Blue	1.16	1.12	1.13	1.21
32	White	1.15	1.38	1.40	1.41
33	Blue	1.17	0.90	1.05	0.81
33	White	0.75	0.74	1.29	1.19
35	Blue	1.22	1.21	1.84	1.52
35	White	1.01	0.82	0.98	1.05
38	Blue	0.88	0.94	1.09	1.07
38	White	0.65	0.82	1.16	1.24

Note: T-2 (T-1) refers to two (one) years before the year of the takeover.

Table 5. Changes and Levels after Takeover in the Ratio of Wages in Target Establishments to Wages in All Privately-owned Establishments.

	Foreign takeovers of private-domestic plants		Private-domestic takeovers of foreign plants	
	Changes (T+2)-(T-1)	Levels T+2	Changes (T+2)-(T-1)	Levels T+2
Unweighted				
Total Blue	+0.26	1.48	-0.16	1.15
Total White	+0.82	1.81	+0.17	1.15
Weighted by sector employment				
Total Blue	+0.58	1.64	-0.23	1.15
Total White	+0.65	1.56	0	1.32
By Sector				
31 Blue	+1.04	2.07	-0.98	1.10
31 White	+0.65	1.37	-0.93	0.59
32 Blue	+0.44	1.56	-0.27	0.94
32 White	+1.02	2.40	+0.39	1.80
33 Blue	-0.04	0.86	+0.39	1.20
33 White	+0.27	1.01	-0.17	1.02
35 Blue	+0.52	1.73	+0.64	2.16
35 White	+0.58	1.40	+1.39	2.44
38 Blue	+0.95	1.89	-0.11	0.96
38 White	+0.50	1.32	-0.47	0.77

Table 6. The relation of average plant wage to ownership and plants characteristics 1975-1999 (dependent variable – average wage per employee).

	Blue Collar	White Collar	Blue Collar	White Collar	Blue Collar	White Collar	Blue Collar	White Collar	Blue Collar	White Collar
Constant	3.70 (0.01)***	4.61 (0.01)***	2.39 (0.01)***	2.90 (0.01)***	2.39 (0.02)***	2.90 (0.02)***	2.74 (0.01)***	3.06 (0.02)***	3.41 (0.01)***	3.86 (0.02)***
Foreign owner	0.67 (0.01)***	0.92 (0.01)***	0.29 (0.01)***	0.43 (0.01)***	0.29 (0.01)***	0.43 (0.02)***	0.17 (0.01)***	0.35 (0.01)***	0.10 (0.01)***	0.21 (0.01)***
Government owner	0.42 (0.01)***	0.09 (0.01)***	0.27 (0.01)***	-0.16 (0.01)***	0.27 (0.02)***	-0.16 (0.02)***	0.06 (0.01)***	-0.03 (0.01)***	0.01 (0.01)***	-0.01 (0.01)***
Energy per worker	--	--	0.08 (0.00)***	0.06 (0.00)***	0.08 (0.00)***	0.06 (0.00)***	0.08 (0.00)***	0.06 (0.00)***	0.07 (0.00)***	0.06 (0.00)***
Inputs per worker	--	--	0.20 (0.00)***	0.18 (0.00)***	0.20 (0.00)***	0.18 (0.00)***	0.16 (0.00)***	0.15 (0.00)***	0.14 (0.00)***	0.13 (0.00)***
Size	--	--	0.01 (0.00)***	0.14 (0.02)***	0.01 (0.00)***	0.14 (0.03)***	0.00 (0.00)**	0.13 (0.00)***	-0.02 (0.00)***	0.07 (0.00)***
Time dummies	estimated	estimated	estimated	estimated	estimated	estimated	estimated	estimated	estimated	estimated
Industry dummies	estimated	estimated	estimated	estimated	estimated	estimated	estimated	estimated	--	--
Regional dummies	estimated	estimated	estimated	estimated	estimated	estimated	estimated	estimated	--	--
Robust standard errors (cluster)	--	--	--	--	estimated	estimated	--	--	--	--
Establishment random effect	--	--	--	--	--	--	estimated	estimated	--	--
Hausman test (chisquare)	--	--	--	--	--	--	2,460***	2,001***	--	--
Establishment fixed effect	--	--	--	--	--	--	--	--	estimated	estimated
R-square	0.64	0.53	0.72	0.61	0.72	0.61	0.72	0.61	0.66	0.57
No of observations	336,576	269,536	316,031	256,852	316,031	256,852	316,031	256,852	316,031	256,852

Note: Standard errors within brackets. (\*\*\*) significant at the one percent level; \*\*) significant at the five percent level; \*) significant at the ten percent level.

Table 7. The relation of average plant wage to changes in ownership and plant characteristics 1975-1999 (dependent variable – average wage per employee).

	Blue Collar	White Collar	Blue Collar	White Collar	Blue Collar	White Collar
Constant	3.70 (0.01)***	4.61 (0.01)***	2.40 (0.01)***	2.91 (0.01)***	3.39 (0.01)***	3.83 (0.02)***
Foreign takeovers	0.61 (0.01)***	0.87 (0.01)***	0.28 (0.01)***	0.41 (0.01)***	0.17 (0.01)***	0.33 (0.02)***
Foreign greenfield	0.70 (0.01)***	0.95 (0.01)***	0.30 (0.01)***	0.45 (0.01)***	--	--
Domestic takeovers	0.20 (0.01)***	0.30 (0.01)***	0.06 (0.01)***	0.10 (0.01)***	0.05 (0.01)***	0.17 (0.02)***
Public	0.42 (0.01)***	0.09 (0.01)***	0.27 (0.01)***	-0.16 (0.01)***	0.01 (0.01)	-0.01 (0.01)
Energy per worker	--	--	0.08 (0.00)***	0.06 (0.00)***	0.07 (0.00)***	0.06 (0.00)***
Inputs per worker	--	--	0.20 (0.00)***	0.18 (0.00)***	0.14 (0.00)***	0.13 (0.00)***
Size	--	--	0.01 (0.00)***	0.14 (0.00)***	-0.02 (0.00)***	0.07 (0.00)***
Time dummies	estimated	estimated	estimated	estimated	estimated	estimated
Industry dummies	estimated	estimated	estimated	estimated	--	--
Regional dummies	estimated	estimated	estimated	estimated	--	--
Fixed effect	--	--	--	--	estimated	estimated
R-square	0.64	0.53	0.72	0.61	0.66	0.57
No of plants	--	--	--	--	44,050	38,145
No of observations	336,576	269,536	316,031	256,852	304,738	245,837

Note: Standard errors within brackets. (\*\*\*) significant at the one percent level; \*\*) significant at the five percent level; \*) significant at the ten percent level. Domestic takeovers refers only to takeovers of foreign plants.



Table 8. The relation of average plant wage to ownership changes and plant characteristics at a sector level (dependent variable – average wage per employee).

	Food Products (ISIC 31)		Textiles (ISIC 32)		Wood Products (ISIC 33)		Chemicals (ISIC 35)		Fabricated Metal Products (ISIC 38)	
	Blue Collar	White Collar	Blue Collar	White Collar	Blue Collar	White Collar	Blue Collar	White Collar	Blue Collar	White Collar
Constant	2.74 (0.03)***	3.48 (0.04)***	3.64 (0.02)***	4.04 (0.04)***	3.67 (0.05)***	3.94 (0.07)***	3.74 (0.04)***	3.93 (0.06)***	4.04 (0.04)***	4.31 (0.06)***
Foreign takeovers	0.23 (0.03)***	0.29 (0.04)***	0.11 (0.03)***	0.26 (0.04)***	0.14 (0.04)***	0.23 (0.06)***	0.15 (0.03)***	0.29 (0.04)***	0.21 (0.03)***	0.50 (0.04)***
Domestic takeovers	0.06 (0.03)*	0.26 (0.05)***	0.15 (0.02)***	0.18 (0.04)***	0.07 (0.05)***	-0.03 (0.07)	-0.08 (0.05)*	0.02 (0.07)	0.05 (0.04)	0.18 (0.06)***
Public	-0.01 (0.01)	-0.01 (0.02)	0.02 (0.02)	0.03 (0.03)	0.01 (0.03)	0.03 (0.04)	0.03 (0.02)	-0.01 (0.03)	0.07 (0.03)***	-0.11 (0.04)***
Energy per worker	0.11 (0.00)***	0.08 (0.00)***	0.06 (0.00)***	0.04 (0.00)***	0.09 (0.00)***	0.06 (0.01)***	0.04 (0.00)***	0.04 (0.00)***	0.04 (0.00)***	0.04 (0.00)***
Inputs per worker	0.17 (0.00)***	0.13 (0.00)***	0.11 (0.00)***	0.09 (0.00)***	0.15 (0.00)***	0.13 (0.01)***	0.12 (0.00)***	0.15 (0.01)***	0.12 (0.00)***	0.11 (0.01)***
Size	-0.03 (0.00)***	0.05 (0.01)***	0.00 (0.00)	0.09 (0.01)***	-0.01 (0.01)	0.07 (0.01)***	-0.02 (0.01)***	0.05 (0.01)***	-0.04 (0.01)***	0.08 (0.01)***
Time dummies	estimated	estimated	estimated	estimated	estimated	estimated	estimated	estimated	estimated	estimated
Fixed effect	estimated	estimated	estimated	estimated	estimated	estimated	estimated	estimated	estimated	estimated
R-square	0.66	0.56	0.78	0.63	0.56	0.49	0.71	0.55	0.71	0.59
No of plants	11,551	9,903	11,051	8,715	6,490	5,871	4,814	4,629	4,440	4,123
No of observations	86,456	66,867	72,626	52,276	34,468	30,244	34,147	31,876	29,822	27,012

Note: Standard errors within brackets. (\*\*\*) significant at the one percent level; \*\*) significant at the five percent level; \*) significant at the ten percent level. Domestic takeovers refers only to takeovers of foreign plants.

Table 9. Employment of blue- and white-collar workers before and after takeovers.

Sector		Foreign takeovers of private-domestic plants			Private-domestic takeovers of foreign plants		
		T-1	T+2	Growth	T-1	T+2	Growth
Total	Unweighted						
	Blue	327	452	38,4%	243	243	0,1%
Total	White	61	44	-27,4%	66	45	-32,1%
		Weighted by sector employment					
Total	Blue	380	573	50,8%	336	355	5,6%
Total	White	64	46	-28,7%	70	45	-36,1%
		By Sector					
31	Blue	167	247	47,9%	90	108	21,2%
31	White	97	74	-23,5%	86	28	-67,2%
32	Blue	595	1002	68,3%	670	737	10,0%
32	White	67	37	-45,4%	66	78	18,2%
33	Blue	431	524	21,4%	140	112	-19,9%
33	White	84	73	-13,4%	46	40	-12,8%
35	Blue	216	223	3,1%	91	99	9,0%
35	White	29	19	-33,6%	73	25	-65,2%
38	Blue	223	264	18,3%	224	159	-29,1%
38	White	29	19	-33,6%	61	53	-12,4%

Note: T-1 (T+2) refers to one year before (two years after) the year of the takeover

Table 10. The relation of average plant wage to changes in ownership and plants characteristics including changes in employment (dependent variable – average wage per employee).

	Blue Collar	White Collar
Constant	4.58 (0.02)***	3.95 (0.02)
Foreign takeovers	0.16 (0.01)***	0.30 (0.02)***
Domestic takeovers	0.05 (0.02)***	0.17 (0.02)
Public	0.01 (0.01)	0.01 (0.01)
Growth in Blue Collar	-0.10 (0.00)***	--
Growth in White Collar	--	-0.20 (0.00)***
Energy per worker	0.07 (0.00)***	0.05 (0.00)
Inputs per worker	0.13 (0.00)***	0.11 (0.00)
Size	0.01 (0.00)***	0.12 (0.00)
Time dummies	estimated	estimated
Fixed effect	estimated	estimated
R-square	0.66	0.57
No of plants	38,201	31,501
No of observations	259,514	201,787

Note: Standard errors within brackets. (\*\*\*) significant at the one percent level; \*\*) significant at the five percent level; \*) significant at the ten percent level.