

Do foreign-owned firms pay more?
Evidence from the Indonesian
manufacturing sector 1990-99

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Preface

This paper has been prepared within the framework of a research project on analysing the employment effects of multinational enterprises (MNEs), coordinated and edited by Ann Harrison of the University of California, Berkeley and Kee Beom Kim of the Multinational Enterprises Programme of the ILO.

In this paper, Ann Harrison and Jason Scorse utilize Indonesian manufacturing census data from 1990 to 1999 to address whether MNEs pay higher wages than comparable domestic enterprises. The Indonesian dataset is particularly interesting as it allows the measurement of the educational attainment of the workers in each plant and the tracking of the same plant over time. Consequently, unlike previous economic studies on the same subject, the authors are able to control for unmeasured quality differences in the composition of the labour force hired by MNEs and other enterprises over a period of time.

Even after controlling for these differences, the authors find that MNEs pay significantly higher wages than domestic enterprises. Wage premiums for unskilled workers in MNEs were in the range of five per cent to ten per cent and between 20 per cent and 35 per cent for skilled workers. Furthermore, the wage premiums paid by MNEs in Indonesia during the 1990s were found to be robust within selected industries, across specifications, and in limited samples for which the foreign ownership variable changed significantly.

As the wage premiums paid by MNEs might not simply be due to MNEs hiring workers with more skills and better education, a useful follow-up research agenda would be to try to see why the wage premium exists.

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1. Introduction

It is people who work in so-called "sweatshops" in poor countries go back day after day and are the envy of the even poorer people in the farming communities they left. Preventing them from having those jobs keeps them poor.

David Henderson: The Hoover Institute (2001)

In many cases, sweatshop workers employed by large multinational corporations are trapped in a system of modern day indentured servitude comparable to slavery and denied basic human freedoms like the right to join a union, attend religious services, quit or marry. Menial wages and reports of physical abuse in addition are typical of a new economic world order in which the poor are getting poorer and the rich growing richer.

From the global exchange web site (2003)

The above quotes are emblematic of the continuing debate over whether globalization benefits workers in developing countries. Economic theory does not provide clear and simple answers to this question since there are many competing forces at work. As developing countries liberalize their economies, foreign firms may bring new technologies to the host country, thereby raising productivity (Bailey and Gersbach, 1995), and they may have incentives to retain workers due to high personnel search and job training costs, reputation effects, and political considerations, all of which would lead to higher wages. However, foreign firms may also be concentrated in export sectors which face increased global competition, thereby depressing wages in a "race to the bottom" scenario (Chau and Kanbur, 2001; Feenstra, 1998). Given the inconclusive nature of the question it is best addressed empirically at a micro-level within developing countries.

Wages in developing countries have been the topic of extensive literature and numerous empirical studies have examined the links between foreign ownership and wages. Aitken, Harrison, and Lipsey (1995) compared wages and foreign ownership in Mexico, Venezuela, and the United States in the late 1970s through 1990 and consistently found evidence that foreign firms paid more than their domestic counterparts, in the range of 20 per cent-30 per cent, even after controlling for firm size, geographic location, skill mix, and capital intensity. They also found little evidence of wage spillovers from foreign to domestic-owned firms in Mexico and Venezuela, despite the belief that an infusion of technological knowledge into developing countries leads to increased productivity within industries.

Using data from 1970-96, Ramstetter (1999) found evidence that the average worker productivity was significantly higher in foreign-owned firms in Hong Kong (China), Indonesia, Malaysia, Singapore, and Taiwan Province of China, but that in most cases this did not translate into significantly higher wages for employees; a surprising result given the theoretical link between compensation and worker productivity. Using data from Cameroon, Ghana, Kenya, Zambia, and Zimbabwe from 1990-93, te Velde and Morrissey (2001) found significant wage premiums in foreign-owned firms, which increased with worker skill level. Lipsey and Sjöholm (2001) used a 1996 cross-section of data on Indonesian manufacturing firms to show that foreign firms paid significantly higher wages, in the range of 20 per cent-30 per cent, and that the increased presence of foreign firms in a given province led domestic firms to pay higher wages as well, thus leading to an enhanced wage effect. However, the authors did not control for worker education levels.

Udomsaph (2002) used a similar approach as the one in this chapter to posit that many of the wage differentials between foreign-owned and domestic firms uncovered in previous empirical work have been due mainly to the inability to control for worker characteristics. Using data from the Thai manufacturing sector in 1999-2000, he showed that once worker heterogeneity is controlled for, unskilled workers received no wage premium while the premium for high-skilled workers still remained.

One problem with the above studies however, is that they do not have an extensive time series available, combined with detailed information on worker characteristics, skill levels, and educational achievement. Consequently, it is difficult for previous studies to be able to say conclusively whether higher wages paid by foreign firms are actually the result of foreign wage premiums or unobserved quality differentials of workers hired by foreign firms. Using firm level data collected by the Indonesian Government, this paper compares the wage rates paid by foreign-owned and domestic firms during the years 1990-99. In addition, we control for detailed worker characteristics in the years 1995-97 in order to analyse to what extent worker heterogeneity may be driving any persistent differences. Foreign-owned firms may employ workers with different skill levels that are not picked up by the common aggregate measurements such as “unskilled” and “skilled” common to most studies.

We find that although there is evidence of wage premiums for unskilled workers in foreign-owned firms this is largely diminished, in the range of five per cent to ten per cent, once education levels and gender enter the equation. However, high wage premiums between 20 per cent and 30 per cent for more skilled workers persist even after controlling for these factors. The results suggest that foreign firms do indeed pay a significant wage premium, even after taking into account differences in worker characteristics such as skill levels and education. Section 2 summarizes the data, Section 3 presents a simple economic model, Section 4 presents the econometric results, and we conclude with Section 5.

2. Data summary

Indonesia has firms that fall within all International Standard Industrial Classification (ISIC) categories for manufacturing. Food and beverages, wood products, textiles and garments, chemicals and petroleum products, minerals, and metal sectors have the greatest number of firms. Foreign-owned businesses are dispersed throughout most of Indonesia’s manufacturing sectors but are particularly concentrated in textile and garments, metal products, and the chemical and petroleum industries.

The data for this analysis comes from the annual manufacturing survey of Indonesia collected and compiled by the Indonesian Government’s statistical agency, Badan Pusat Statistik (BPS). The completion of this survey is mandatory under Indonesian law and therefore the data captures the entire population of Indonesian manufacturing firms; which ranged from approximately 13,000 in 1990 to over 20,000 in 1999. The survey includes over 400 questions in any given year, the large majority of which remain constant although in certain periods additional questions are included and others removed. Over the ten-year period, there is an average of 4.5 observations per firm, reflecting the fact that some firms go out of business while others enter.

There are two obvious sources of measurement error in the data. The first is human error in either filling out the questionnaire or reading the data from it. A fairly significant percentage of the observations include non-sensical entries such as a negative number of workers, a negative age of the firm, or a zero level of output. These observations were

dropped. This could potentially bias the results if they were systematic, but an inspection of the data revealed no underlying patterns in the erroneous values.

Another potential source of measurement error is the inclusion of purposefully untruthful information. Given that Indonesia has minimum wage laws there would appear to be an incentive for firms to exaggerate wages in order to feign compliance. However, whether due to ignorance of these laws or a lack of enforcement, a very large percentage of firms reported wages significantly below the minimum for a number of years. Although surprising and sure to engender scepticism on the part of most economists, Harrison and Currie (1997) found self-reported non-compliance rates of up to 50 per cent in Morocco, presumably due to a lack of enforcement or fear of penalties as well.

Figure 1 shows the percentage of foreign-owned firms (firms with any positive level of foreign ownership) and domestic firms that report average wages for unskilled workers which fall below the minimum wage between 1990-99. Although a significant percentage of both types of firms exhibit a high degree of non-compliance, the domestic firms consistently fail to comply with greater frequency. It is important to keep in mind that this does not control for the number of employees, the degree of foreign ownership, or the level of divergence from the minimum wage. The absolute number of domestic firms greatly outweighed the number of foreign-owned firms throughout this time period, at approximately 50:1 in 1990 and 16:1 in 1999; the share of foreign-owned firms rising from less than two per cent to almost six per cent.

Figure 1. Non-compliance with the minimum wage laws 1990-99

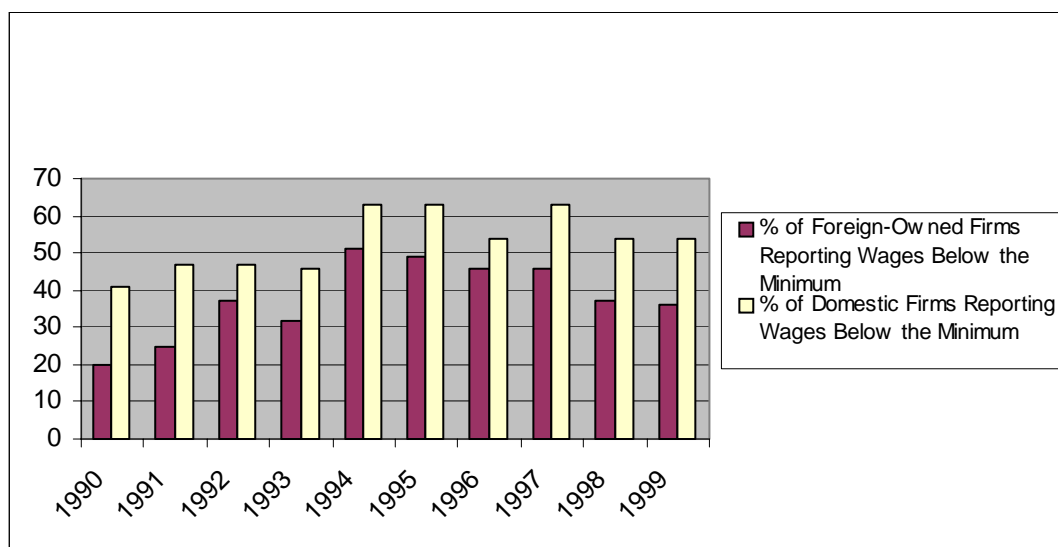
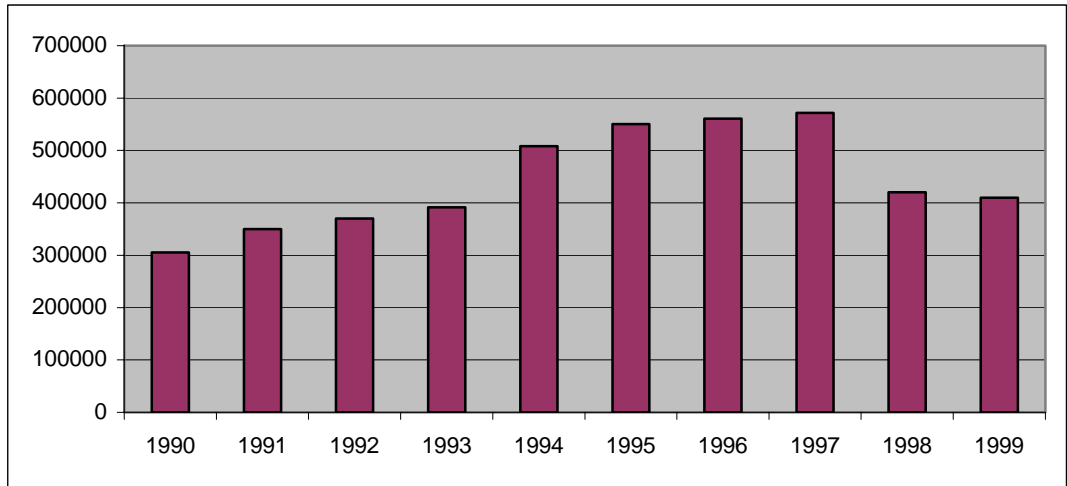


Figure 2 shows the average real minimum wage throughout the 1990s, which increased steadily until the extreme inflation that accompanied the East Asian crisis at the end of the decade. In most countries with minimum wage laws (e.g. the United States), the nominal levels remain constant for a number of years but in Indonesian the experience is quite different; changes often take place every year or two. This may account for some of the high levels of non-compliance since firms must continually take this new information into account.

Figure 2. Real minimum wage in rupiahs (1990-99)



Figures 3 and 4 show that on average the annual real wages for both unskilled and skilled workers were much higher in foreign-owned firms throughout this time period. Not controlling for worker characteristics, wages ranged from double for unskilled workers in 1993 to more than five times for skilled workers in 1999. This does not include overtime pay, health benefits, gifts, or pension plans.

Figure 3. Average real wages paid to unskilled workers in Indonesian rupiahs (1990-99)

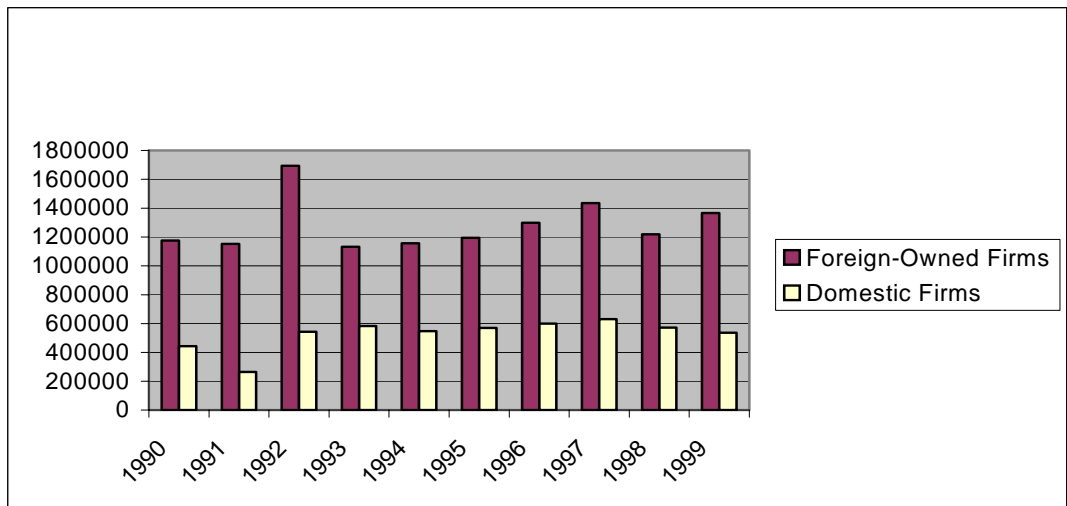


Figure 4. Average real wages paid to skilled workers in Indonesian rupiahs (1990-99)

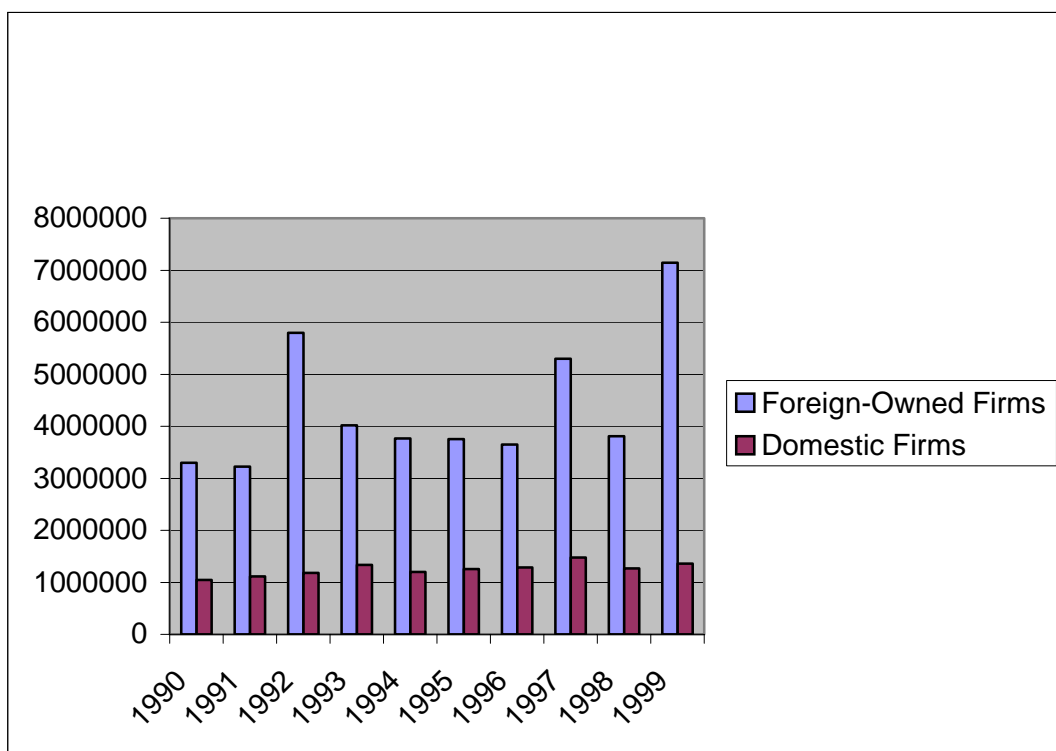


Table 1 presents the aggregate summary statistics for key variables in the years 1990 and 1999. Notice the increases in the average number of unskilled workers from 124 to 154 (up 24 per cent), the average level of foreign ownership from 1.3 per cent to 4.4 per cent (up 240 per cent), and the average percentage of goods exported from 7.9 per cent to 11.2 per cent (up 42 per cent). Dividing the firms into domestic and foreign-owned, the average number of unskilled workers in foreign-owned firms increased from 416 to 498 (up 20 per cent) while the average number of skilled workers actually fell (possibly signalling a shift to low-skilled production) from 95 to 69 (a drop of more than 27 per cent). The average percentage of foreign ownership increased from 67 per cent to 78 per cent (up 16 per cent), the average level of exports increased slightly from 30 per cent to 34 per cent (up 13 per cent), while the percentage of foreign-owned firms with any export activities at all remained in the range of 40 per cent to 50 per cent throughout the decade. At the same time, the average number of unskilled workers in domestic firms increased from 118 to 133 (up 13 per cent), the average number of skilled workers stayed almost exactly the same at 24, the average level of exports rose from 7.5 per cent to 9.8 per cent (up 30 per cent), and the percentage of firms with any exports stayed in the range of 11 per cent to 13 per cent.

From these numbers we can see that although the underlying trend during the 1990s was a move to larger firms with a greater average level of exports, on average foreign-owned firms continued to be both much bigger and much more focused on export production than domestic firms. These increases occurred both within existing firms and new entries, as well as across industries, such that no one source was driving the change. This is true also for the increase in wages.

Table 1. Summary statistics 1990-99

Variable	# Obs		Mean		Std. Dev.		Min		Max	
	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999
Firm ID	11,051	19,853								
No. of unskilled workers	11,051	19,853	125	154	480	577	2	0	36,874	33,797
No. of skilled workers	11,051	19,853	24	27	125	113	0	0	6,965	4,009
% Foreign ownership	11,051	15,784	1.3	4.4	9.9	18.8	0	0	100	100
% Goods exported	11,051	15,773	7.9	11.2	24.4	29.4	0	0	100	100
Age of firm (years)	11,022	15,784	12	16	11	18	0	0	90	99
Average wage (prod, 000)*	11,051	15,783	677	2,720	362	1,406	120	548	1,920	8,069
Average wage (NonProd, 000) **	11,051	12,526	1,471	5,481	1,024	4,685	120	555	5,509	30,100
Capital value (000)	11,051	15,784	1,578	1,170	62,600	6,800	0	0	6,440,000	5,340,000

Notes: *Prod refers to production workers, **NonProd refers to non-production workers.

3. The model

Our model begins with the assumption that both domestic and foreign firms in Indonesia face the same labour market, and in line with standard economic theory, firms should pay a wage each to the marginal revenue product of labour; which is the marginal productivity of labour times the price of output. Therefore, assuming two inputs, labour and capital, firms will pay higher wages the more capital they employ (since the marginal productivity of labour increases) or the higher their price of output; all else held equal. Although classical theory would typically predict that workers' marginal product decreases with an increase in the total number of workers, numerous empirical studies of firm size have documented that larger firms often pay considerably more (Oi and Idson, 1995). This may be due to the fact that bigger firms enjoy economies of scale and therefore are generally more productive. Productivity is also a function of capital vintage, with older firms typically utilizing older and less productive machinery and therefore, ceteris paribus, wages have been shown to decrease with firm age. Finally, firms face a heterogeneous workforce and will pay more for workers with higher skills, and hence productivity, which we assume is highly correlated with, levels of education.

What we have laid out so far would not predict any systematic differences between wages paid by different types of firms once size, age, capital, and worker characteristics are controlled for. However, Card and Krueger (1995) outline how differences in information on worker ability, search and training costs, and alternative wages paid by competitors, as well as a desire to prevent shirking may cause firms to pay a variety of wage rates to workers with similar skill levels. For example, a firm that has higher training costs and wants to decrease turnover, or a firm that has higher managerial costs and wants to provide incentives for high effort levels, may pay a higher wage. These types of firm behaviour have been documented extensively in the labour economics literature and are increasingly being used to explain many common labour market "anomalies".

Unfortunately, we do not have much data which can help to illuminate to what degree these added considerations are factoring into firm wage decisions in Indonesia. However, we do know that on average foreign firms in Indonesia spent twice as much on training costs per worker, which suggests that in an econometric analysis foreign ownership might be correlated with a wage premium since it serves as a proxy for higher investment in workers.

In addition, foreign firms may also have very real incentives to pay more due both to political considerations (e.g. in order to win favour with local governments) and for reputation effects (e.g. to counter claims of worker exploitation), which will also be captured in a foreign ownership variable. We have no way at present of disentangling all of these potential effects, most of which are not necessarily specific to foreign-owned firms.

For the econometric estimation we will control for capital stock (the total estimated value of all machinery, land, buildings, and vehicles), size (the total number of paid workers), age, as well as the price of output. Since firms do not state the prices they received directly, we use the Indonesian Census Bureau's manufacturing index which provides average annual prices for outputs based on 5-digit ISIC codes. In order to control for the alternative wage faced by workers, for each province we constructed an average wage variable by firm which is the average wage paid by all other firms in the area. Since legal minimum wages, which differs between provinces, will presumably also affect a firm's decisions to some degree, they too are included, even if they are not always binding. Apart from the percentage of foreign ownership, which takes on a value of 0 to 100 and is the primary variable of interest, the percentage of goods exported is the final firm characteristic included in the estimating equation since firms which produce for export often face additional levels of competition. Therefore, we estimate separately for both unskilled and skilled workers the following reduced form equation, where ε_{it} is a identically and independently distributed (i.i.d.) disturbance term and the signs above the betas indicate the predicted signs of the coefficients:

$$\ln w_{it} = \beta_0 + \overset{+}{\beta_1} \ln \text{altwage}_{it} + \overset{+}{\beta_2} \ln \text{minwage}_{it} + \overset{?}{\beta_3} \text{foreign}_{it} + \overset{?}{\beta_4} \text{exports}_{it} + \overset{+}{\beta_5} \text{kapital}_{it} \\ + \overset{+}{\beta_6} \text{size} + \overset{+}{\beta_7} \text{price} + \overset{-}{\beta_8} \text{age} + \overset{+}{\text{worker}_{it}} + \text{region} + \text{time} + \text{industry} + \varepsilon_{it}$$

Higher worker characteristics, as measured by levels of education (included in a subset of the data from 1995-97), should lead to higher wages although we expect men to receive higher compensation than women which is likely to make female coefficients negative. The dependent variable, the average annual wage, was constructed by dividing total firm wages by the total number of employees per year. All monetary variables are in real terms; Indonesian rupiahs divided by the Consumer Price Index (CPI). In line with common economic practice, region, time, and industry-level dummy variables are included since there may be particular types of laws, constraints, or added costs captured by these variables which need to be controlled for since they could potentially bias the results.

Since all of the variables are annualized, yet capture decisions and changes that occur throughout the year, we use lag variables for foreign ownership, exports, capital, and size, both for convenience and to eliminate any potential endogeneity problems. It is reasonable to assume that even if in the present year these variables changed, the effects on wages would not be felt for at least some time and therefore do not bias our estimates.

4. Results

Table 2 shows the results for the entire sample (1990-99), which exclude worker characteristics, for average unskilled wages using both ordinary least squares (OLS) and fixed effects. The Hausman test for non-systematic correlation between the error terms and the independent variables was strongly rejected so we do not include the random effects results. Robust covariance estimates were computed using White's standard errors and we allowed for clustering at the province level. We checked to see if using logs for both the percentage of foreign ownership and exports significantly affected the results and they did not, so we use the non-log forms throughout.

Table 2. Dependent variable: Log average wage of unskilled workers (1990-99)

Variable	OLS	Fixed effects
Firm age	-0.00057 (0.00046)	
Price of output (log)	0.070 (0.0178)**	0.023 (0.0099)*
Average wage (log)	0.053 (0.0233)*	0.021 (0.0083)**
Minimum wage (log)	0.39 (0.0773)**	0.17 (0.0140)**
Percentage of foreign ownership (-1)	0.0018 (0.00024)**	0.0005 (0.00018)**
Capital stock (log -1)	0.0043 (0.00089)**	-0.000024 (0.00026)
Firm size (log -1)	0.064 (0.0074)**	-0.0001 (0.00006)
Percentage of goods exported (-1)	-0.00005 (0.00016)	-0.00022 (0.0033)
Time dummies	Yes	Yes
Industry dummies	Yes	Yes
Province dummies	Yes	No
Number of observations	71,130	71,130
R ²	.2872	.1113

Notes: *Indicates significance at the five per cent level and ** at the one per cent level.

In the OLS specification all of the coefficients on the independent variables have the expected sign and are all significant at the one per cent level except for age and percentage of goods exported. The magnitude of the foreign ownership coefficient suggests that a firm which is 100 per cent foreign-owned would on average pay a wage premium to unskilled workers of 18 per cent. However, the fixed effects specification is likely to be the more accurate model since there are probably unobserved firm characteristics such as the management styles or country of the main foreign investor, which do not change over time and yet influence the estimates. In the fixed effects specification, the effect of foreign ownership, while still significant at the five per cent level is severely muted. A firm with 100 per cent foreign ownership would only provide a wage for unskilled workers on average about five per cent more than a similar domestic firm. Note that the industry dummies are still included in the fixed effects regressions because many of the firms change ISIC code over the course of the ten-year period; almost always reflecting a shift to a similar type of production within the same general manufacturing category.

Table 3 shows the results using the same estimators and data but with the average wage for skilled workers as the dependent variable. In the OLS specification all of the coefficients have the expected signs and all are significant at the one per cent level except for the price of output and average wage. The coefficient on foreign ownership is even more pronounced, suggesting a wage premium of 31 per cent for complete foreign ownership. The fixed effects estimates are supported by the Hausman test and all of the significant coefficients have the correct signs. Again, however, the wage premium corresponding to complete foreign ownership is much diminished, down to about seven per cent.

Table 3. Dependent variable: Log average wages of skilled workers (1990-99)

Variable	OLS	Fixed effects
Firm age	-0.0019 (0.00068)**	
Price of output (log)	0.034 (0.022)	0.030 (0.015)*
Average wage (log)	0.017 (0.022)	0.022 (0.012)
Minimum wage (log)	0.404 (0.066)**	0.078 (0.022)**
Percentage of foreign ownership (-1)	0.003 (0.00040)**	0.0007 (0.00029)*
Capital stock (log -1)	0.006 (0.0007)**	-0.0006 (0.0004)
Firm size (log -1)	0.150 (0.0097)**	-0.005 (0.0053)
Percentage of goods exported (-1)	0.0010 (0.00009)**	-0.00004 (0.00009)
Time dummies	Yes	Yes
Industry dummies	Yes	Yes
Province dummies	Yes	No
Number of observations	59,021	59,021
R ²	.2703	.0519

Notes: *Indicates significance at the five per cent level and **at the one per cent level.

Table 4 presents the OLS and random effects estimates of the reduced sample for the years 1995-97 in which detailed worker education variables are included. Education levels for both men and women are provided in a highly disaggregated form, ranging from no school to college for unskilled workers and less than high school to PhD for skilled workers.

In the OLS estimates, all of the coefficients on the main variables have the expected signs and most are significant at the five per cent or one per cent levels. The only education variables that are significant are for female workers and they have the expected negative sign. The effect of foreign ownership is much less than in the unrestricted of sample from 1990-99 but stays at around nine per cent in both the estimates with and without worker characteristics. The estimates from a random effects regression using the same data shows that the signs on the coefficients have the correct sign and the magnitude of the effect of complete foreign ownership increases only slightly to about ten per cent. The only education variables that are significant are for males and they have the expected

positive sign. We have used random effects specifications as for this subset, the Hausman test fails to reject the lack of correlation between the error term and the independent variables, suggesting that the fixed effects is not appropriate.

Table 4. Dependent variable: Log average wages of unskilled workers (1995-97)

Variable	OLS	OLS with worker characteristics	Random effects
Firm age	-0.004 (0.0005)	-0.0004 (0.0005)	
Price of output (log)	0.053 (0.0212)*	0.054 (0.0303)*	0.065 (0.019)**
Average wage (log)	0.030 (0.058)	0.007 (0.059)	0.144 (0.017)**
Minimum wage (log)	0.922 (0.249)**	0.968 (0.238)**	0.58 (0.028)**
Percentage of foreign ownership (-1)	0.0009 (0.0003)**	0.0009 (0.0003)**	0.001 (0.0002)**
Capital stock (log -1)	0.0018 (0.0007)*	0.0012 (0.0007)*	0.00009 (0.0004)
Firm size (log -1)	0.043 (0.006)**	0.044 (0.006)**	0.040 (0.003)**
Percentage of goods exported (-1)	0.0002 (0.0002)	0.0002 (0.0002)	0.0003 (0.00009)**
No school (M)		-0.016 (0.050)	3.07 (0.26)**
Some primary (M)		0.032 (0.050)	3.09 (0.26)**
Junior high (M)		0.042 (0.050)	3.10 (0.257)**
Senior high (M)		0.073 (0.045)	3.13 (0.257)**
Some college (M)		(dropped)	2.99 (0.263)**
College (M)		0.220 (0.138)	3.27 (0.265)**
No school (F)		-0.0753 (0.032)*	-0.052 (0.036)
Some primary (F)		-0.066 (0.025)*	-0.046 (0.036)
Junior high (F)		-0.054 (0.027)*	-0.053 (0.036)
Senior high (F)		-0.071 (0.028)*	-0.064 (0.036)
Some college (F)		-0.019 (0.040)	0.009 (0.050)
College (F)		(dropped)	(dropped)
Time dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	No
Number of observations	23,451	17,582	17,583
R ²	.2703	.3079	.2922

Notes: *Indicates significance at the five per cent level and **at the one per cent level.

Table 5 provides the same OLS and random effects estimates for skilled workers. In the OLS specification, all of the coefficients have, again, the expected signs except for the

average wage variable which is also significant at the five per cent level. This may be due to the fact that the minimum wage variable is picking up more of the effect, since for skilled workers it is typically binding. The average wage premiums for complete foreign ownership are again high, at around 24 per cent in both regressions, down somewhat from the 31 per cent in the entire ten-year sample. Surprisingly, none of the worker characteristic variables are significant. In the random effects estimates, all of the principle coefficients have the expected sign and most are significant at the one per cent level. The effect of complete foreign ownership decreases only slightly too a little over 22 per cent.

Table 5. Dependent variable: Log average wages of skilled workers (1995-97)

Variable	OLS	OLS with worker characteristics	Random effects
Firm age	-0.002 (0.001)	-0.002 (0.001)	
Price of output (log)	0.010 (0.043)	0.045 (0.044)	0.037 (0.0328)
Average wage (log)	-0.178 (0.071)*	-0.227 (0.072)**	0.158 (0.0204)
Minimum wage (log)	1.32 (0.315)**	1.37 (0.417)**	0.814 (0.0464)**
Percentage of foreign ownership (-1)	0.0024 (0.0004)**	0.0024 (0.0004)**	0.0023 (0.0003)**
Capital stock (log -1)	0.0059 (0.0006)**	0.0068 (0.0006)**	0.0047 (0.0008)**
Firm size (log -1)	0.151 (0.0095)**	0.142 (0.0091)**	0.134 (0.005)**
Percentage of goods exported (-1)	0.0009 (0.0002)**	0.0008 (0.0002)**	0.0007 (0.00018)**
High school or less (M)		0.420 (0.3222)	-0.66 (0.054)
Some college (M)		0.43 (0.3243)	-0.65 (0.549)
College (M)		0.49 (0.344)	-0.61 (0.549)
Masters (M)		(dropped)	-1.05 (0.58)
PhD (M)		0.86 (0.546)	(dropped)
High school or less (F)		-0.20 (0.221)	0.53 (0.745)
Some college (F)		-0.14 (0.224)	0.578 (0.749)
College (F)		-0.19 (0.226)	0.52 (0.74)
Masters (F)		(dropped)	0.716 (0.782)
PhD (F)		0.56 (1.012)	1.31 (1.19)
Time dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Province dummies	Yes	Yes	No
Number of observations	21,579	13,483	13,484
R ²	.2624	.2435	.2316

Notes: *Indicates significance at the five per cent level and **at the one per cent level.

The foreign wage premium is robust to the inclusion of worker characteristics, particularly for skilled workers. However, we also tested further for robustness by including only those firms which experienced a change in foreign ownership during the 1995-97 period. There are approximately 580 observations for which the mean change in foreign ownership was a little over four per cent. About 60 per cent of the firms in this sample increased foreign ownership by an average of 38 per cent while the remaining 40 per cent of the observations decreased foreign ownership by an average of near 50 per cent, resulting in a small net gain over all 580 firms. Tables 6 and 7 provide OLS and random effects estimates for unskilled and skilled workers using this reduced sample.

Table 6. Dependent variable: Log average wage of unskilled workers 1995-97
(Reduced sample: Only firms with changes in foreign ownership)

Variable	OLS	Random effects
Price of output (log)	0.45 (0.211)*	0.41 (0.263)
Average wage (log)	0.28 (0.167)	0.31 (0.236)
Minimum wage (log)	0.65 (0.253)*	0.60 (0.375)
Percentage of foreign ownership (-1)	0.001 (0.00048)*	0.001 (0.00092)
Capital stock (log -1)	0.003 (0.006)	0.003 (0.005)
Firm size (log -1)	0.041 (0.0357)	0.043 (0.0317)
Percentage of goods exported (-1)	-0.0019 (0.0006)**	-0.0017 (0.0008)
No school (M)	-0.57 (0.345)	-2.46 (1.005)*
Some primary (M)	-0.25 (0.195)	-2.27 (0.960)*
Junior high (M)	-0.27 (0.209)	-2.29 (0.955)*
Senior high (M)	-0.15 (0.234)	-2.17 (0.958)*
Some college (M)	(dropped)	-2.05 (1.18)
College (M)	2.18 (1.01)*	(dropped)
No school (F)	-0.48 (0.417)	-0.03 (0.482)
Some primary (F)	-0.25 (0.40)	0.11 (0.399)
Junior high (F)	-0.37 (0.467)	0.11 (0.397)
Senior high (F)	-0.44 (0.458)	0.04 (0.390)
Some college (F)	-0.46 (0.731)	(dropped)
College (F)	(dropped)	0.48 (0.533)
Time dummies	Yes	Yes
Industry dummies	Yes	Yes
Province dummies	Yes	No
Number of observations	580	580
R ²	.2692	.2683

Notes: *Indicates significance at the five per cent level and **at the one per cent level.

In the OLS specification for unskilled workers (Table 6), all the coefficients exhibit the proper signs, yet only price of output, minimum wage, and foreign ownership are significant (at the five per cent level). The effect of complete foreign ownership remains near ten per cent and persists in the random effects specification (the Hausman test again strongly rejects the use of fixed effects) even though it's not significant. The only education variable that is significant is male college which exhibits the predicted positive sign.

Table 7. Dependent variable: Log average wages of skilled workers 1995-97
(Reduced sample: Only firms with changes in foreign ownership)

Variable	OLS	Random effect
Price of output (log)	0.20 (0.185)	0.58 (0.281)
Average wage (log)	0.27 (0.136)*	0.18 (0.194)
Minimum wage (log)	0.54 (0.223)*	0.70 (0.421)
Percentage of foreign ownership (-1)	0.0034 (0.00103)**	0.0029 (0.00118)*
Capital stock (log -1)	0.026 (0.0075)**	0.027 (0.0061)**
Firm size (log -1)	0.028 (0.0541)	0.030 (0.006)
Percentage of goods exported (-1)	-0.0015 (0.00087)	-0.0014 (0.0012)
High school or less (M)	-6.22 (2.296)*	6.74 (28.993)
Some college (M)	-6.27 (2.538)*	6.765 (28.999)
College (M)	-5.95 (2.342)*	6.85 (28.997)
Masters (M)	(dropped)	15.80 (29.341)
PhD (M)	-18.34 (5.211)**	-5.13 (28.774)
High school or less (F)	-5.81 (43.582)	-4.83 (28.384)
Some college (F)	-5.91 (43.557)	-4.90 (28.386)
College (F)	-5.75 (43.471)	-4.81 (28.383)
Masters (F)	-8.33 (43.441)	-7.64 (28.509)
PhD (F)	(dropped)	(dropped)
Time dummies	Yes	Yes
Industry dummies	Yes	Yes
Province dummies	Yes	No
Number of observations	564	564
R ²	.2106	.2029

Notes: *Indicates significance at the five per cent level and **at the one per cent level.

In the OLS specification for skilled workers (Table 7), the signs are all in the right direction and the effect of foreign ownership is quite high, 34 per cent, and significant at the one per cent level. It is also significant in the random effects specification (at the five per cent level) with almost as high a magnitude at close to 30 per cent. The coefficients on levels of education are odd, with female levels higher than males, although not significant, and the male PhD variable is highly negative. This is most probably due to the fact that less than one per cent of the (already small number of) observations contain any entries for masters or PhD workers of either gender.

Next, we decreased the sample to only those firms which operated in the textile, apparel, or footwear sectors since these have been targeted by anti-sweatshop groups for their low wages and are typically concentrated in the export sector. The percentage of foreign firms in these almost 31,000 observations was a little greater than across the whole sample, at approximately 6.5 per cent. The foreign-owned firms exported on average a little over 50 per cent of their output compared to 12 per cent for domestic firms. Foreign-owned firms were also much bigger, employing an average of 1,058 unskilled workers and 87 skilled workers, compared to 224 unskilled and 28 skilled workers for domestic firms. Again, the average unskilled wage on average was almost double for foreign firms and the average skilled wage almost five times as much without controlling for worker characteristics.

In the simple OLS regressions for the ten-year period without worker characteristics, the premium for unskilled workers was actually a little higher than in other specifications, at almost 13 per cent, and the same was true for skilled workers for which the premium was close to 39 per cent; both significant at the one per cent level. All of the other primary variables had the predicted signs, and the coefficient on exports is positive and significant at the five per cent level in both regressions as well. In Tables 8 and 9 we report the random effects estimates for the reduced sample for 1995-97 with worker characteristics since once again we failed to reject the Hausman test that the errors are non-systematic. The premium for full foreign ownership decreased to about nine per cent for unskilled workers and remained significant at the five per cent level, while the premium for skilled worker dropped to 28 per cent and was significant at the one per cent level. The positive coefficient on exports remained significant at the one per cent level in both.

In order to see if selection bias may be affecting our results, we used Heckman's maximum likelihood estimator. For both production and non-production workers the coefficients on foreign ownership were significantly higher once firm exiting had been taken into account. Over the full sample excluding worker characteristics, the wage premiums were 31 per cent and 56 per cent for production and non-production workers respectively. In the restricted sample that included worker characteristics, the wage premiums were 22 per cent for production workers and 45 per cent for non-production workers. All the coefficients on foreign ownership were significant beyond the one per cent level and all of the other primary coefficients continued to exhibit the proper signs.

Furthermore, as the model may suffer from endogeneity even when using lagged values for exports, we therefore used an instrumental variables estimator to see how this would affect the results. As an instrument for exports, we used the percentage of output within the ISIC sector that is exported at the province level, excluding firms' own exports. The premiums for production workers were significantly higher than the OLS results for both the whole sample and restricted sample with worker characteristics, at 26 per cent and 17 per cent respectively, the former significant at the one per cent level and the latter at the five per cent level. For non-production workers, the premiums were again higher, at 49 per cent and 41 per cent respectively, and both were significant well beyond the one per cent level. Again, all of the other primary coefficients had the expected signs.

Table 8. Dependent variable: Log average wage of unskilled workers (1995-97)
(Reduced sample: Only textile, apparel, and footwear industries)

Variable	Random effects
Price of output (log)	-0.11 (0.102)
Average wage (log)	0.21 (0.057)**
Minimum wage (log)	1.03 (0.087)**
Percentage of foreign ownership (-1)	0.0009 (0.0004)*
Capital stock (log -1)	0.0007 (0.001)
Firm Size (log -1)	0.048 (0.007)**
Percentage of goods exported (-1)	0.0009 (0.0002)**
No school (M)	-3.24 (0.926)**
Some primary (M)	-3.19 (0.925)**
Junior high (M)	-3.18 (0.924)**
Senior high (M)	-3.20 (0.925)**
Some college (M)	-3.42 (0.943)**
College (M)	-3.25 (0.939)**
No school (F)	-0.053 (0.506)
Some primary (F)	-0.0051 (0.505)
Junior high (F)	-0.0051 (0.505)
Senior high (F)	-0.046 (0.508)
Some college (F)	0.116 (0.553)
College (F)	(dropped)
Time dummies	Yes
Industry dummies	No
Province dummies	No
Number of observations	4,736
R ²	.30

Notes: *Indicates significance at the five per cent level and **at the one per cent level.

Table 9. Dependent variable: log average wage of skilled workers (1995-97)
(Reduced sample: Only textile, apparel, and footwear industries)

Variable	Random effects
Price of output (log)	-0.55 (0.195)**
Average wage (log)	0.30 (0.066)**
Minimum wage (log)	1.00 (0.139)**
Percentage of foreign ownership (-1)	0.0028 (0.0007)**
Capital stock (log -1)	0.005 (0.0024)*
Firm size (log -1)	0.16 (0.012)**
Percentage of goods exported (-1)	0.0013 (0.0004)**
High school or less (M)	-1.73 (1.76)
Some college (M)	-1.78 (1.75)
College (M)	-1.71 (1.76)
Masters (M)	-3.11 (2.06)
PhD (M)	-0.842 (2.26)
High school or less (F)	-0.607 (0.922)
Some college (F)	-0.63 (0.929)
College (F)	-0.71 (0.93)
Masters (F)	(dropped)
PhD (F)	13.63 (14.30)
Time dummies	Yes
Industry dummies	Yes
Province dummies	No
Number of observations	13,484
R ²	.2316

Notes: *Indicates significance at the five per cent level and **at the one per cent level.

5. General discussion and conclusions

Wage premiums paid by foreign establishments in Indonesia during the 1990s were found to be robust to the inclusion of worker characteristics, across specifications, within selected industries and in limited samples for which the foreign ownership variable changed significantly. Premiums for unskilled workers were mostly in the range of five per cent to ten per cent and between 20 per cent and 35 per cent for skilled workers. These findings are in line with other similar estimates using data from Central and South America, other parts of Asia, and Africa.

This paper provides strong evidence that foreign-owned companies do pay higher wages on average. The next question is why? As mentioned earlier, the dataset includes limited information on total training costs, and it reveals that foreign firms on average spend much more on training. This finding would support the view that foreign firms pay higher wages in order to retain workers, given their increased investment in training. However, we have no way of determining whether foreign firms have less turnover than domestic firms since we have no data on hires and fires, only on annual aggregate numbers of workers.

Although hard to quantify, political and social pressure on foreign firms should not be discounted. The anti-sweatshop movement of the 1990s, with its particular focus on companies like Nike, which operate in Indonesia, led to a number of large lawsuits, immense negative publicity, and eventually commitments by many firms to increase wages for the poorest workers.

Empirical studies such as these will surely not put an end to the heated debate surrounding globalization, and well they should not, but they can help to focus inquiry and potentially direct policy. As this paper and other studies demonstrate, it is wrong to claim that foreign firms pay the lowest wages in developing countries. In Indonesia, based on simple summary statistics, on average they paid very high wages compared to their domestic counterparts throughout the 1990s.

This being said, aside from the potential reputation and political considerations, perhaps the question of whether foreign firms pay more just because they are foreign is not the best one to ask. If higher productivity is largely responsible for higher wages, which is what most economic theory predicts, maybe it would be more fruitful to investigate the mechanisms, both at the firm level and the institutional level, that promote increased productivity. We may want to know whether productivity is largely a function of access to capital and technology, related to an infant-industry argument or perhaps linked to state-ownership. Given that many firms in developing countries are actually partnerships between various entities – private, both domestic and foreign, as well as public – isolating simply the foreign component may not tell us much. Furthermore, foreign ownership in and of itself is not particularly informative because there are hundreds of potential foreign owners each with varying levels of capital, technology, and management skills. It is probably not accurate to treat foreign ownership originating from Malaysia the same as foreign ownership originating from the United States. The exact nature by which productivity gains are correlated with foreign ownership is also unclear. It may simply be a linear function of the percent of foreign ownership but perhaps there may be discontinuities that come with majority ownership or non-linearities.

All of these questions and issues emphasize how difficult it is to study wage determination since it is based on very dynamic and complex processes, especially in

developing countries such as Indonesia which have recently undergone tremendous change; social, political, and economic. Narrowing the focus of research on more specific determinants of productivity growth within industries, or on the precise channels through which outside pressure may force firms to pay higher wages, might offer the best policy-relevant information. Given that in our model the variables which economic theory predicts are directly linked to productivity captured such a large portion of the wage premiums between foreign and domestic firms, and were significant in almost all specifications, this leads us to believe that we have an excellent foundation to build upon.

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