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## 16 Do foreign-owned firms pay more? Evidence from the Indonesian manufacturing sector

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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 *Citizen Works* website

### 1 Introduction

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 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 2002, 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 an extensive literature and numerous empirical studies have examined the links between foreign ownership and wages. Aitken, Harrison, and Lipsey (1996) compared wages and foreign ownership in Mexico, Venezuela, and the USA in the late 1970s through 1990 and consistently found evidence that foreign firms paid more

than their domestic counterparts, in the range of 20–30%, even after controlling for size, geographic location, skill mix, and capital intensity. They also found little evidence of wage spillovers from foreign to domestic owned firms in Venezuela and Mexico, despite the belief that an infusion of technological knowledge into developing countries leads to increased productivity within industries.

Using data from 1970 to 1996 Ramstetter (1999) found evidence that average worker productivity was significantly higher in foreign-owned firms in Hong Kong, Indonesia, Taiwan, Malaysia, and Singapore 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 to 1993 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 to 30%, 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, they did not control for worker education levels.

Udomsaph (2002) used a similar approach as the one in this paper 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 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 premia 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 1990–1999. In addition, we control for detailed worker characteristics in the years 1995–1997 in order to analyze 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 5 to 10%, once education levels and gender enter the equation. However, high wage premiums between 20 and 30% 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 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 BPS (Badan Pusat Statistik). 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 10-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 nonsensical 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 skepticism on the part of most economists, Currie and Harrison (1997) found self-reported non-compliance rates of up to 50% in Morocco, presumably due to a lack of enforcement or fear of penalties as well.

Figure 16.1 shows the percentage of foreign-owned firms (firms with any positive level of foreign ownership) and domestic firms which report average wages for unskilled workers which fall below the minimum wage between 1990 and 1999. Although a significant percentage of both types of firm 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

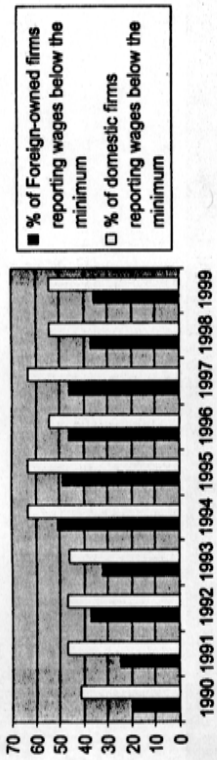


Figure 16.1 Non-compliance with the minimum wage laws 1990-1999.

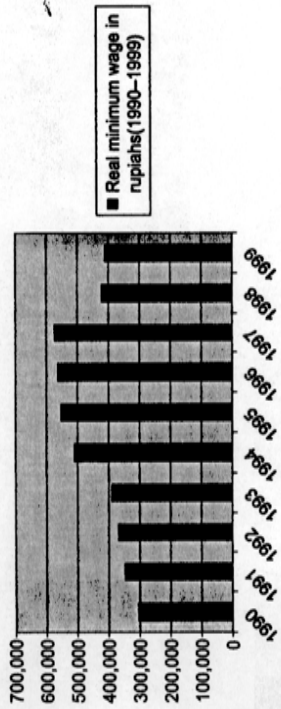


Figure 16.2 Real minimum wage in rupiahs (1990-1999).

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 2% to almost 6%.

Figure 16.2 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 USA) the nominal levels remain constant for a number of years but in Indonesia 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.

Figures 16.3 and 16.4 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.

Tables 16.1 and 16.2 present 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%), the average level of foreign

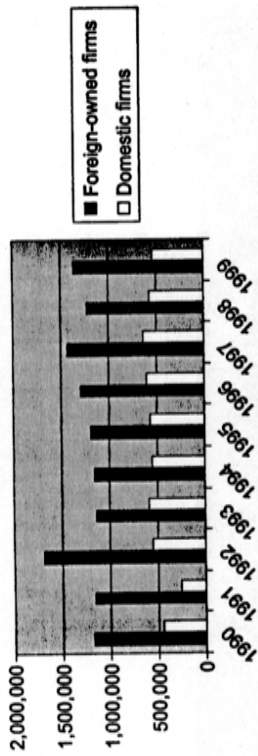


Figure 16.3 Average real wages paid to unskilled workers in rupiahs (1990-1999).

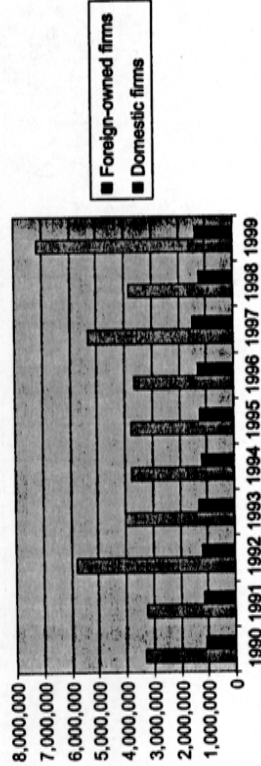


Figure 16.4 Average real wages paid to skilled workers in rupiahs (1990-1999).

Table 16.1 Summary statistics 1990

| Variable                    | # Obs  | Mean | Std dev. | Min | Max       |
|-----------------------------|--------|------|----------|-----|-----------|
| Firm ID                     | 11,051 |      |          |     |           |
| Unskilled workers           | 11,051 | 125  | 480      | 2   | 36,874    |
| Skilled workers             | 11,051 | 24   | 125      | 0   | 6,965     |
| % foreign ownership         | 11,051 | 1.3  | 9.9      | 0   | 100       |
| % goods exported            | 11,051 | 7.9  | 24.4     | 0   | 100       |
| Age of firm (years)         | 11,022 | 12   | 11       | 0   | 90        |
| Average wage (prod 000)     | 11,051 | 677  | 362      | 120 | 1,920     |
| Average wage (non-prod 000) | 11,051 | 1471 | 1,024    | 120 | 5,509     |
| Capital value (000)         | 11,051 | 1578 | 62,600   | 0   | 6,440,000 |

ownership from 1.3 to 4.4% (up 240%), and the average percentage of goods exported from 7.9 to 11.2% (up 42%). 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%), the average number of skilled workers actually fell (possibly signaling a shift to low-skilled production) from 95 to 69 (a drop of more than 27%), the average percentage of foreign ownership increased from 67 to 78% (up 16%), the average level of exports increased slightly from 30 to 34% (up 13%), while the percentage of firms with

Table 16.2 Summary statistics 1999

| Variable                    | # Obs  | Mean  | Std dev | Min | Max       |
|-----------------------------|--------|-------|---------|-----|-----------|
| Firm ID                     | 19,583 |       |         |     |           |
| Unskilled workers           | 19,853 | 154   | 577     | 0   | 33,797    |
| Skilled workers             | 19,853 | 27    | 113     | 0   | 4,009     |
| % foreign ownership         | 15,784 | 4.4   | 18.8    | 0   | 100       |
| % goods exported            | 15,773 | 11.2  | 29.4    | 0   | 100       |
| Age of firm                 | 15,784 | 16    | 18      | 0   | 99        |
| Average wage (prod 000)     | 15,783 | 2,720 | 1,406   | 548 | 8,069     |
| Average wage (non-prod 000) | 12,526 | 5,481 | 4,685   | 555 | 30,100    |
| Capital value (000)         | 15,784 | 1,170 | 46,800  | 0   | 5,340,000 |

any export activities at all remained in the range of 40 to 50% throughout the decade. At the same time the average number of unskilled workers in domestic firms increased from 118 to 133 (up 13%), the average number of skilled workers stayed almost exactly the same at 24, the average level of exports rose from 7.5% to 9.8% (up 30%), and the percentage of firms with any exports stayed in the range of 11% to 13%.

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 the 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 increases in wages.

### 3 The empirical framework

We begin with the assumption that both domestic and foreign firms in Indonesia face the same labor market. In line with standard economic theory, firms should pay a wage equal to the marginal revenue product of labor, which is the marginal productivity of labor times the price of output. Therefore, assuming two inputs, labor and capital, firms will pay higher wages the more capital they employ (since the marginal productivity of labor is increasing in capital) 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 1999). 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 employing 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.

This framework would not predict any systematic differences between wages paid by different types of firm 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, alternative wages paid by competitors, as well as a desire to prevent shirking may cause firms to pay a variety of wages 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 behavior have been documented extensively in the labor economics literature and are increasingly being used to explain many common labor 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 a 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 favor 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 did not state the prices they received directly we use the Indonesian Census Bureau's manufacturing index which provides average annual prices for output based on five-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 minimum wage laws, which differ within provinces, will presumably also effect 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  $\epsilon_i$  is an i.i.d. disturbance term and the signs above the betas indicate the predicted signs of the coefficients:

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

Higher worker characteristics, as measured by levels of education (included in a subset of the data from 1995-7), 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; rupiahs divided by the CPI. In line with common economic practice, region, time, and industry-level dummy variables are included since there may be particular types of law, constraint, or added cost 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 16.3 shows the results for the entire sample (1990-9), 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.

In the OLS specification all of the coefficients on the independent variables have the expected sign and are all significant at the 1% level besides age and exports. The magnitude of the foreign ownership coefficient suggests that a firm which is 100% foreign-owned would on average pay a wage premium to unskilled workers of 18%. However, in the fixed effects specification, which is likely to be the more accurate model since there are probably unobserved firm characteristics such as management styles or country of main foreign investor which do not change over time and yet influence the estimates, the effect of foreign ownership, while still significant at the 5% level, is severely muted. A firm with 100% foreign ownership would only provide a wage for unskilled workers on average about 5% more than a similar domestic

Table 16.3 Dependent variable: log average wage of unskilled workers (1990-9)

|                          | OLS                   | Fixed effects         |
|--------------------------|-----------------------|-----------------------|
| Firm age                 | -0.00057<br>(0.00046) |                       |
| Price of output (log)    | 0.070<br>(0.0178)**   | 0.023<br>(0.0099)*    |
| Average wage (log)       | 0.053<br>(0.0233)*    | 0.021<br>(0.0083)**   |
| Minimum wage (log)       | 0.39<br>(0.0773)**    | 0.17<br>(0.0140)**    |
| % foreign ownership (-1) | 0.0018<br>(0.00024)** | 0.0005<br>(0.00018)** |
| Capital stock (log -1)   | 0.0043<br>(0.00089)** | -0.00024<br>(0.00026) |
| Firm size (log -1)       | 0.064<br>(0.0074)**   | -0.0001<br>(0.00006)  |
| % goods exported (-1)    | -0.00005<br>(0.00016) | -0.00022<br>(0.00033) |
| Time dummies             | Yes                   | Yes                   |
| Industry dummies         | Yes                   | Yes                   |
| Province dummies         | Yes                   | No                    |
| Number of observations   | 71,130                | 71,130                |
| R <sup>2</sup>           | .2872                 | .1113                 |

\* Indicates significance at the 5% level and \*\* at the 1% level

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 10-year period; almost always reflecting a shift to a similar type of production within the same general manufacturing category.

Table 16.4 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 1% level except price of output and average wage. The coefficient on foreign ownership is even more pronounced, suggesting a wage premium of 31% 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 7%.

Table 16.5 presents the OLS estimates of the reduced sample for the years 1995-7 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 Ph.D. for skilled workers.

All of the coefficients on the main variables have the expected signs and most are significant at the 5% or 1% levels. The only education variables

Table 16.4 Dependent variable: log average wages of skilled workers (1990-9)

|                          | OLS                    | Fixed effects         |
|--------------------------|------------------------|-----------------------|
| Firm age                 | -0.0019<br>(0.00068)** |                       |
| Price of output (log)    | 0.030<br>(0.022)       | 0.030<br>(0.015)*     |
| Average wage (log)       | 0.017<br>(0.022)       | 0.022<br>(0.012)      |
| Minimum wage (log)       | 0.404<br>(0.066)**     | 0.078<br>(0.22)**     |
| % foreign ownership (-1) | 0.003<br>(0.00040)**   | 0.0007<br>(0.00029)*  |
| Capital stock (log -1)   | 0.006<br>(0.0007)**    | -0.0006<br>(0.0004)   |
| Firm size (log -1)       | 0.150<br>(0.0097)**    | -0.005<br>(0.0053)    |
| % goods exported (-1)    | 0.0010<br>(0.00009)**  | -0.00004<br>(0.00009) |
| Time dummies             | Yes                    | Yes                   |
| Industry dummies         | Yes                    | Yes                   |
| Province dummies         | Yes                    | No                    |
| Number of observations   | 59,021                 | 59,021                |
| R <sup>2</sup>           | .2703                  | .0519                 |

\* Indicates significance at the 5% level and \*\* at the 1% level

which 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 1990-9 but stays at around 9% in both the estimates with and without worker characteristics.

Table 16.6 presents estimates from a random effects regression using the same data, since 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 effect is not appropriate. Again, the signs on the coefficients have the correct sign and the magnitude of the effect of complete foreign ownership increases only slightly to about 10%. The only education variables which are significant are for males and they have the expected positive sign.

Table 16.7 provides the same OLS estimates for skilled workers. Again, all of the coefficients have the expected signs except for the average wage variable, which is also significant at the 5% 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% in both regressions, down somewhat from the 31% in the entire 10-year sample. Surprisingly, none of the worker characteristic variables are significant. In the random effects

Table 16.5 Dependent variable: log average wages of unskilled workers (1995-7)

|                          | OLS                  | OLS w/worker characteristics |
|--------------------------|----------------------|------------------------------|
| Firm age                 | -0.004<br>(0.0005)   | -0.0004<br>(0.0005)          |
| Price of output (log)    | 0.053<br>(0.0212)*   | 0.054<br>(0.0303)*           |
| Average wage (log)       | 0.030<br>(0.058)     | 0.007<br>(0.059)             |
| Minimum wage (log)       | 0.922<br>(0.249)**   | 0.968<br>(0.238)**           |
| % foreign ownership (-1) | 0.0009<br>(0.0003)** | 0.0009<br>(0.0003)**         |
| Capital stock (log -1)   | 0.0018<br>(0.0007)*  | 0.0012<br>(0.0007)*          |
| Firm size (log -1)       | 0.043<br>(0.006)**   | 0.044<br>(0.006)**           |
| % goods exported (-1)    | 0.0002<br>(0.0002)   | 0.0002<br>(0.0002)           |
| No school (M)            |                      | -0.016<br>(0.050)            |
| Some primary (M)         |                      | 0.032<br>(0.050)             |
| Junior high (M)          |                      | 0.042<br>(0.050)             |
| Senior high (M)          |                      | 0.073<br>(0.045)             |
| Some college (M)         |                      | (dropped)                    |
| College (M)              |                      | 0.220<br>(0.138)             |
| No school (F)            |                      | -0.0753<br>(0.032)*          |
| Some primary (F)         |                      | -0.066<br>(0.025)*           |
| Junior high (F)          |                      | -0.054<br>(0.027)*           |
| Senior high (F)          |                      | -0.071<br>(0.028)*           |
| Some college (F)         |                      | -0.019<br>(0.040)            |
| College (F)              |                      | (dropped)                    |
| Time dummies             | Yes                  | Yes                          |
| Industry dummies         | Yes                  | Yes                          |
| Province dummies         | Yes                  | Yes                          |
| Number of observations   | 23,451               | 17,582                       |
| R <sup>2</sup>           | .2703                | .3079                        |

\* Indicates significance at the 5% level and \*\* at the 1% level

Table 16.6 Dependent variable: log average wages of unskilled workers (1995-7)

|                          | Random effects        |
|--------------------------|-----------------------|
| Price of output (log)    | 0.065<br>(0.019)**    |
| Average wage (log)       | 0.144<br>(0.017)**    |
| Minimum wage (log)       | 0.58<br>(0.028)**     |
| % foreign ownership (-1) | 0.001<br>(0.0002)**   |
| Capital stock (log -1)   | 0.00009<br>(0.0004)   |
| Firm size (log -1)       | 0.040<br>(0.003)**    |
| % goods exported (-1)    | 0.0003<br>(0.00009)** |
| No school (M)            | 3.07<br>(0.26)**      |
| Some primary (M)         | 3.09<br>(0.26)**      |
| Junior high (M)          | 3.10<br>(0.257)**     |
| Senior high (M)          | 3.13<br>(0.257)**     |
| Some college (M)         | 2.99<br>(0.263)**     |
| College (M)              | 3.27<br>(0.265)**     |
| No school (F)            | -0.052<br>(0.036)     |
| Some primary (F)         | -0.046<br>(0.036)     |
| Junior high (F)          | -0.053<br>(0.036)     |
| Senior high (F)          | -0.064<br>(0.036)     |
| Some college (F)         | 0.009<br>(0.050)      |
| College (F)              | (dropped)             |
| Time dummies             | Yes                   |
| Industry dummies         | Yes                   |
| Province dummies         | No                    |
| Number of observations   | 17,583                |
| R <sup>2</sup>           | .2922                 |

\*\* Indicates significance at the 1% level.

Table 16.7 Dependent variable: log average wages of skilled workers (1995-7)

|                          | OLS                  | OLS w/ worker characteristics |
|--------------------------|----------------------|-------------------------------|
| Firm age                 | -0.002<br>(0.001)    | -0.002<br>(0.001)             |
| Price of output (log)    | 0.010<br>(0.043)     | 0.045<br>(0.044)              |
| Average wage (log)       | -0.178<br>(0.071)*   | -0.227<br>(0.072)**           |
| Minimum wage (log)       | 1.32<br>(0.315)**    | 1.37<br>(0.417)**             |
| % foreign ownership (-1) | 0.0024<br>(0.0004)** | 0.0024<br>(0.0004)**          |
| Capital stock (log -1)   | 0.0059<br>(0.0006)** | 0.0068<br>(0.0006)**          |
| Firm size (log -1)       | 0.151<br>(0.0095)**  | 0.142<br>(0.0091)**           |
| % goods exported (-1)    | 0.0009<br>(0.0002)** | 0.0008<br>(0.0002)**          |
| High school or less (M)  | .420<br>(0.3222)     | .420<br>(0.3222)              |
| Some college (M)         | 0.43<br>(0.3243)     | 0.43<br>(0.3243)              |
| College (M)              | 0.49<br>(0.344)      | 0.49<br>(0.344)               |
| Masters (M)              | (dropped)            | (dropped)                     |
| PhD (M)                  | 0.86<br>(0.546)      | 0.86<br>(0.546)               |
| High school or less (F)  | -0.20<br>(0.221)     | -0.20<br>(0.221)              |
| Some college (F)         | -0.14<br>(0.224)     | -0.14<br>(0.224)              |
| College (F)              | -0.19<br>(0.226)     | -0.19<br>(0.226)              |
| Masters (F)              | (dropped)            | (dropped)                     |
| Ph.D.(F)                 | 0.56<br>(1.012)      | 0.56<br>(1.012)               |
| Time dummies             | Yes                  | Yes                           |
| Industry dummies         | Yes                  | Yes                           |
| Province dummies         | Yes                  | Yes                           |
| Number of observations   | 21,579               | 13,483                        |
| R <sup>2</sup>           | .2624                | .2435                         |

\* Indicates significance at the 5% level and \*\* at the 1% level

estimates in Table 16.8 all of the principle coefficients have the expected sign and most are significant at the 1% level. The effect of complete foreign ownership decreases only slightly to a little over 22%.

The foreign wage premium is robust to the inclusion of worker



Table 16.8 Dependent variable: log average wages of skilled workers (1995-7)

|                          | Random effects        |
|--------------------------|-----------------------|
| Price of output (log)    | 0.037<br>(0.0328)     |
| Average wage (log)       | 0.158<br>(0.0204)     |
| Minimum wage (log)       | 0.814<br>(0.0464)**   |
| % foreign ownership (-1) | 0.0023<br>(0.0003)**  |
| Capital stock (log -1)   | 0.0047<br>(0.0008)**  |
| Firm size (log -1)       | 0.134<br>(0.005)**    |
| % goods exported (-1)    | 0.0007<br>(0.00018)** |
| High school or less (M)  | -0.66<br>(0.054)      |
| Some college (M)         | -0.65<br>(0.549)      |
| College (M)              | -0.61<br>(0.549)      |
| Masters (M)              | -1.05<br>(0.58)       |
| Ph.D. (M)                | .53<br>(dropped)      |
| High school or less (F)  | (0.745)               |
| Some college (F)         | 0.578<br>(0.749)      |
| College (F)              | 0.52<br>(0.74)        |
| Masters (F)              | 0.716<br>(0.782)      |
| Ph.D. (F)                | 1.31<br>(1.19)        |
| Time dummies             | Yes                   |
| Industry dummies         | Yes                   |
| Province dummies         | No                    |
| Number of observations   | 13,484                |
| R <sup>2</sup>           | .2316                 |

\*\* Indicates significance at the 1% level.

average of 38% while the remaining 40% of the observations decreased foreign ownership by an average of near 50%, resulting in a small net gain over all 580 firms. Tables 16.9 and 16.10 provide an OLS and random effects estimate for unskilled and skilled workers using this reduced sample.

In the OLS specification for unskilled workers all the coefficients exhibit the proper signs, yet only price of output, minimum wage, and foreign ownership are significant (at the 5% level). The effect of complete foreign ownership remains near 10% and persists in the random effects specification (the Hausman test again strongly rejects the use of fixed effects) even though it is not significant. The only education variable which is significant is the male college, which exhibits the predicted positive sign.

In the OLS specification for skilled workers the signs are all in the right direction and the effect of foreign ownership is quite high, 34%, and significant at the 1% level. It is also significant in the random effects specification (at the 5% level) with almost as high a magnitude at close to 30%. The coefficients on levels of education are odd, with female levels higher than males, although not significant, and the male Ph.D. variable highly negative. This is most probably due to the fact that less than 1% of the (already small number of) observations contain any entries for masters or Ph.D. 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%. The foreign owned firms exported on average a little over 50% of their output compared to 12% for domestic firms and they were much bigger, employing an average of 1,058 unskilled workers to the 224 in domestic firms, more than four times as much, and 87 skilled workers to 28 in domestic firms, more than three times as much. 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 10-year period without worker characteristics the premium for unskilled workers was actually a little higher than in other specifications, at almost 13%, and the same was true for skilled workers for which the premium was close to 39%; both significant at the 1% level. All of the other primary variables had the predicted signs, and the coefficient on exports is positive and significant at the 5% level in both regressions as well. In Tables 16.11 and 16.12 we report the random effects estimates for the reduced sample for 1995 to 1997 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 9% for unskilled workers and remained significant at the 5% level, while the premium for skilled worker dropped to 28% and was significant at

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 1995-7 period. There are approximately 580 observations for which the mean change in foreign ownership was a little over 4%. About 60% of the firms in this sample increased foreign ownership an

Table 16.9 Dependent variable: log average wage of unskilled workers (only firms with changes in foreign ownership 1995-7)

|                          | OLS                 | Random effects    |
|--------------------------|---------------------|-------------------|
| Price of output (log)    | .45<br>(.211)*      | .41<br>(.263)     |
| Average wage (log)       | .28<br>(.167)       | .31<br>(.236)     |
| Minimum wage (log)       | .65<br>(.253)*      | .60<br>(.375)     |
| % foreign ownership (-1) | .001<br>(.00048)*   | .001<br>(.00092)  |
| Capital stock (log -1)   | .003<br>(.006)      | .003<br>(.005)    |
| Firm size (log -1)       | .041<br>(.0357)     | .043<br>(.0317)   |
| % goods exported (-1)    | -.0019<br>(.0006)** | -.0017<br>(.0008) |
| No school (M)            | -.57<br>(.345)      | -2.46<br>(1.005)* |
| Some primary (M)         | -.25<br>(.195)      | -2.27<br>(.960)*  |
| Junior high (M)          | -.27<br>(.209)      | -2.29<br>(.955)*  |
| Senior high (M)          | -.15<br>(.234)      | -2.17<br>(.958)*  |
| Some college (M)         | (dropped)           | -2.05<br>(1.18)   |
| College (M)              | 2.18<br>(1.01)*     | (dropped)         |
| No school (F)            | -.48<br>(.417)      | -.03<br>(.482)    |
| Some primary (F)         | -.25<br>(.40)       | .11<br>(.399)     |
| Junior high (F)          | -.37<br>(.467)      | .11<br>(.397)     |
| Senior high (F)          | -.44<br>(.458)      | .04<br>(.390)     |
| Some college (F)         | -.46<br>(.731)      | (dropped)         |
| College (F)              | (dropped)           | .48<br>(.533)     |
| Time dummies             | Yes                 | Yes               |
| Industry dummies         | Yes                 | Yes               |
| Province dummies         | Yes                 | No                |
| Number of observations   | 580                 | 580               |
| R <sup>2</sup>           | .2692               | .2683             |

\* Indicates significance at the 5% level and \*\* at the 1% level

Table 16.10 Dependent variable: log average wages of skilled workers (only firms with changes in foreign ownership 1995-7)

|                          | OLS                 | Random effects     |
|--------------------------|---------------------|--------------------|
| Price of output (log)    | .20<br>(.185)       | .58<br>(.281)      |
| Average wage (log)       | .27<br>(.136)*      | .18<br>(.194)      |
| Minimum wage (log)       | .54<br>(.223)*      | .70<br>(.421)      |
| % foreign ownership (-1) | .0034<br>(.00103)** | .0029<br>(.00118)* |
| Capital stock (log -1)   | .026<br>(.0075)**   | .027<br>(.0061)**  |
| Firm size (log -1)       | .028<br>(.0541)     | .030<br>(.006)     |
| % goods exported (-1)    | -.0015<br>(.00087)  | -.0014<br>(.0012)  |
| High school or less (M)  | -6.22<br>(2.296)*   | 6.74<br>(28.993)   |
| Some college (M)         | -6.27<br>(2.538)*   | 6.765<br>(28.999)  |
| College (M)              | -5.95<br>(2.342)*   | 6.85<br>(28.997)   |
| Masters (M)              | (dropped)           | 15.80<br>(29.341)  |
| Ph.D. (M)                | -18.34<br>(5.211)** | -5.13<br>(28.774)  |
| High school or less (F)  | -5.81<br>(43.582)   | -4.83<br>(28.384)  |
| Some college (F)         | -5.91<br>(43.557)   | -4.90<br>(28.386)  |
| College (F)              | -5.75<br>(43.471)   | -4.81<br>(28.383)  |
| Masters (F)              | -8.33<br>(43.441)   | -7.64<br>(28.509)  |
| Ph.D.(F)                 | (dropped)           | (dropped)          |
| Time dummies             | Yes                 | Yes                |
| Industry dummies         | Yes                 | Yes                |
| Province dummies         | Yes                 | No                 |
| Number of observations   | 564                 | 564                |
| R <sup>2</sup>           | .2106               | .2029              |

\* Indicates significance at the 5% level and \*\* at the 1% level

the 1% level. The positive coefficient on exports remained significant at the 1% 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

Table 16.11 Dependent variable: log average wage of unskilled worker (1995-7) (reduced sample: only textile, apparel, and footwear industries)

|                          | Random effects       |
|--------------------------|----------------------|
| Price of output (log)    | -11<br>(0.102)       |
| Average wage (log)       | 0.21<br>(0.057)**    |
| Minimum wage (log)       | 1.03<br>(0.087)**    |
| % foreign ownership (-1) | 0.0009<br>(0.0004)*  |
| Capital stock (log -1)   | 0.0007<br>(0.001)    |
| Firm size (log -1)       | 0.048<br>(0.007)**   |
| % goods exported (-1)    | 0.0009<br>(0.0002)** |
| No school (M)            | -3.24<br>(0.926)**   |
| Some primary (M)         | -3.19<br>(0.925)**   |
| Junior high (M)          | -3.18<br>(.924)**    |
| Senior high (M)          | -3.20<br>(.925)**    |
| Some college (M)         | -3.42<br>(.943)**    |
| College (M)              | -3.25<br>(0.939)**   |
| No school (F)            | -0.53<br>(0.506)     |
| Some primary (F)         | -0.51<br>(0.505)     |
| Junior high (F)          | 0.051<br>(0.505)     |
| Senior high (F)          | -0.46<br>(.508)      |
| Some college (F)         | .116<br>(.553)       |
| College (F)              | (Dropped)            |
| Time dummies             | Yes                  |
| Industry dummies         | No                   |
| Province dummies         | No                   |
| Number of observations   | 4736                 |
| R <sup>2</sup>           | .30                  |

\* Indicates significance at the 5% level and \*\* at the 1% level

Table 16.12 Dependent variable: log average wage of skilled workers (1995-7) (reduced sample: only textile, apparel, and footwear industries)

|                          | Random effects       |
|--------------------------|----------------------|
| Price of output (log)    | -.55<br>(0.195)**    |
| Average wage (log)       | 0.30<br>(0.066)**    |
| Minimum wage (log)       | 1.00<br>(0.139)**    |
| % foreign ownership (-1) | 0.0028<br>(0.0007)** |
| Capital stock (log -1)   | 0.005<br>(0.0024)*   |
| Firm size (log -1)       | 0.16<br>(0.012)**    |
| % goods exported (-1)    | 0.0013<br>(0.0004)** |
| High school or less (M)  | -1.73<br>(1.76)      |
| Some college (M)         | -1.78<br>(1.75)      |
| College (M)              | -1.71<br>(1.76)      |
| Masters (M)              | -3.11<br>(2.06)      |
| Ph.D. (M)                | -842<br>(2.26)       |
| High school or less (F)  | -607<br>(0.922)      |
| Some college (F)         | -63<br>(0.929)       |
| College (F)              | -71<br>(0.93)        |
| Masters (F)              | (dropped)            |
| Ph.D.(F)                 | 13.63<br>(14.30)     |
| Time dummies             | Yes                  |
| Industry dummies         | Yes                  |
| Province dummies         | No                   |
| Number of observations   | 13,484               |
| R <sup>2</sup>           | .2316                |

\* Indicates significance at the 5% level and \*\* at the 1% level

significantly higher once firm exiting was taken into account. Over the full sample excluding worker characteristics the wage premiums were 31% and 56% for production and non-production workers respectively, and 22% and 45% in the restricted sample which included worker characteristics; with all

coefficients being significant beyond the 1% level. All of the other primary coefficients continued to exhibit the proper signs.

Even with lagged values for exports the model may still suffer from endogeneity and therefore we 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 own firm's 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% and 17% respectively, the former significant at the 1% level and the latter at the 5% level. For non-production workers the premiums were again higher, at 49% and 41% respectively, and both were significant well beyond the 1% level. Again, all of the other primary coefficients had the expected signs.

### 5 General discussion and conclusion

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 5 to 10% and between 20 and 35% 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 foreign firms on average spent much more. 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 antisweatshop movement of the 1990s, with its particular focus on companies such as Nike, which is based 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. A follow-up study will try to determine to what extent this contributed to upward wage pressure.

Empirical studies such as these will surely not put an end to the heated debate surrounding globalization, and well they shouldn't, but they can help to focus inquiry and potentially direct policy. As this study 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 reputational 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 in the same way as foreign ownership originating from the USA. The exact nature by which productivity gains are correlated with foreign ownership is also unclear. It may simply be a linear function of the percentage 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 that 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 on which to build.

### Note

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# 17 Gender inequality in the labor market during economic transition

## Changes in India's manufacturing sector\*

*Nidhiya Menon and Yana van der Meulen Rodgers*

### Introduction

In 1990 and early 1991, a series of international and domestic shocks—including an oil price hike, a reduction in remittances from Indians working in the Middle East, a weakening in investor confidence following the assassination of Rajiv Gandhi, and expanding fiscal and trade deficits—precipitated a financial crisis in India. In return for receiving stand-by assistance from the International Monetary Fund in August 1991, the Indian government agreed to a standard policy prescription of stabilization and structural adjustment policies. Prominent among the policy reforms were substantial reductions in tariff levels on a wide range of imported products. Several new waves of reforms occurred in 1994 and 1997, with a slowdown in the pace of trade liberalization after 1997 as pressures from international agencies and creditors subsided.

During this period of liberalization, the gender wage differential remained unchanged, with women in manufacturing earning 49% of what men earned. This paper analyzes why women's relative wages in manufacturing stagnated during the reform period. Understanding why trade liberalization in India did not contribute to an increase in women's relative wages adds depth to the growing literature on wage structures and women's labor market performance in developing and transition economies. Relatively few studies have gone beyond descriptive analyses of changes in women's relative wages in periods of trade liberalization and increasing trade openness. The few studies that do employ econometric techniques to identify the impact of international trade on gender wage gaps have found conflicting results. In particular, Berik, Rodgers, and Zveglich (2004) find evidence that increasing trade openness is associated with higher residual wage gaps between men and women in two East Asian economies, a sign the authors interpret as increased wage discrimination.<sup>1</sup> Yet Black and Brainerd (2004) reach the opposite conclusion for the USA, with shrinking residual wage gaps associated with greater openness to imports. Hazarika and Otero (2004) also find that increased trade (in this case Mexico) is associated with lower gender earnings differentials. Finally,