Foreign Direct Investment and Wages in Indonesian Manufacturing

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Abstract

This paper asks two types of questions. One is about the behavior of foreign-owned firms in Indonesian labor markets and the other is about the effect of the presence of foreign-owned firms on Indonesian wages. We ask first whether foreign-owned establishments pay more than locally-owned establishments for workers of a given quality, given the characteristics of the establishments such as their size, industry, and location. The answer is that foreign firms do pay more. The second is whether a larger presence of foreign-owned establishments results in higher wages overall and in locally-owned establishments. The answer is that higher foreign presence leads to higher wages in locally-owned establishments and, since the foreign establishments pay higher wages than locally-owned ones, that higher foreign presence raises the general wage level in a province and industry.

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Introduction

It seems to be a universal rule that, in every country, foreign-owned firms and establishments pay higher wages, on average, than domestically-owned ones. That is true not only in developing countries, but also in high-income countries, such as the United States and the United Kingdom. Part of the gap in average wages can be explained by industry composition. Foreign direct investment tends to take place in relatively high-wage industry sectors. However, the gap exists within industries as well; in most industries, in almost all countries, foreign-owned firms or establishments pay higher wages than domestically-owned ones.

These wage gaps raise two related questions. One is about the operation of labor markets and one is about policy toward inward investment.

The labor market question is whether foreign-owned operations face a higher price of labor, in the sense that they pay more for labor of a given quality, at least as measured by education and broad skill categories. They might do so for several reasons. One is that they may be forced to do so by host-country regulations or home country pressures. Another might be that workers have a preference for locally-owned employers. A third is that foreign-owned firms might wish to reduce employee turnover, because they invest more in training than locally-owned firms, or because they fear the leakage of their technological advantages if employees move to other employers.

The policy question is whether the wage level of an industry, a region, or a

whole country will be raised if a host country reduces the barriers to foreign firms or actively encourages them. Such an increase in wages could result from foreign firms paying a higher price for labor than domestic firms, as described above, but there could be impacts on wages even if foreign and domestic firms of the same size paid the same price for labor within any industry or region. The inflow of foreign firms might increase wages simply by raising the demand for labor. In addition, foreign firms might introduce new high-wage industries to a country or expand a country's high-wage, high-skill, sector. Foreign firms might, by introducing new or more advanced technology, cause the upgrading of average skill levels within industries. Foreign firms might shift the composition of establishment sizes in the industries in which they operate toward larger scale, higher wage operations.

In this paper, we attempt to shed light on both of these questions as they relate to the Indonesian manufacturing sector. The analysis is based on a cross-section of Indonesian manufacturing establishments in 1996. It has the advantage over most earlier studies of including data on the educational level of the employees in each plant.

The Indonesian Manufacturing Sector: Data sources and Description

Manufacturing production was of low importance in Indonesia as late as in the beginning of the 1980s, and the country depended heavily on the oil sector. Foreign firms were not viewed favorably, and their operations in Indonesia were

restricted. The hostility toward FDI was a heritage of Presidents Sukarno's campaign against foreign interests in Indonesia, which culminated in the nationalization of foreign firms in the 1950s. However, falling prices of oil and other raw materials in the mid 1980s forced the government to change its economic policies including a reduction in foreign investment regulations.[1] The reforms continued during the late 1980s and early 1990s, in part because of the emergence of China, Vietnam and other South East Asian countries as strong competitors for foreign investment. The severe economic crisis, starting in 1997, has led to further liberalization and deregulation of the Indonesian economy. For instance, the Indonesian government has been under pressure from the IMF to open new sectors of the economy to foreign firms.

All establishments in the manufacturing sector with more than 20 employees are included in the census by the Biro Pusat Statistik (Central Statistical Office). There were 22,997 establishments known to the Statistical Office in 1996. However, some of the establishments did not respond to the questionnaire and Statistical Office staff estimated their data from earlier responses and average changes within the same industries. We have excluded such estimated data from our analysis, leaving 19,911 establishment observations.

There is information for each establishment on detailed industry, type of ownership, value added, energy consumption, geographical location, and labor

[1] See e.g. Guillouet (1990), and Thee and Pangestu (1995).

characteristics, separately for white collar and blue collar employees. The information about the labor force includes number of employees, wages, and the distribution by level of education completed, less than primary, primary, junior high school, senior high school, and university.

Among manufacturing industries at the 2-digit ISIC level, Textiles, Apparel, and Leather (ISIC 32) is the largest in terms of both value added and employment (Table 1). That industry and Food, Beverages, and Tobacco (ISIC 31) together constitute almost 40 per cent of value added and over 50 per cent of employment in Indonesian manufacturing. Fabricated Metal Products (ISIC 38) is also of major importance in terms of value added.

The foreign share is defined as the share of production or employment in all establishments with any foreign ownership.[2] For Indonesian manufacturing as a whole the foreign shares are 16 per cent of employment and 30 per cent of value added, indicating an average output per employee in foreign operations around twice as high as in domestically-owned establishments. The foreign shares are relatively large in Basic Metal Industries, Fabricated Metal Products, and Other Manufactures, but small in such labor intensive industries as Foods, Beverages, and Tobacco, and Textiles, Apparel, and Leather. The highest government shares of employment are in Foods, Beverages, and Tobacco, Paper

[2] Most foreign-owned establishments are joint ventures with a foreign majority share. The average foreign share among establishments with any foreign ownership is 72 per cent. 23 per cent of the establishments have 100 per cent foreign ownership and 18 per cent a foreign minority share.

and Printing, and Chemicals, and of value added in the last two of those industries.

The high-wage industries in Indonesian manufacturing are Paper and Printing and the two metals industries, with Chemicals close behind. The low wage industries are Foods, etc. and Other Manufacturing (Table 2). On average, white- collar workers earn well over twice as much as blue- collar workers.

Earlier studies on Indonesia by Hill (1990) and Manning (1998, Ch. 6) observed that wages were, in general, relatively high in foreign establishments.[3] In our data for 1996, within three-digit industries, wages in foreign establishments are relatively high in all sectors except Basic Metal Industries (ISIC 37), and Other Manufactures (ISIC 39). The average wage in foreign establishments is between 22-26 per cent higher than in private domestic establishments within three-digit industries. That margin is slightly lower than the difference reported for Mexico, Venezuela, and the United States by Aitken, Harrison, and Lipsey (1996, Table 6). Finally, government owned establishments pay high blue- collar wages but low white- collar wages relative to private domestically- owned establishments.

Some of the explanation for the higher wages in foreign plants is evident in Tables 3 and 4, which give the distributions of blue-collar and white-collar

[3] There are exceptions. For instance, FDI from the Asian NIE in the 1990s do not always pay high wages Manning (1993).

employees by educational attainment. Among blue-collar employees, over 5 per cent of those in private and government domestic establishments had less than a primary education and more than 30 per cent only primary education, while in foreign-owned establishments, only 2 per cent had less than a primary education and 17 per cent only primary schooling. At the other end of the distribution, about a third of the employees in domestic establishments had stopped after completion of high school and only between 1-2.5 per cent had a university education, while more than half the employees of foreign-owned firms had completed high school and 3 per cent had a completed university education.

The difference in education among white-collar employees is mainly in the elementary school and university levels. Domestic establishments, particularly government-owned ones, had a high proportion of workers with only an elementary education, but only 13 per cent in private establishments and ii per cent in government establishments with completed university education, as compared to 19 per cent in foreign-owned establishments. Still, the figures indicate that the difference in education between employees in foreign and domestic establishments are lower for white collar than for blue collar workers, in contrast to the differences in wages.

Some other characteristics of foreign-owned and domestically-owned private plants are described in Table 5. Foreign-owned plants used more energy per worker and more of other current inputs per worker, by about the same margin.

They were also much larger in terms of average employment, almost five times as large as domestically-owned plants.[4]

Econometric Estimations

The figures above show wages in foreign establishments to be substantially higher than wages in domestic establishments. The result is in accordance with other studies on foreign ownership and wages. However, we have also seen that the educational levels of both blue- and white collar employees are higher in foreign than in domestic establishments and that foreign establishments use more inputs and are larger in size.

In examining the determinants of establishments' wage levels, we estimate an equation of the form:

$$\ln W = f(\textit{Foreign owner, Education, Sector, Location}, \ln X), \qquad (1)$$

where W is an establishment's wage (separately for blue and white collar employees), *Foreign owner* is a dummy variable for foreign ownership, *Education* is the education level of the employees (the share of the employees with primary,

[4] Capital stocks were reported but do not seem reliable. For instance, the ratio between foreign and domestic establishments' capital labor ratios went from about 3 in 1995 to 0.7 in 1996. One likely reason is that the Central Statistical Office changed the definition of capital stocks in the questionnaire for 1996. Apparently, the new definition did not yield satisfactory responses and the Statistical Office later returned to the old definition.

junior, senior, and university education), *Sector* and *Location* are dummy variables for industries and provinces, and *X* is a vector with establishment specific characteristics such as size and the use of inputs. Descriptive statistics for the variables are found in table A1.

Table 6 examines the effect of foreign ownership and education on wages. All the equations here assume that the premiums paid for each higher level of education to blue-collar and white-collar workers are identical across industries (3 digit level of ISIC), regions (provinces), and types of ownership.

Regressions 1 and 2 show that the higher average wages in foreign-owned establishments are not simply a reflection of higher labor quality, as measured by education. They represent a higher price for labor of a given quality, and by a large margin: a third for blue-collar workers and 70 per cent for white-collar workers.

The Indonesian labor market has become increasingly integrated during the 1990s (Manning, 1998). Most migration within the manufacturing sector is from the outer islands to industrial centers on Java, and the mobility of educated labor seems to be the highest. Still, Indonesia's vast archipelago and relatively poor communication means that some segmentation of the labor market is likely to remain. Moreover, FDI in Indonesia tends to be clustered in certain industries and regions (Sjöholm, 1999a, 1999b). We therefore add 3-digit industry and province dummy variables in Regressions 3 and 4, because we do not wish an industry or region wage effect due to historical development or to the location of government or

other industries, to masquerade as an effect of foreign ownership. That addition reduces the coefficients for foreign ownership and for each level of education. Use of the dummy variables produces a more conservative estimate of the effects of ownership, with some risk that effects of foreign ownership may disappear into some of the dummy variable coefficients. Even this form of the equations indicates that foreign firms pay a higher price for labor than domestic firms do. The foreign premium is about a quarter for blue-collar workers and over a half for white-collar workers.

As previously said, foreign-owned operations are clustered in a few provinces. More precisely, 80 per cent of value added in foreign owned establishments is produced in three provinces on Java – East Java, West Java, and Jakarta. As an alternative to using province dummy variables, we examined the difference between foreign and domestic establishments in these three provinces alone but the previous results remained largely unaffected (not shown).

Increased education has a positive effect on wages in all groups of establishments, and the differential for university education is particularly high. It seems to be higher, surprisingly, relative to both the omitted group (primary education completed) and to high school graduates, for blue-collar workers than for white-collar workers. The inclusion of the industry and province dummy variables reduces the university differential, as well as the foreign ownership differential.

Foreign-owned establishments tend to use energy, and other inputs more

intensively than do domestically-owned ones, as shown in Table 5. Those factor intensities should imply higher marginal productivity for workers in foreign-owned plants and higher wages on that account if labor markets are not perfectly competitive. Foreign-owned establishments are also much larger than domestically-owned plants, on average, and it is typical of most countries that larger plants pay higher wages than smaller ones. The possible influence of these characteristics is examined in Table 7.

The additional input variables all affect wage levels positively. Size, too, has the expected positive effect, and the degree of explanation of wage levels improves. The wage differentials for foreign ownership itself are still significant, but the coefficients are reduced. The remaining direct effect of foreign ownership is about 10 per cent higher wages for blue-collar workers and almost 25 per cent for white-collar workers. The implication of the reduction in the foreign ownership differential is that part of the gross differential operates through larger size and higher inputs per worker in foreign-owned plants.

Not only the foreign-ownership wage differential, but also the education premiums are reduced somewhat by the addition of the other input measures. That is more true for blue-collar than for white-collar workers and the difference suggests that some of the surprisingly large differentials in return to education may reflect plant characteristics, rather than education itself.

Table 8 analyzes some of the interrelationships between size and the other

variables by examining three size classes separately. The foreign establishment wage differential is insignificant in the smallest size class, partly because there are few foreign establishments there, only 31 in all industries combined. The differential is large in the medium size class, and significant even though, with only 111 foreign establishments, 30 industries, and 27 provinces, there are many cells empty of foreign establishments. The differential for the large establishments, the class containing most foreign operations, is similar to that in Table 7 for all establishments, and confirms that size alone is not the explanation of the higher wages in foreign plants..

The wage differentials for all levels of schooling except university completion are larger for white-collar than for blue-collar employees. Those for schooling below the university level do not differ greatly across establishment size classes. However, the differential for university education is much higher in the large establishments, especially for blue-collar employees.

The equations in the tables so far have assumed that education premiums are identical among all ownership groups. That assumption is tested in Table 9, which shows versions of equation 1 fitted to data for private domestic, government, and foreign plant workers separately.

In the private domestic sector, there are clear negative effects on wages from failure to complete elementary education. The coefficients in the foreign-owned sector are of similar size, but are not statistically significant,

perhaps because the number of observations for such workers is much smaller. In the government sector, the wage effects are much smaller than in the other two.

The largest differences by type of ownership are for university completion. The premiums are larger in government and foreign-owned establishments than in private domestic ones. And they are particularly large for blue-collar workers in those two sectors, well above the premium paid to white-collar workers for university completion.

There is evidence here that some of our assumptions, such as the equality of wage effects across different establishment sizes and types of ownership, are questionable. For example, education effects on wages are largest for foreign-owned establishments, and greater within the larger establishments than in others.

Does FDI affect wages in domestic establishments?

We have found that wages in foreign establishments are higher than in domestic establishments, even after differences in labor quality (employee education) and establishment characteristics are taken into account. FDI could also raise the wages of employees in domestic establishments even if there were no differential between wages in foreign-owned plants and those in domestic plants. That would be the case if labor markets were close to being perfectly competitive. For instance, foreign firms might raise the demand for labor or

increase competition in labor markets, and thereby force domestic establishments to increase wages. Moreover, technological externalities – spillovers – from FDI may increase productivity and, possibly, wages in domestic establishments.[5] Labor turnover, demonstration effects, or support of linkage industries may for instance cause such spillovers and raise the technological level in domestic establishments.

To examine the effect of FDI on wages in domestic establishments we estimate equation 1 from only domestic establishments, but add the variable *FDI*, which is the share of an industry's value added produced in foreign establishments. The foreign share is calculated at several different levels of the industrial classification, each implying a different definition of a labor market. Equations with foreign shares measured at a 2-digit ISIC level imply that a labor market consists of workers throughout Indonesia within a 2-digit industry. It assumes that workers move freely among firms and among the 3-digit and 5-digit components of a two-digit industry, but not from one 2-digit industry to another. When the share is calculated at a 3-digit level, the implication is that workers do not move from one 3-digit sub-industry to another, even within the same 2-digit industry, but do move among 5-digit industries. The equations with five-digit ISIC industry shares assume labor mobility only within single 5- digit industries, implying that five-digit industries define labor markets in which foreign and

[5] Blomström and Sjöholm (1999) and Sjöholm (1999a, 1999c) find spillovers from FDI on domestic establishments' productivity in Indonesia.

domestic firms compete for labor.

We would expect the coefficient for the *FDI* share to be positive and statistically significant if FDI leads to higher wages in domestic establishments. That expectation is strongly confirmed in Table 10, whatever the level at which the FDI shares are calculated. While the coefficients for the other variables are not much affected by the level used for the FDI share variable, the FDI coefficient is greatly diminished as the industrial classification becomes more detailed. One might expect the opposite result if competition for labor were most severe among firms in the same narrow industry. However, the narrowing of the classification may have the effect of removing many cases of foreign and domestic firms similar in other characteristics co-existing in the same industry.

The potential impact on wages from FDI may be conditioned on geographic proximity. For instance, previous studies of patent citations suggest that technological spillovers benefit mainly other actors in the same region (Jaffe et al 1993). We therefore calculate an alternative measure of FDI – *FDI province* – which is the share of an industry's output in a province that is produced in foreign establishments. We would expect a positive and statistically significant coefficient on *FDI province* if foreign firms affect wages in domestic establishments in the same industry within the same province.

Table 11 shows equations for wages in domestic establishments where the FDI share is measured within each province. In the first equation of each set,

white- collar and blue-collar, the implicit assumption is that labor is mobile among industries within a province, but not across provinces. Therefore, the effect of FDI presence in any industry is felt in all industries in the same province. The *FDI share coefficient* at the province level is positive and statistically significant, and about the same size as the national FDI share variable at the 2-digit level in Table 10. The next pair of equations, with the FDI share in the province calculated at the two-digit ISIC level, implies that FDI presence affects wages only within the same two-digit industry in the same province. The coefficients for FDI share are again statistically significant, but much smaller, though one might expect the effect to be stronger within the same two-digit industry than across all industries in a province. As the industry breakdown becomes finer, the coefficients on FDI share decrease further, but they are always significant.

Conclusions

The clearest labor market conclusion from our analysis is that foreign-owned establishments in Indonesia pay a higher price for labor than domestically-owned establishments. They pay higher wages for workers of a given educational level, by a margin of about a quarter for blue-collar workers and over a half for white-collar workers. Furthermore, those higher wages for workers of a given educational level do not reflect only the greater size and larger inputs per worker in foreign plants, or their industry or location. Even taking

account of all these factors, wages in foreign-owned plants are about 10 per cent higher than in private domestic plants for blue-collar workers and by more than 20 per cent for white-collar workers.

Foreign ownership in an industry, or an industry within a region, could affect wages in domestic plants, or in all plants taken together, even if there were no differential in wage levels between foreign and domestic plants. Higher foreign ownership in an industry, or in a province, or in an industry in a province, appears to raise the level of wages in domestically-owned plants for workers of a given educational level. It raises their wages aside from the influence of plant size and the extent of energy and other inputs.

Since higher foreign presence raises the level of wages in domestically-owned plants, and foreign-owned plants pay higher wages than domestically-owned plants, higher foreign presence must act to raise the wage level for all plants, domestic and foreign, taken together. This effect on wages is in addition to the effect of the larger average size of foreign-owned plants and their typically higher average inputs of other factors of production.

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Table 1. Descriptive statistics of the Indonesian manufacturing industry in 1996 at a 2-digit level of ISIC.

		Sector's share of		Private domestic share of sector's		Government share of sector's		Foreign share of sector's	
Sector	ISIC	Value added (%)	Employ-ment (%)	Employ-ment (%)	Value added (%)	Employ-ment (%)	Value added (%)	Employ-ment (%)	Value added (%)
Total		100	100	76.2	59.5	7.3	10.8	16.5	29.6
Food	31	17.3	21.2	75.7	69.7	17.7	14.4	6.6	15.9
Textiles	32	20.8	30.6	75.5	71.3	1.8	1.7	22.7	27.0
Wood, Furniture	33	12.7	14.5	89.3	75.0	1.1	0.7	9.6	24.3
Paper, Printing	34	6.2	3.6	76.9	45.7	11.2	24.2	11.9	30.1
Chemicals	35	13.3	11.5	75.2	51.9	12.9	24.6	11.9	23.6
Non-Metallic Mineral	36	6.3	4.7	83.4	47.4	5.9	14.0	10.6	38.6
Basic Metal Industries	37	4.5	1.2	69.5	48.1	4.4	1.6	26.1	50.3
Fabricated Metal Prod	38	17.7	11.0	61.3	43.5	5.8	12.2	32.9	44.4
Other Manufacturing	39	1.1	1.7	67.0	47.3	0.2	0.1	32.8	52.6

Table 2. Wages in the Indonesian manufacturing sector in 1996 at a 2-digit level of ISIC.

	Average Wage – 1000 Ruphias			Ratio of average wages			
	Total	Blue Collar	White Collar	Blue Collar	White Collar	Blue Collar	White Collar
ISIC				Government / Private	Government / Private	Foreign / Private	Foreign / Private
Total	2556	2133	4637	1.05	0.61	1.22	1.26
31	1957	1657	2933	0.90	0.70	1.63	2.00
32	2298	1995	4845	1.17	1.41	1.32	1.15
33	2183	1930	3805	0.95	0.78	1.15	1.21
34	3504	3025	4989	3.1	1.60	1.73	1.15
35	3201	2408	5792	1.67	0.73	1.84	1.74
36	2765	2243	5173	1.79	1.13	2.35	1.61
37	5314	4502	8093	1.07	0.61	1.12	0.90
38	3522	2848	6603	1.80	1.24	1.49	1.67
39	1888	1621	4129	0.72	0.20	0.93	0.98

Note: Sector names are found in table 1. Average wage in the first three columns have been calculated as aggregate average. Average wages for different ownership groups (column 4-7) have been calculated at a three 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.

Table 3. Educational level of blue collar workers in 1996 at a 2-digit level of ISIC (per cent of total employees).

	Private-domestic establishments				Government-domestic establishment				Foreign establishments			
ISIC	Primary	Junior High School	Senior High School	University	Primary	Junior High School	Senior High School	University	Primary	Junior High School	Senior High School	University
Total	31.7	28.7	32.2	1.2	30.7	25.9	35.6	2.5	16.6	25.4	53.0	3.0
31	43.9	22.7	17.9	1.0	39.6	15.6	32.2	1.5	22.3	23.0	48.9	2.8
32	30.7	34.1	31.7	0.7	25.6	37.0	34.8	1.6	16.9	35.5	45.8	1.4
33	28.1	29.2	36.4	0.8	31.7	25.9	34.9	0.6	20.8	25.0	50.0	1.0
34	20.0	27.6	47.2	2.8	22.8	14.6	57.3	5.1	7.1	14.8	67.2	10.4
35	30.8	30.1	31.7	1.3	35.9	24.6	25.0	2.9	14.4	21.0	55.9	4.0
36	43.9	19.6	22.8	1.4	58.7	13.8	22.2	1.9	20.9	23.6	49.4	1.9
37	14.6	27.8	53.4	3.3	14.7	22.0	57.8	3.6	13.4	23.5	59.3	3.8
38	19.6	26.8	49.6	2.2	13.4	26.6	50.0	8.1	4.3	13.0	75.3	7.3
39	35.3	35.2	24.6	0.7	36.1	24.1	38.6	1.2	17.6	31.7	47.6	0.5

Note: Sector names are found in table 1. The groups do not sum up to 100 per cent since some employees have not finished primary school. Educational level for different ownership groups have been calculated at a three digit level of ISIC and aggregated up to a 2 digit level of ISIC using shares of total blue collar employees as weights.

Table 4. Educational level of white collar workers in 1996 at a 2-digit level of ISIC (per cent of total employees).

	Private-domestic establishments				Government-domestic establishment				Foreign establishments			
ISIC	Primary	Junior High School	Senior High School	University	Primary	Junior High School	Senior High School	University	Primary	Junior High School	Senior High School	University
Total	13.7	16.5	53.4	13.3	22.6	17.4	42.1	10.9	10.3	13.8	51.1	19.4
31	22.6	17.4	45.4	8.8	40.5	19.7	25.9	2.9	14.3	13.8	42.5	17.4
32	8.9	17.5	60.0	12.9	12.9	24.3	51.4	10.8	8.4	14.6	62.4	14.3
33	11.8	17.8	58.5	10.3	17.6	15.1	52.5	11.1	10.3	17.9	59.9	10.8
34	8.6	12.2	57.2	20.8	18.4	14.4	51.7	15.4	6.7	11.8	57.4	23.4
35	14.2	16.2	49.1	15.5	20.8	10.0	41.5	8.6	11.9	12.1	40.4	25.2
36	11.6	21.2	51.8	12.8	19.1	18.5	45.1	16.5	8.7	12.7	46.7	30.6
37	5.9	11.9	63.2	18.6	5.3	6.8	59.1	28.8	7.1	12.2	60.5	19.8
38	5.7	13.6	59.9	20.2	8.1	18.0	48.5	25.3	4.5	12.1	57.6	25.7
39	7.3	11.8	63.2	16.4	15.8	10.5	52.6	21.1	6.0	15.5	60.2	18.0

Note: Sector names are found in table 1. The groups do not sum up to 100 per cent since some employees have not finished primary school. Educational level for different ownership groups have been calculated at a three digit level of ISIC and aggregated up to a 2 digit level of ISIC using shares of total white collar employees as weights.

Table 5. Inputs per employee (1000-Ruphias) and size in 1996 at a 2-digit level of ISIC.

	Average inputs per employee and size			Ratio between government-domestic and private-domestic establishments			Ratio between foreign and private-domestic establishments		
ISIC	Size	Energy/L	Inputs/L	Size	Energy/L	Inputs/L	Size	Energy/L	Inputs/L
Total	164	913	27,984	1.96	1.07	0.84	4.86	1.92	1.93
31	123	547	31,188	4.04	1.00	0.38	3.27	1.92	1.97
32	228	490	17,901	1.83	0.32	1.00	12.24	2.12	1.37
33	175	622	20,548	0.49	0.48	0.79	1.69	1.15	2.15
34	143	2,331	39,585	4.47	3.65	1.48	4.83	5.01	1.24
35	179	996	39,632	2.19	1.72	0.71	1.70	1.21	2.12
36	79	5,180	20,379	1.82	1.34	1.73	2.62	1.90	2.42
37	292	5,351	98,539	1.26	0.33	1.19	1.27	1.43	1.25
38	179	394	41,919	3.71	0.34	1.18	3.88	1.37	2.45
39	144	119	12,514	0.48	0.15	0.54	4.62	1.55	1.23

Note: Sector names are found in table 1. Size is measured as average number of employees; Energy- and Inputs per employee are in 1000 Ruphias per employee. The figures have been calculated at a three digit level of ISIC and aggregated up to a 2 digit level of ISIC using shares of total employees as weights.

Table 6. The relation of average establishment wage to ownership and education (dependent variable – average wage per employee).

Variable	Regression 1	Regression 2	Regression 3	Regression 4
	Blue Collar	White Collar	Blue Collar	White Collar
Constant	6.93 (638.91)***	7.03 (284.42)***	7.31 (447.54)***	7.39 (247.02)***
Below Primary	-0.48 (14.37)***	-0.48 (6.68)***	-0.24 (8.47)***	-0.38 (5.94)***
Junior High	0.41 (19.07)***	0.47 (13.88)***	0.25 (12.88)***	0.41 (13.15)***
Senior High	0.68 (36.19)***	0.80 (29.70)***	0.44 (23.73)***	0.63 (25.11)***
University	1.85 (12.65)***	1.55 (38.72)***	1.59 (11.40)***	1.29 (32.37)***
Government owner	0.18 (4.94)***	0.15 (3.89)**	0.19 (5.74)***	0.16 (4.11)***
Foreign owner	0.36 (15.83)***	0.69 (22.61)***	0.27 (12.50)***	0.56 (18.63)***
Industry Dummies	--	--	estimated	estimated
Province Dummies	--	--	estimated	estimated
Adjusted R-sq	0.18	0.22	0.40	0.31
Number of obs.	19,579	15,208	19,579	15,208

Note: t-statistics within brackets are based on White's (1980) adjustment for heteroscedasticity. *) Significant at the 10 percent level, **) Significant at the 5 percent level, ***) Significant at the 1 percent level.

Table 7. The relation of average establishment wage to ownership, education, and establishments characteristics (dependent variable – average wage per employee).

Variable	Regression 1	Regression 2
	Blue Collar	White Collar
Constant	5.85 (151.08)***	5.56 (105.67)***
Below Primary	-0.20 (7.33)***	-0.33 (5.52)***
Junior High	0.15 (8.28)***	0.34 (11.79)***
Senior High	0.17 (9.35)***	0.49 (20.72)***
University	1.14 (9.79)***	0.92 (25.01)***
Government owner	0.11 (3.44)***	-0.11 (2.82)***
Foreign owner	0.11 (5.38)***	0.22 (7.36)***
Energy per worker	0.05 (16.28)***	0.05 (10.44)***
Inputs per worker	0.12 (32.52)***	0.12 (25.12)***
Size	0.02 (5.49)***	0.14 (24.65)***
Industry Dummies Province Dummies	estimated estimated	estimated estimated
Adjusted R-sq Number of obs.	0.47 18,460	0.40 14,615

Note: t-statistics within brackets are based on White's (1980) adjustment for heteroscedasticity. *) Significant at the 10 percent level, **) Significant at the 5 percent level, ***) Significant at the 1 percent level.

Table 8. Determinants of average wage in establishments of different size (dependent variable – average wage per employee).

	Small establishments – below 28 employees		Medium sized establishments – between 28-70 employees		Large establishments – above 70 employees	
Variables	Blue Collar	White Collar	Blue Collar	White Collar	Blue Collar	White Collar
Constant	6.19 (32.68)***	5.22 (19.34)***	6.14 (54.20)***	5.51 (36.62)***	5.73 (77.30)***	5.61 (51.33)***
Below Primary	-0.20 (5.48)***	-0.33 (4.24)***	-0.16 (3.55)***	-0.28 (2.88)***	-0.13 (1.91)*	-0.31 (2.07)***
Junior	0.17 (5.83)***	0.29 (7.28)***	0.14 (4.68)***	0.32 (6.88)***	0.16 (3.77)***	0.40 (5.01)***
Senior	0.23 (6.58)***	0.46 (12.85)***	0.20 (6.20)***	0.48 (12.68)***	0.19 (5.70)***	0.50 (8.08)***
University	0.67 (3.39)***	0.65 (10.44)***	0.86 (3.37)***	0.74 (12.72)***	1.40 (9.20)***	1.20 (15.83)***
Government	-0.02 (0.25)	-0.35 (2.52)**	0.07 (0.95)	-0.06 (0.55)	0.13 (3.52)***	-0.05 (1.18)
Foreign	0.22 (1.92)*	0.11 (0.80)	0.22 (3.93)***	0.38 (4.54)***	0.10 (4.44)***	0.19 (5.89)***
Energy	0.07 (11.90)***	0.08 (8.76)***	0.05 (8.91)***	0.06 (7.48)***	0.05 (8.81)***	0.03 (3.99)***
Inputs	0.12 (16.85)***	0.09 (9.91)***	0.11 (16.77)***	0.11 (13.65)***	0.13 (19.82)***	0.14 (16.78)***
Size	-0.09 (1.65)*	0.31 (3.56)***	-0.01 (0.43)	0.18 (5.35)***	0.04 (4.87)***	0.12 (10.68)***
Industry Province	estimated estimated	estimated estimated	estimated estimated	estimated estimated	estimated estimated	estimated estimated
No foreign Adj R-sq No of obs	31 0.50 6,175	31 0.36 3,679	111 0.51 6,121	111 0.37 4,973	840 0.38 6,164	840 0.31 5,963

Note: t-statistics within brackets are based on White's (1980) adjustment for heteroscedasticity. *) Significant at the 10 percent level, **) Significant at the 5 percent level, ***) Significant at the 1 percent level.

Table 9. Determinants of average wage in establishments of different ownership (dependent variable – average wage per employee).

Variable	Private-Domestic		Government-Domestic		Foreign	
	Blue Collar	White Collar	Blue Collar	White Collar	Blue Collar	White Collar
Constant	7.30 (442.30)***	7.38 (242.35)***	7.26 (38.71)***	7.43 (27.61)***	7.67 (67.87)***	8.34 (35.23)***
Below primary	-0.24 (8.51)***	-0.39 (6.03)***	0.09 (0.43)	-0.12 (0.40)	-0.26 (1.13)	-0.32 (0.82)
Junior High	0.25 (12.87)***	0.41 (13.00)***	0.55 (2.49)**	0.45 (1.72)*	0.10 (0.73)	0.22 (0.76)
Senior High	0.44 (22.83)***	0.64 (24.92)***	0.82 (5.40)***	0.59 (3.49)***	0.40 (4.72)***	0.41 (2.00)**
University	1.30 (8.96)***	1.25 (30.70)***	2.53 (4.06)***	1.66 (5.00)***	2.76 (6.75)***	1.58 (6.92)***
Industry Dummies Province Dummies	estimated estimated	estimated estimated	estimated estimated	estimated estimated	estimated estimated	estimated estimated
Adjusted R-sq Number of obs.	0.39 18160	0.28 13862	0.26 477	0.09 436	0.30 942	0.24 910

Note: t-statistics within brackets are based on White's (1980) adjustment for heteroscedasticity. *) Significant at the 10 percent level, **) Significant at the 5 percent level, ***) Significant at the 1 percent level.

Table 10. FDI and wages in domestic establishment (dependent variable – average wage per employee).

	Regression 1	Regression 2	Regression 3	Regression 4	Regression 5	Regression 6
	Blue collar	Blue collar	Blue collar	White collar	White collar	White collar
Constant	5.05	5.43	5.48	4.91	5.16	5.19
	(114.24)***	(143.64)***	(149.94)***	(87.27)***	(98.11)***	(101.42)***
Below Primary	-0.39	-0.43	-0.43	-0.42	-0.44	-0.43
	(12.77)***	(13.33)***	(13.30)***	(6.27)***	(6.31)***	(6.14)***
Junior High	0.29	0.32	0.32	0.37	0.38	0.38
	(14.33)***	(15.37)***	(15.47)***	(11.85)***	(11.98)***	(11.95)***
Senior High	0.28	0.37	0.37	0.59	0.62	0.61
	(15.09)***	(19.65)***	(19.71)***	(23.56)***	(24.50)***	(24.38)***
University	0.98	1.06	1.04	1.00	1.07	1.06
	(8.25)***	(8.91)***	(8.78)***	(26.48)***	(28.26)***	(28.05)***
Energy	0.04	0.05	0.05	0.05	0.05	0.05
	(13.68)***	(14.88)***	(15.14)***	(10.56)***	(10.69)***	(11.18)***
Inputs	0.16	0.14	0.14	0.13	0.12	0.12
	(39.38)***	(36.97)***	(36.71)***	(26.70)***	(24.84)***	(24.54)***
Size	0.02	0.02	0.02	0.16	0.16	0.16
	(4.61)***	(4.41)***	(4.35)***	(26.30)***	(26.67)***	(26.35)***
Government	0.10	0.05	0.06	-0.16	-0.18	-0.17
	(3.02)***	(1.59)	(1.71)*	(4.06)***	(4.80)***	(4.39)***
FDI–2digit	1.29	---	---	1.05	---	---
	(26.13)***			(16.52)***		
FDI-3digit	---	0.33	---	---	0.34	---
		(7.44)***			(5.35)***	
FDI-5digit	---	---	0.15	---	---	0.35
			(7.15)***			(11.31)***
Adjusted R-square	0.30	0.27	0.27	0.31	0.30	0.30
Number of observations	17,550	17,550	17,550	13,735	13,735	13,735

Note: t-statistics within brackets are based on White's (1980) adjustment for heteroscedasticity. *) Significant at the 10 percent level, **) Significant at the 5 percent level, ***) Significant at the 1 percent level.

Table 11. FDI in the province and wages in domestic establishment (dependent variable – average wage per employee).

	Blue	Blue collar	Blue collar	Blue	White	White	White	White
Constant	5.33	5.44	5.48	5.49	5.00	5.16	5.20	5.22
	(145.49)***	(147.48)***	(150.36)***	(150.63)***	(97.71)***	(100.51)***	(101.72)***	(102.37)***
Below Primary	-0.38	-0.42	-0.42	-0.42	-0.38	-0.43	-0.42	-0.42
	(12.43)***	(13.14)***	(13.24)***	(13.24)***	(5.66)***	(6.25)***	(6.15)***	(6.07)***
Junior High	0.31	0.32	0.32	0.31	0.38	0.38	0.38	0.38
	(15.45)***	(15.77)***	(15.59)***	(15.28)***	(12.21)***	(11.94)***	(12.12)***	(12.00)***
Senior High	0.37	0.38	0.38	0.37	0.59	0.62	0.62	0.62
	(19.79)***	(20.37)***	(20.08)***	(19.91)***	(24.27)***	(24.57)***	(24.71)***	(24.49)***
University	1.05	1.07	1.09	1.06	1.02	1.06	1.07	1.06
	(8.72)***	(8.97)***	(9.08)***	(8.76)***	(27.62)***	(28.21)***	(28.56)***	(28.28)***
Energy	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05
	(13.35)***	(14.91)***	(15.04)***	(15.32)***	(10.34)***	(10.72)***	(10.63)***	(11.13)***
Inputs	0.14	0.14	0.14	0.14	0.12	0.12	0.12	0.12
	(37.08)***	(37.16)***	(36.41)***	(36.75)***	(25.25)***	(25.24)***	(24.43)***	(24.72)***
Size	0.01	0.02	0.02	0.02	0.15	0.16	0.16	0.15
	(2.15)**	(3.63)***	(4.29)***	(3.65)***	(26.14)***	(26.39)***	(26.73)***	(25.88)***
Government	0.09	0.06	0.05	0.06	-0.15	-0.17	-0.18	-0.17
	(2.76)***	(1.94)*	(1.59)	(1.89)*	(3.85)***	(4.55)***	(4.80)***	(4.38)***
FDI province – all sectors	1.10	---	---	---	1.23	---	---	---
	(33.89)***				(28.43)***			
FDI province–2digit	---	0.52	---	---	---	0.54	---	---
		(15.14)***				(12.38)***		
FDI province-3digit	---	---	0.41	---	---	---	0.45	---
			(13.62)***				(12.21)***	
FDI province-5digit	---	---	---	0.25	---	---	---	0.38
				(11.64)***				(13.10)***
Adjusted R-square	0.31	0.28	0.27	0.27	0.34	0.31	0.31	0.31
Number of obs.	17,550	17,550	17,550	17,550	13,735	13,735	13,735	13,735

Note: t-statistics within brackets are based on White's (1980) adjustment for heteroscedasticity. *) Significant at the 10 percent level, **) Significant at the 5 percent level, ***) Significant at the 1 percent level.

Table A1. Descriptive statistics.

Variable	Mean	Standard Deviation	Minimum	Maximum
Blue collar wages per empl. (1000 Rp)	287360.73	1376663.06	302.00	75769296.00
White collar wages per empl.(1000 Rp)	63340.17	737704.50	72.00	30152036.00
Blue collar below primary (share)	0.10	0.20	0.0	1.0
Blue collar primary school (share)	0.42	0.32	0.0	1.0
Blue collar junior high school (share)	0.26	0.23	0.0	1.0
Blue collar senior high school (share)	0.21	0.27	0.0	1.0
Blue collar university (share)	0.01	0.04	0.0	1.0
White collar below primary (share)	0.03	0.13	0.0	1.0
White collar primary school (share)	0.14	0.26	0.0	1.0
White collar junior high school (share)	0.19	0.27	0.0	1.0
White collar senior high school (share)	0.53	0.36	0.0	1.0
White collar university (share)	0.12	0.21	0.0	1.0
Energy per employee (1000 Ruphias)	4.96	1.67	0.0	11.10
Inputs per employee (1000 Ruphias)	8.47	1.59	1.63	14.05
Size (number of employees)	4.07	1.15	2.48	10.18
Foreign owner (dummy variable)	0.05	0.21	0.0	1.0
Government owner (dummy variabe)	0.02	0.15	0.0	1.0
FDI-2digit (share)	0.27	0.10	0.16	0.53
FDI-3digit(share)	0.22	0.09	0.0	0.82
FDI-5-digit (share)	0.18	0.19	0.0	1.0
FDI province-all sectors (share)	0.25	0.14	0.0	0.61
FDI province-2digit (share)	0.15	0.13	0.0	1.0
FDI province-3digit (share)	0.13	0.15	0.0	1.0
FDI province-5digit (share)	0.13	0.22	0.0	1.0