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Multinationals and Anti-Sweatshop Activism

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During the 1990s, anti-sweatshop activists campaigned to improve conditions for workers in developing countries. This paper analyzes the impact of anti-sweatshop campaigns in Indonesia on wages and employment. Identification is based on comparing the wage growth of workers in foreign-owned and exporting firms in targeted regions or sectors before and after the initiation of anti-sweatshop campaigns. We find the campaigns led to large real wage increases for targeted enterprises. There were some costs in terms of reduced investment, falling profits, and increased probability of closure for smaller plants, but we fail to find significant effects on employment. (*JEL* F23, J31, J81, L67, O14, O15)

Anti-sweatshop campaigns increased dramatically in the 1990s. These campaigns took different forms: direct pressure to change legislation in developing countries, pressure on firms, newspaper campaigns, and grassroots organizing. Activists targeted multinational firms in the textiles, footwear, and apparel sectors and helped spread consumer boycotts throughout college campuses. Yet there has been almost no academic research that analyzes precisely how these anti-sweatshop campaigns affected the workers they were designed to assist.

This paper examines the impact of anti-sweatshop activism on labor market outcomes in Indonesia. Indonesia makes an ideal case study because it was the focus of campaigns introduced in the 1990s to improve conditions for workers. The pressure took several forms. The United States threatened to withdraw special tariff privileges for Indonesian exports if Indonesia failed to address human rights issues. The Indonesian government responded by making minimum wage increases a central component of its labor market policies in the 1990s.[1] The nominal minimum wage quadrupled and its real value more than doubled between 1989 and 1996.[2] Indonesia was also the target of consumer awareness campaigns waged against such companies as Nike, Adidas, and Reebok. As a result of activist pressure, these firms were induced to sign codes of conduct pledging to raise wages and improve working conditions in factories producing their products.

We identify the impact of anti-sweatshop campaigns on wages through two approaches. First, we compare wage growth in textile, footwear, and apparel (TFA) plants relative to wage growth in the rest of manufacturing. We restrict the treatment group to foreign-owned or exporting TFA

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[1] For a discussion of the role of minimum wages in Indonesia, see SMERU Research Institute (2001) or Martin Rama (1996).

[2] See Appendix Table A1 for trends in the minimum wage.

factories. Second, we exploit geographic variation in the anti-sweatshop movement *within* the TFA sector in Indonesia. The anti-sweatshop campaign targeted contractors for Nike, Reebok, and Adidas. Consequently, we compare the real wage growth of TFA plants in districts with contractors working for these firms relative to TFA plants in other districts. The advantage of this second approach to identification is that it controls for any changes that affected the TFA sector as a whole.

To measure the impact of the anti-sweatshop movement, we use a difference-in-difference methodology, comparing wages before and after the advent of the campaigns. Both approaches indicate that targeted plants increased real wages in response to activist pressure. Compared to non-TFA plants, foreign-owned and exporting TFA firms increased real wages 10 to 20 percent across all of Indonesia. Comparing wage growth in districts targeted by activists relative to other districts, the effects are even larger. Real wages increased as much as 30 percent in large foreign-owned and exporting TFA plants relative to other TFA plants. Most of these wage increases are due to higher compliance with minimum wages on the part of targeted plants.

One question that arises is whether such large real wage increases led to higher unemployment. Our estimates suggest that there were large, negative effects of the minimum wage increases on aggregate manufacturing employment. The coefficient on the minimum wage indicates that a 10 percent increase in the real minimum wage reduces production worker employment by 1.2 percent. However, we fail to find significant negative employment effects of the additional wage increases at targeted TFA plants. Employment growth in the TFA sector exceeded growth in other sectors during the sample time period. Although TFA plants increased wages in large part by increasing compliance with minimum wages, greater compliance was not associated with significant employment losses relative to non-TFA plants.

One explanation for why the short-run employment costs of the anti-sweatshop campaigns are difficult to identify is that TFA plants had the flexibility to adjust to higher wages along other dimensions. Some plants exited the sector; small exporters in regions targeted by activists were more likely to close. Across all TFA plants, profits fell relative to other sectors. Profit declines were largest in the districts targeted by anti-sweatshop activities. It appears that the anti-sweatshop movement resulted in a type of forced profit sharing, where higher wages for TFA workers were financed largely through lower returns to capital.

Our results are robust to a range of alternative specifications. We include controls for confounding factors that are likely to be correlated with wage growth, including changes in plant size, the educational attainment of the workforce, region-specific variation in minimum wage changes, foreign-ownership, export status, investments in technology, productivity growth, different initial wage levels, differences in output growth, and changes in profitability.[3] We also contrast the changes in wages for unskilled (production) workers with those for skilled (non-production) workers, whose wages generally exceeded the statutory minimum. Finally, we show that wages in foreign-owned and exporting firms in our treatment districts, but outside of the TFA sectors, were not affected.

The remainder of the paper is organized as follows. In Section I, we outline the development of anti-sweatshop campaigns, discuss the identification strategy, and set up a framework for estimation. We present results on wages in Section II. Section III examines the impact of anti-sweatshop activism on employment, profits, investment, plant entry and exit, and explores the extent to which the results reflect different degrees of compliance with minimum wage laws. Section IV concludes.

[3] Some robustness tests, such as those controlling for initial wages or adding profit margins, are reported only in the working paper version of this article, available on the AER Web site (http://www.aeaweb.org/articles.php?doi=10.1257/aer.100.1.247).

I. Background, Identification Strategy, and Framework for Estimation

A. *Background*

The roots of the anti-sweatshop campaign in Indonesia can be traced to a 1989 study commissioned by the United States Agency for International Development(USAID). The study, carried out by the Asian American Free Labor Institute–Indonesia under the direction of Jeff Ballinger, discovered that of all the factories that produced goods for the export sector, plants that manufactured for Nike paid the lowest wages.[4] Organizations such as Global Exchange, Press for Change (founded by Ballinger), and the National Labor Committee used the momentum generated from the increasing mainstream media attention on poor factory conditions in Nike plants to create an international campaign against sweatshop conditions in factories contracting for Nike, and to a lesser extent, Adidas and Reebok.[5]

The campaign against Nike's contractors in the early 1990s focused almost exclusively on Indonesia. One major reason is that much of the research documenting poor working conditions and low minimum wage compliance was completed by Jeff Ballinger while working for the AFL-CIO in Indonesia; no comparable work was carried out in China (currently the site of the largest number of Nike contractors). In addition, significant anger was directed against the foreign (primarily East-Asian) owners of these subcontracting factories within Indonesia. The relatively more open political atmosphere also contributed to the ability of US groups to work with local NGOs in Indonesia.

Nike established its own codes of conduct in 1992 in order to comply with labor standards and establish living wages, but these practices were not fully implemented until 1995–1996.[6] During this period, nongovernmental organizations (NGOs) conducted persistent and steady appraisals of working conditions in and around Nike vendor factories in order to hold the company to account for the treatment of its workers.

The campaign against Nike, Adidas, and Reebok in Indonesia was essentially a media campaign, which operated (and continues to operate) through contacts with newspaper columnists, magazine writers, TV shows, and other outlets. One way to gauge the extent of negative media exposure brought about by the anti-sweatshop campaigns is to count the dramatic increase in the number of articles about sweatshops and child labor that appeared in major international newspapers in the 1990s.[7] There was a 300 percent increase in the number of articles regarding child labor and a 400 percent increase in the number of articles focusing on sweatshop activities.

If we restrict the analysis to articles about sweatshops in Indonesia alone, the trends are very similar. The ratio of the number of articles on sweatshops or child labor relative to articles on

[4] In 1992 Ballinger's work appeared in *Harper's Magazine* in a short piece entitled, "The New Free-Trade Hell: Nike's profits jump on the backs of Asian workers," and in 1993 CBS featured Ballinger in a report about poor working conditions in Asian factories.

[5] Coupled with media strategies, including ads that satirized Nike symbols and slogans (e.g., the "swooshtika" in place of the Nike "swoosh" symbol), the anti-sweatshop activists waged a public relations war against Nike and other big clothing retailers. The movement in the United States and Europe was assisted by electronic forums where young activists shared information and planned their campaigns.

[6] See David F. Murphy and David Matthew (2001).

[7] The trends in number of articles published about child labor and the anti-sweatshop campaigns discussed in this and the following paragraph are described in more detail in the working paper version of this article. We graph both the number and the proportion of articles devoted to the anti-sweatshop movement. Our list of "Major US and World Publications" is available on the Web site for Lexis-Nexis (http://wiki.lexisnexis.com/academic/index.php?title=Academic_URLs_for_News_Sources). Examples include the *New York Times*, *Business Week*, *Economist*, *Newsweek*, *Boston Globe*, *Times* (London), *Christian Science Monitor*, *Herald* (Glasgow), *Washington Post*, *Hong Kong Standard*, etc. We also analyzed the trends for US newspapers alone, available from the authors upon request. The trends are very similar whether we restrict the analysis to US newspapers or use all major international sources.

general economic issues on Indonesia in major world newspapers increased from zero to a high of 10 percent of all articles at the peak in 1996. In 1997 there was an increasing shift in focus toward the financial crisis, which erupted at the end of 1997. Interest in child labor and sweatshop labor fell in the late 1990s—at least relative to other issues of economic interest—but has been increasing again in the last several years.[8]

While previous studies do not directly address the impact of anti-sweatshop activism on wages, an excellent overview of foreign ownership and wages can be found in Drusilla K. Brown, Alan V. Deardorff, and Robert M. Stern (2004).[9] A discussion of the links between trade and labor standards is provided by Brown (2001). Other related work includes Eric V. Edmonds and Nina Pavcnik (2001), who explore how rice prices affected the use of child labor in Vietnam.[10] Previous work has also examined the rationale for labor standards, as well as the determinants of ratification of International Labour Organization (ILO) conventions. [11]

B. *Identification and Framework for Estimation*

Our identification strategy is twofold. First, anti-sweatshop activism in Indonesia was uniquely focused on firms in the TFA sectors. Consequently, we begin by comparing real wage growth in those sectors versus other sectors, paying particular attention to the foreign-owned and exporting firms most likely to act as suppliers or contractors.[12] Real wages are calculated by deflating the nominal wage by the consumer price index (CPI), where the CPI is equal to 100 in 1996.

Our second treatment exploits the fact that anti-sweatshop activists in Indonesia concentrated on contractors for the three most highly visible retailers: Nike, Adidas, and Reebok. While Nike, Adidas, and Reebok did not take equity positions in their contractors, they did source heavily from foreign-owned and exporting firms whose owners came from other parts of Asia, including Korea, Taiwan, and Japan. Nike's primary mode of operation was (and continues to be) through arm's-length contracts. Unfortunately, confidentiality restrictions do not permit us to identify the *actual* contractors in the census data (since firm names are withheld in the Indonesian census data made available to researchers). Instead, we have identified likely contractors using census

[8] Why did interest in these issues increase so rapidly in the mid-1990s? In 1996–1997, there were a series of high-profile exposes on Nike, Gap, Wal-Mart, Disney, and others. For instance, in the second quarter of 1996 the Kathie Lee Gifford sweatshop scandal was highlighted in the news. These exposes were picked up by student movements on campuses. Student groups staged protests and sit-ins and subsequently kept these issues in the news, and contributed to the creation of groups designed to respond to sweatshop problems. The convergence of high-profile exposes, student activism, and the creation of new groups designed to address anti-sweatshop concerns fueled the increase in newspaper coverage. Post-1996, the shift in focus toward the Asian financial crisis contributed to a decline in interest in these issues. The student movement also weakened and moved on to other issues. This section has benefited greatly from discussions with Kimberly Elliott, Dara O'Rourke, and Sandra Spolaski.

[9] For an early paper showing that foreign-owned enterprises in developing countries are more likely to pay higher wages than comparable domestically owned enterprises, see Brian Aitken, Ann Harrison, and Robert Lipsey (1996)

[10] Edmonds and Pavcnik find that in rural areas, where most people are both rice producers and consumers, the income effect of higher rice prices has greatly outweighed the higher opportunity costs of not employing children in the workforce, and therefore child labor has declined significantly. However, in urban areas, where families are only rice consumers, the effects of the rice exports on price has led to increases in child labor since urban incomes have declined. Since Vietnam is predominantly rural, the overall effect has been a decline in child labor.

[11] Nancy H. Chau and Ravi Kanbur (2001) postulate that if ratification of these conventions were costless, or if the benefits greatly outweighed the costs, one would expect complete compliance across countries. Given that this is not the case, Chau and Kanbur investigate the determinants of signing. They find little evidence that variables predicted by standard economic theory—such as per capita gross domestic product (GDP), degree of openness to trade, or average education—are determining factors, but rather that countries with higher domestic standards have a higher probability of adoption. Keith Maskus (1996) refutes the argument that a lack of international standards has led to significant erosion of low-skilled wages in developed countries, or is a significant determinant of trade performance and foreign direct investment throughout the developing world.

[12] Our analysis is focused on real wages; we refer to nominal wages only to contrast the two since inflation was high during the 1990s.

data on foreign ownership, export status, and district of operation. Using information released by all three companies regarding the locations of their contractors in Indonesia, we have identified the districts in which companies targeted by activists operated in the 1990s. Consequently, our second approach compares the changes in wages and employment in TFA plants in regions with Nike, Adidas, and Reebok contractors, relative to other regions.

One important limitation is that our list of vendors for Nike, Adidas, and Reebok (available from the authors upon request) is from 2004. Since the vendor list is more recent than our census data, there could be a selection bias in our identification of treatment districts. It is difficult to sign the direction of the bias, since it is equally likely that only the pro-worker or anti-worker vendors have survived. However, by matching the names of enterprises described in newspaper accounts of sweatshops in Indonesia with names that appeared in the 2004 list of Nike vendors, we have been able to verify that many of the companies initially accused of the worst exploitation are still operating in Indonesia.

A proper framework for evaluating a firm's decision to raise wages in the context of anti-sweatshop activism would take into account both the costs and benefits of setting wages above the market-clearing level. In a competitive market with no external pressures, a worker's wages are set equal to the value of their marginal product. This implies that if log real wages are given by w, the log product price is p, the marginal product of labor is given by the partial derivative of output (Y) relative to labor input (L), and worker- or region-specific characteristics are captured by the vector $\mathbf{Z}$, then a standard log-linear reduced-form wage equation for an establishment i in region r at time t is given by

$$\log w_{irt} = a_1 + a_2 \log p_{irt} + a_3 \log (\delta Y/\delta L)_{irt} + \alpha_4 \mathbf{Z}_{irt} + r_{rt} + f_i + e_{it}. \tag{1}$$

Since there are likely to be a number of establishment-specific effects (f_i) as well as time-varying regional effects (r_{rt}) that are unobserved, we will estimate (1) in differences, thus eliminating the establishment-level fixed effects but not the regional effects, which are allowed to vary over time. We model the costs and benefits of setting wages above the market-clearing level as a function of $G(u,F)_{it}$, where G represents a markup over competitive wages and is a positive function of the probability of exposure by activists (w) and any official sanctions F associated with violating labor market regulations. G could, for example, measure the costs in terms of foregone sales or lost contracts due to negative publicity if the firm failed to adhere to minimum wages. This yields the following equation:

$$d \log w_{irt} = a_2 d \log p_{irt} + a_3 d \log(\delta Y/\delta L)_{irt} + \alpha_4 \mathbf{dZ}_{irt} + G(u,F)_{it} + r'_{rt} + e'_{it}. \tag{2}$$

Clearly, not all firms face the same probability of detection or the same penalties associated with operating sweatshop factories; only those with high probability of detection u or costly penalties associated with detection F are likely to change their wage-setting behavior.

As human rights activism and anti-sweatshop organizations proliferated, the probability of detection and the penalty for paying low wages or failing to adhere to the minimum wage increased, particularly for firms with high visibility, such as large multinationals or well-established exporters. We allow the treatment to vary with both export status and foreign-ownership, defined prior to treatment at the beginning of the sample period. We define export status *EXP* and foreign-ownership *FOR* as dummy variables equal to one if the establishment exported 10 percent or more of its output or had 10 percent or more foreign-ownership in 1990 and continued to do so over the entire sample period.

We explore two alternative treatments. We alternatively define *TREATMENT* as equal to one if one of the following is true: the plant was in a TFA sector at the beginning of the period: or the plant operated in a district that had contractors for Nike, Reebok, or Adidas.

Allowing the impact of activism to vary depending on whether the contractor is a foreign-owned or exporting enterprise leads to the following specification for $G(F,u)$:

$$G(F,u) = b_1 EXP_{it0} + b_2 FOR_{it0} + b_3 TREATMENT_{it0} + b_4(EXP \times TREATMENT)_{it0} + b_5(FOR \times TREATMENT)_{it0}.$$

Consequently, introducing deviations from competitive wage setting due to activism leads to

$$(3)\, d\log w_{irt} = a_2 d\log p_{irt} + a_3 d\log(\delta Y/\delta L)_{irt} + \alpha_4 \mathbf{dZ}_{irt} + b_1 EXP_{it0} + b_2 FOR_{it0} + b_3 TREATMENT_{it0} + b_4(EXP \times TREATMENT)_{it0} + b_5(FOR \times TREATMENT_{it0}) + r_{rt} + e'_{it}.$$

Equation (3) is essentially a difference-in-difference approach to estimating the impact of anti-sweatshop campaigns on wage outcomes. We regress log change in real wages (with 1996 as the base year) between 1990 and 1996 on a number of determinants, and then test whether there is any difference for our two treatment groups. Since firms that subcontracted for the major TFA multinationals were typically either foreign owned or export oriented or both, we focus primarily on the interaction terms b_4 and b_5.

We include controls for a number of potentially confounding determinants of the observed wage changes. We control for price changes using changes in log output and profitability at the level of the individual establishment. Factors that affect the marginal product of labor are also included in the estimation, including changes in capital stock, changes in material inputs, technology expenditures, total factor productivity growth, and changes in firm size, defined as the change in the total number of employees. Other components of the vector $\mathbf{dZ}$ include changes in worker characteristics (specifically education levels) and changes in the statutory minimum wage.

To give the reader an idea of the importance of TFA enterprises for manufacturing employment in Indonesia in the 1990s, Figure 1 shows the share of TFA employees in total production worker employment. Employment in the TFA sector as a share of total production worker employment increased from 25 percent to 35 percent during the period. The percentage of production workers in foreign-owned TFA plants rose from 2 percent to over 5 percent, while the percentage of production workers in TFA exporting plants increased from 5 to nearly 20 percent. Figure 1 shows that TFA plants employed a major share of production workers in the manufacturing sector in Indonesia.

II. Wages and Anti-Sweatshop Activism in Indonesia

A. *Data Summary*

The data for this analysis come 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 for firms with more than 20 employees. The number of observations ranges from approximately 13,000 in 1990 to over 18,000 in 1999. Over the ten-year period there is an average of 4.5 observations per establishment, reflecting either plant closings or changing reporting requirements.

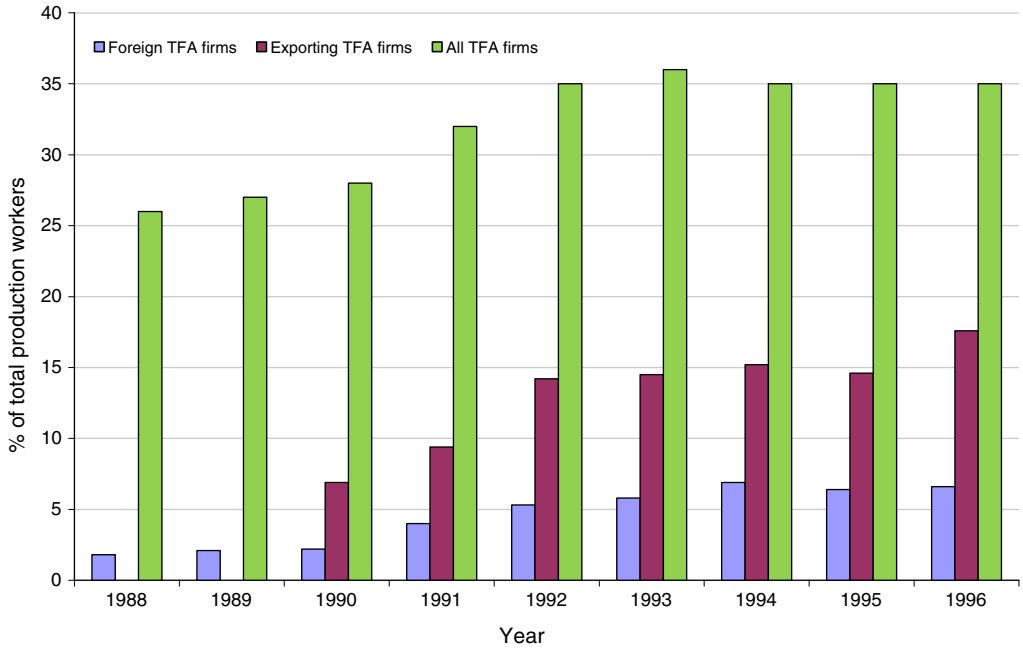

FIGURE 1. SHARE OF TOTAL PRODUCTION WORKERS EMPLOYED IN FOREIGN AND EXPORTING TFA IN INDONESIA 1988–1996

In the first two rows of Table 1A, we report mean real wages (in thousands of 1996 rupiahs) for the manufacturing sector in 1990 and 1996. We focus on this seven-year period because information on export orientation was not collected before 1990, and the financial crisis that erupted in 1997 makes any evaluations post-1996 problematic.[13] We define the plant's average wage for both production and nonproduction workers as basic compensation (salary) by type of worker, divided by the number of workers in that skill category. For the remainder of the analysis, we focus almost exclusively on production worker wages, which we use as our measure of unskilled wages.

Based on an exchange rate of about 2,000 rupiahs to the dollar, real annual wages for TFA and non-TFA domestic plants at the onset of the sample period averaged approximately US$550. If we compare columns 1 and 4, we see that wages in nonexporting, domestically owned plants were remarkably similar for TFA and non-TFA plants at the onset of the sample period. Between 1990 and 1996, average annual production worker wages in both TFA and non-TFA domestic enterprises increased by about $200.

At the onset of the sample period, however, both foreign-owned and exporting TFA enterprises paid their unskilled workers significantly less than other enterprises. A comparison of columns 2 and 5 shows that, in 1990, workers in foreign-owned TFA plants were paid half as much as workers at other foreign-owned plants. In the first row, comparing columns 3 and 6 indicates that exporters in TFA plants paid their workers 30 percent less than in other exporting plants. These large differences were one factor that contributed to the focus of anti-sweatshop activists on workers in the TFA sector.

[13] Nevertheless, we have experimented with adding 1997 and show that the main results presented in Tables 2 and 3 are robust to extending the sample. These results are available from the authors upon request.

Table 1A—Mean Production Worker Wages in 1990 and 1996
(*Contrasting textiles, footwear, and apparel (TFA) versus other sectors*)

	Textiles, footwear, and apparel			Other establishments			Difference		
	Domestic[a]	Always foreign[b]	Always exporting[c]	Domestic[a]	Always foreign[b]	Always exporting[c]	(1)–(4)	(2)–(5)	(3)–(6)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Mean wage in 1990, all observations	1,078.2	1,775.1	1,462.4	1,134.2	3,560.8	1,934.6	56.0	−1,805.6	−472.2
	(15.5)	(112.1)	(122.8)	(13.2)	(182.1)	(102.7)	(27.9)	(419.1)	(205.2)
2. Mean wage in 1996, all observations	1,441.2	2,268.8	2,079.2	1,552.4	3,798.6	2,125.2	−111.1	−1,529.7	−46.0
	(19.6)	(79.2)	(100.0)	(14.4)	(137.8)	(54.6)	(32.1)	(280.0)	(115.6)
3. Change in mean wage, 1990-1996	363.0	513.7	616.8	418.1	237.8	190.6	−54.9	275.9	426.2
	(25.7)	(151.2)	(187.1)	(20.2)	(241.1)	(111.2)	(36.7)	(497.6)	(188.5)
4. Change in mean wage, balanced sample[d]	349.4	740.1	474.2	374.7	814.9	259.4	−25.3	−74.8	214.8
	(33.4)	(196.3)	(170.0)	(26.6)	(318.8)	(135.2)	(47.4)	(497.6)	(188.5)
5. Mean change in log wage, 1990–1996	0.30	0.29	0.40	0.37	0.08	0.13	−0.07	0.21	0.27
	(0.03)	(0.09)	(0.05)	(0.01)	(0.05)	(0.04)	(0.02)	(0.11)	(0.07)
6. Mean change in log wage, balanced sample	0.30	0.36	0.35	0.30	0.22	0.16	0.00	0.14	0.19
	(0.03)	(0.10)	(0.06)	(0.02)	(0.07)	(0.05)	(0.02)	(0.10)	(0.10)

Note: Standard errors in parentheses.
[a] A plant that is neither foreign-owned nor exports the entire period.
[b] Includes at least 10 percent foreign equity over the entire period.
[c] Exports at least 10 percent of output over the entire period.
[d] Defined as establishments present in both 1990 and 1996.

One question that naturally arises is why these workers were paid so little. While one explanation could be their low level of skill, the regressions in the remainder of the paper control for the observed skill composition of workers in each establishment, and firm-level fixed effects control for unobserved skill differences that remain constant over time. An important consideration in explaining the wage differences is the high concentration of female production workers in these sectors. Three of the five most female-intensive sectors (with female production workers accounting for 50 percent or more of total production workers) in Indonesian manufacturing in 1995 were textiles, footwear, and apparel.[14] Joeseph G. Altonji and Rebecca M. Blank (1999) review the existing evidence and report that female-dominated occupations pay significantly less, after accounting for all observable worker characteristics, even in the United States.

By 1996, the wage gap between exporting and foreign-owned TFA and exporting and foreign-owned non-TFA plants had narrowed considerably. In 1996, the difference in wages between exporting TFA and exporting non-TFA plants amounted to only 46,000 rupiahs ($23) per employee per year. The difference—computed in the last column of Table 1A—is not statistically significant. The gap between wages in foreign-owned TFA enterprises and foreign-owned non-TFA firms also narrowed, but by less: foreign-owned non-TFA establishments continued to pay 1,529 thousand rupiahs, or $750 dollars, more per worker in total salary in 1996 (second row, column 8) than foreign-owned TFA firms. The trends in Table 1A suggest that the wage benefits from anti-sweatshop activism were limited to workers in export-oriented or foreign-owned plants.

[14] In Indonesia, the share of female workers in the census is highly inversely correlated with wages. These results are available from the authors upon request.

Table 1B—Comparison of Treatment Groups Relative to Controls Prior to Treatment (1988–1990)

Results of *t*-test difference in means for the control relative to treatment for the following variables:	Foreign-owned enterprises			Exporters		
	Treatment	Control	*t*-test of difference	Treatment	Control	*t*-test of difference
Average production worker wages ('000s of real rupiahs per worker)	2,029 (124.9)	3,847 (127.8)	5.76**	1,656 (92.49)	2,618 (66.64)	6.51**
Size (total number of employees)	975.7 (80.33)	374.1 (20.39)	−10.1**	616.5 (38.11)	442.3 (15.67)	−4.61**
Profits (value added less payments to workers as a share of value added)	0.343 (0.019)	0.349 (0.009)	0.26	0.364 (0.011)	0.348 (0.005)	−1.22
Log change in production worker wages	0.061 (0.076)	−0.004 (0.026)	−0.88	0.079 (0.035)	0.033 (0.016)	−1.16
Log change in number of production workers	0.065 (0.023)	0.072 (0.018)	0.15	0.136 (0.023)	0.117 (0.013)	−0.63
Log change in material inputs	0.080 (0.069)	0.141 (0.035)	0.65	0.212 (0.061)	0.144 (0.025)	−1.09
Log change in capital stock	0.255 (0.205)	0.245 (0.071)	−0.05	0.142 (0.097)	0.272 (0.044)	1.24
Total factor productivity growth	0.038 (0.056)	0.063 (0.025)	0.36	0.005 (0.040)	0.052 (0.015)	1.25
Output growth	0.097 (0.061)	0.123 (0.026)	0.36	0.229 (0.049)	0.146 (0.021)	−1.65

Notes: Treatment is textiles, footwear, and apparel (TFA) exporting or foreign enterprises relative to other sectors. Standard errors in parentheses. Values calculated for the 1988 through 1990 period, except for total factor productivity growth (TFPG) and capital stock where we use 1988 and 1989 only. All values in real rupiahs are deflated by the CPI, based in 1996. Productivity growth is defined as the log change in output less the weighted changes in inputs, where inputs include production and nonproduction workers, materials, and capital stock. The weights are equal to an average of the shares of each of the inputs in total costs in the current and last period, except capital which is equal to one less other input shares.

** Indicates significance at the 1 percent level.

* Indicates significance at the 5 percent level.

Rows 3 and 4 of Table 1A report wage growth from 1990 to 1996 in levels; rows 5 and 6 report the wage growth in logs. The difference-in-difference—the difference in wage growth across TFA and non-TFA plants—is reported in the last three columns of the table. The results show that wage increases for TFA workers were significantly higher in exporting and foreign-owned establishments. Again, the only exception is for workers in domestically owned plants selling only locally: in these plants, wages for TFA workers increased by 7 percentage points less than for unskilled workers in other sectors. The difference-in-difference between foreign or exporter wage growth in the TFA and non-TFA sectors is reported in the last two rows and last two columns of Table 1A. Across all plants, exporting and foreign TFA plants increased real wages by 21 to 27 percent more than other plants. For the balanced panel, the wage increase for foreign or exporting plants relative to non-TFA plants is between 14 and 19 percent.

To summarize, the trends presented in Table 1A indicate very different patterns of wage growth for TFA plants in the 1990s. While production workers in most exporting and foreign-owned plants generally received smaller wage increases than the rest of the manufacturing labor force in the 1990s, *the opposite was true for workers in TFA factories.* In foreign-owned and exporting TFA plants, unskilled wages grew 30 to 40 percent in real terms between 1990 and 1996.

Table 1C—Comparison of Treatment Groups relative to Controls Prior to Treatment (1988–1990)

Results of *t*-test difference in means for the control relative to treatment for the following variables:	Foreign-owned enterprises			Exporters		
	Treatment	Control	*t*-test of difference	Treatment	Control	*t*-test of difference
Average production worker wages ('000s of real rupiahs per worker)	1,577 (106.6)	2,381 (194.9)	3.35**	1,371 (62.9)	1,813 (137.9)	2.30*
Size (total number of employees)	810.9 (128.4)	1,104.2 (99.9)	−1.83	683.9 (67.6)	579.6 (45.8)	−1.31
Profits (value added less payments to workers as a share of value added)	0.345 (0.035)	0.342 (0.020)	−0.07	0.338 (0.014)	0.378 (0.014)	−0.07
Log change in production worker wages	−0.024 (0.073)	0.108 (0.112)	0.83	0.080 (0.051)	0.078 (0.046)	−0.02
Log change in number of production workers	0.105 (0.056)	0.042 (0.018)	−1.32	0.109 (0.040)	0.148 (0.029)	0.77
Log change in material inputs	0.145 (0.115)	0.043 (0.086)	−0.709	0.231 (0.088)	0.203 (0.079)	−0.211
Log change in capital stock	−0.015 (0.579)	0.373 (0.164)	0.867	−0.065 (0.203)	0.223 (0.108)	1.344
Total factor productivity growth	0.084 (0.072)	0.018 (0.076)	−0.52	0.012 (0.032)	0.003 (0.055)	−0.10
Output growth	0.215 (0.106)	0.032 (0.072)	−1.46	0.279 (0.073)	0.207 (0.063)	−0.68

Notes: Treatment is TFA enterprises in treatment regions versus other TFA enterprises. Standard errors in parentheses. Values calculated for the 1988 through 1990 period, except for TFPG and capital stock where we use 1988 and 1989 only. All values in real rupiahs are deflated by the CPI, based in 1996. Productivity growth is defined as the log change in output less the weighted changes in inputs, where inputs include production and nonproduction workers, materials, and capital stock. The weights are equal to an average of the shares of each of the inputs in total costs in the current and last period, except capital which is equal to one less other input shares.

** Indicates significance at the 1 percent level.

* Indicates significance at the 5 percent level.

Tables 1B and 1C examine differences in the two treatment groups and the control groups prior to the onset of the anti-sweatshop movement. We test the difference in means for 1988 through 1990 for wages, size, profits, and growth in wages, productivity, and output. The pre-treatment period is short due to data limitations prior to 1988; nevertheless, the same tests on wages, size, and output for 1984 through 1989 yielded similar results. Size is defined as total number of employees. Profitability is defined as value added less wages as a share of value added. Total factor productivity growth is defined as the log change in output less the weighted changes in inputs, where inputs include production and nonproduction workers, materials, and capital stock. The weights are equal to an average of the shares of each of the inputs in total costs in the current and last period. The capital share is the residual, computed after subtracting the other factor shares and assuming constant returns to scale.

Table 1B provides *t*-tests of differences between the TFA sector and other non-TFA manufacturing sectors of both foreign-owned and exporting firms. The results show that TFA establishments paid lower wages and were larger than establishments in other sectors, but that initial profits were not significantly different. Variables measured in changes—including log changes in wages, production workers, material inputs, capital stock, and total factor productivity growth (defined below) were not significantly different. There are no significant differences between the control and treatment groups when wages, output, inputs (including production workers), and productivity are measured in changes. Since the difference-in-difference methodology used in

the paper to identify treatment effects relies on changes rather than levels, the fact that there are no statistically significant differences between the treatment and control groups when examining growth rates between 1988 and 1990 is reassuring.

Table 1C reports the results of *t*-tests when the treatment is TFA enterprises in districts with Nike, Reebok, and Adidas contract establishments (our second treatment group) versus TFA enterprises in other districts (our second control group), again examining both foreign-owned and exporting firms separately. As expected, differences between the treatment and control groups are even smaller when we compare different sets of firms within the same manufacturing subsector. Although treatment firms paid significantly lower wages prior to the onset of the anti-sweatshop movement than the control group, they were similar in size and earned almost identical profits prior to treatment. In changes, the differences between treatment and control groups are never statistically significant, whether we examine wage growth, output growth, production worker growth, material inputs, capital stock, or productivity growth.

B. *Main Results*

None of the tests of mean differences in Table 1A controls for differences in plant characteristics. We address this shortcoming in Tables 2 and 3, which present the main results of the paper. Table 2 presents the results of estimating equation (3), with *TREATMENT* defined as belonging to the TFA sector. The dependent variable is the change in the log wage between 1990 and 1996. The first column of Table 2 reports coefficient estimates when we include only ownership dummies for foreign ownership, export orientation, participation in the treatment group, the minimum wage, and interactions between *TREATMENT*, foreign ownership, and export orientation. The minimum wage is defined as the log of the minimum wage in the district where the plant operated in 1996 less the log of the minimum wage in 1990. If that difference is negative, indicating that the minimum wage was not binding in 1990, then the minimum wage is set at zero. This definition of minimum wage changes allows the impact of increases in the minimum wage to be nonlinear, with zero impact on the firm's wage if the minimum wage is not binding and an expected log-linear impact if the minimum wage is binding.[15]

The results are consistent with the difference-in-difference presented in Table 1A; while wages in most foreign-owned or exporting plants did not increase faster than in other plants, TFA establishments were the exception. The coefficient on *TREATMENT* for foreign ownership or exporting enterprises is very similar: 0.106 for foreign and 0.119 for exporting. Controlling for the impact of minimum wage changes, the results suggest that production worker wages in foreign-owned or exporting TFA plants grew 10.6 to 11.9 percent faster than in other plants.

Column 2 in Table 2 adds a number of controls to the basic specification. Plant controls include log changes between 1990 and 1996 in real material inputs and capital stock, plant size, region controls, total factor productivity growth, technology expenditures, and output growth. The results in column 2 also include details on educational attainment for employees at the individual plant (reported in the years 1995 through 1997 and averaged in our estimation across all three years). For production workers, the annual survey reports number of both male and female workers who have had no school, some primary school, junior high school, senior high school, and college. The addition of plant characteristics and educational attainment of the workers does not change the magnitude or significance of the coefficients on Foreign $\times$ *TREATMENT*

[15] In the dataset, 73 percent of plants had average wage levels below the 1996 regional minimum wage in 1990; for these plants, the real minimum wage increased by 70 percent. For the remaining 27 percent of plants with initial wages above the 1996 minimum, the change in the minimum wage was set to zero. Across all plants, the average increase in the (real) minimum wage was 50 percentage points.

Table 2—OLS Long Difference-in-Differences Estimation: Regressing Production Worker Wage Differences for 1990–1996 on the Minimum Wage Gap, Plant Characteristics, and Other Controls

	Ownership dummies only (1)	Adding plant, worker, and region controls (2)	Combining foreign and exporting enterprises (3)	Same as (3) but excluding textiles as treatment (4)	Excluding minimum wage as a control and excluding textiles (5)	Dependent variable is nonwage benefits for production workers (6)	Dependent variable is wages plus nonwage benefits, all controls (7)	Dependent variable is log wages for non-production workers (8)
Foreign[a]	0.094	0.061	—	—	—	—	—	—
	(1.87)	(0.97)						
Exporter[b]	−0.057	−0.052	—	—	—	—	—	—
	(1.35)	(0.98)						
Foreign or exporter (FOREXP)	—	—	−0.001	0.010	−0.097	−0.006	0.010	−0.036
			(0.03)	(0.32)	(3.85)**	(0.43)	(0.33)	(0.97)
TREATMENT[c]	−0.059	−0.039	−0.037	−0.049	−0.031	0.002	−0.049	0.045
	(1.57)	(1.99)	(1.76)	(2.12)*	(0.98)	(0.29)	(2.19)*	(1.72)
Foreign × TREATMENT	0.106	0.124	—	—	—	—	—	—
	(2.25)*	(3.18)**						
Exporting × TREATMENT	0.119	0.110	—	—	—	—	—	—
	(2.30)*	(2.21)*						
FOREXP × TREATMENT	—	—	0.102	0.097	0.202	−0.034	0.096	−0.057
			(2.92)**	(2.43)*	(5.67)**	(0.77)	(2.41)*	(1.13)
Minimum wage[d]	0.554	0.675	0.669	0.667	—	−0.023	0.667	0.150
	(9.79)**	(7.53)**	(7.30)**	(7.41)**		(1.11)	(7.42)**	(3.42)**
Observations	6,165	5,920	5,920	5,920	5,920	5,335	5,920	5,099
R^2	0.12	0.23	0.23	0.23	0.13	0.03	0.23	0.07

Notes: Treatment is establishments in textiles, footwear, and apparel sectors. Dependent variable: log plant unskilled wage in 1996–log plant unskilled wage in 1990. Robust t statistics in parentheses. Constant term included in all specifications but not reported here.

[a] Includes some foreign equity over the entire period.

[b] Exports some share of output over the entire period.

[c] *TREATMENT* is defined as an establishment in the TFA sector.

[d] Defined as the log of the minimum wage in 1996 less the log of the minimum wage in 1990, unless the plant pays above the 1996 minimum wage in 1990, in which case the minimum wage change is set equal to zero.

** Indicates significance at 1 percent level.

* Indicating significance at 5 percent level.

and exporting × *TREATMENT*, which are now 0.124 and 0.110, respectively. These additional controls allow us to reject alternative explanations for the increase in wages for foreign-owned enterprises, such as the fact that foreign owners may have invested in plants with higher productivity growth, higher output growth, or better trained workers.

Since the point estimates for foreign × *TREATMENT* and exporting × *TREATMENT* are very close, in column 3 we combine foreign ownership and exporting status into one variable, *FOREXP*. Most foreign-owned enterprises in Indonesia exported a majority of their output, so it is difficult to separately identify the impact of foreign ownership and export status on wage growth. The remaining specifications in Table 2 combine foreign ownership and export status, although the results are not dependent on doing so. Column 4 tests whether the results are sensitive to excluding plants whose primary product is textiles and retaining only plants producing apparel and footwear. The point estimate on *FOREXP* in column 4 is now 0.097, which suggests that wages for unskilled workers in this sector increased by 9.7 percentage points more than in other sectors, after controlling for worker and plant characteristics.

In columns 1 through 4 of Table 2, we include the minimum wage as a control. However, both the decision to comply with the minimum wage and its actual level could be considered endogenous. Later in the paper we explore the determinants of compliance with the minimum wage as a function of anti-sweatshop activism. In Appendix Table A2, we show that minimum wage levels in Indonesia during the sample period were highly correlated with the CPI, lagged wages in the previous period, and low export shares. Appendix Table A2 also shows that minimum wages were set at a higher level in treatment districts with Nike, Reebok, and Adidas contractors. To address this possible endogeneity, we eliminate the minimum wage as a control in column 5 of Table 2. Now the coefficient on *TREATMENT* interacted with *FOREXP* is equal to 0.202, suggesting that the net effect of *FOREXP* and higher compliance with the minimum wage was to increase real wages by 20.2 percent relative to other sectors.

Columns 6 and 7 test whether firms cut nonwage benefits to offset the higher wages induced by minimum wage changes and activist pressure. The results show that treatment firms did not. When the dependent variable is nonwage benefits (column 6), the coefficient on *FOREXP* $\times$ *TREATMENT* is close to zero and not significant. Column 7 reports the results when wages and nonwage benefits are added together. Since wages account for most of the income for unskilled workers, the results are very similar in magnitude to those reported in the first six columns. The coefficient estimate, equal to 0.096, suggests that real wages and nonwage benefits increased by 9.6 percentage points more for TFA firms than for other firms.

To demonstrate that the anti-sweatshop movement was primarily focused on unskilled workers, in column 8 we use log wages for nonproduction workers as our dependent variable instead of production wages. As indicated earlier, nonproduction workers are typically associated with skilled workers. Since the anti-sweatshop movement focused on poorly paid workers, we would expect the impact on skilled workers to be small; this specification also allows us to test whether we are picking up spurious effects of positive unobserved demand shocks. The results suggest that there was no significant impact of *FOREXP* $\times$ *TREATMENT* on nonproduction worker wage growth. The coefficient estimate is -0.057 and not statistically significant.

The coefficient on the minimum wage is also reported in Table 2. It is equal to 0.675 when all controls are added, which suggests that a 1 percent increase in the real value of the minimum wage was associated with a 0.675 percent increase in the real unskilled wage. The coefficient is robust to the addition of plant, worker, and region controls. We note that it is possible to add region controls because the minimum wage is set at the more disaggregated district level. Given a 50 percentage point increase in the constructed minimum wage facing the sample firms (see footnote 15), the coefficient implies that minimum wage increases were associated with a 34 percent increase in real wages.

In Table 3, the sample includes only TFA plants, and *TREATMENT* is defined as being located in districts with Nike, Adidas, or Reebok contractors. This smaller sample allows us to compare the evolution of wages within the TFA sector across treatment and control districts—between those that were the target of anti-sweatshop campaigns and those that were not. The coefficient on *FOREXP* alone is generally negative and significant for large firms (those defined as having 100 or more employees), indicating that on average foreign-owned or exporting enterprises had lower wage growth than other firms. In addition, the coefficient on *TREATMENT* alone is also negative and significant for large firms, indicating lower than average wage growth in the treatment districts. However, foreign-owned or exporting enterprises in treatment districts—those enterprises targeted by the activists—exhibited significantly higher wage growth. Large foreign-owned or exporting TFA firms in these districts exhibited wage growth *between 22 and 52 percent higher* in real terms than other enterprises, after controlling for worker and plant characteristics. While the coefficient on *FOREXP* $\times$ *TREATMENT* is positive and significant in columns 1, 2, 4, and 6, it is negative for small enterprises.

Table 3—OLS Long Difference-in-Difference Estimation: Regressing Production Worker Wage Differences for 1990–1996 on the Minimum Wage Gap, Plant Characteristics, and Other Controls (Textiles, Footwear and Apparel Only)

Dependent variable: Log plant unskilled wage in 1996–log plant unskilled wage in 1990	All firms (1)	Large firms (at least 100 employees) (2)	Small firms (less than 100 employees) (3)	Large firms (apparel and footwear only) (4)	Small firms apparel and footwear only (5)	Large firms (apparel and footwear including minimum wages) (6)	Small firms (apparel and footwear including minimum wages) (7)
Foreign or exporter (FOREXP)[a]	−0.071	−0.152	0.098	−0.346	0.091	−0.282	0.071
	(1.04)	(2.30)*	(1.25)	(2.10)	(0.99)	(−2.04)	(0.65)
TREATMENT[b]	0.024	−0.014	0.051	−0.218	0.088	−0.182	0.061
	(0.36)	(0.16)	(1.64)	(3.37)*	(1.24)	(2.86)*	(1.00)
FOREXP × TREATMENT	0.216	0.295	−0.209	0.518	−0.070	0.434	−0.165
	(1.78)	(2.36)*	(2.65)*	(2.49)*	(0.64)	(2.68)*	(1.33)
Minimum wage[c]	—	—	—	—	—	1.001	0.686
						(7.31)**	(3.01)*
Observations	1,123	535	588	214	286	214	286
R^2	0.20	0.17	0.32	0.20	0.31	0.36	0.39

Notes: Treatment is establishments in districts with Nike, Reebok, and Adidas contractors. Robust *t*-statistics in parentheses. Constant term included in all specifications but not reported here.

[a] Includes some foreign equity over the entire period or exports some share of output over the entire period.

[b] An establishment in the TFA sector in a district where Nike/Reebok/Adidas contractors operate.

[c] The minimum wage is defined as the log of the minimum wage in 1996 less the log of the minimum wage in 1990, unless the plant pays above the 1996 minimum wage in 1990, in which case the minimum wage change is set equal to zero.

** Indicates significance at the 1 percent level.

* Indicates significance at the 5 percent level.

C. *Robustness*

We perform a test of robustness using nonlinear matching techniques. Additional robustness tests are reported elsewhere.[16] To test whether there is something "special" about the treatment districts that could lead to spurious results within a chosen sector, we redo our estimation using as *TREATMENT* the affected districts (those with Nike, Reebok, or Adidas vendors) for each manufacturing sector separately. While a number of approaches are possible for estimating treatment effects using nonlinear matching techniques, we adopt a procedure using nearest neighbor matching as outlined by Alberto Abadie et al. (2004).

This approach allows us to estimate sample average treatment effects of anti-sweatshop activism on wage growth, using as controls those firms that match most closely firms that have been treated. To identify the most appropriate control group (the "nearest neighbor"), one must specify a list of covariates. For the treatment effects reported in Table 4, we include as our set of

[16] These additional tests are reported in Tables 4 and 5 of the working paper version of this article, available on the AER Web site. In additional robustness tests, we do the following: (i) add the long of production workers as an additional control variable; (ii) control for low initial wages by adding a dummy variable equal to one if the firm paid below the 1996 minimum wage in 1990; (iii) add profit margins as a control, to address the possibility that differences in product types or export opportunities could account for wage growth differentials; and (iv) perform a series of "nonsense" regressions by replacing the dummy variable for TFA plants with a dummy variable for other sectors. None of the additional tests alters the main results in Tables 2 and 3.

Table 4—An Additional Test of Robustness: A Matching Estimator by Sector
(*Dependent variable: Log plant unskilled wage in 1996–log plant unskilled age in 1990*)

Industry (ISIC classification)	Estimating sample average treatment effect using matching estimation treatment defined as foreign or exporting enterprises located in districts with Nike, Reebok, or Adidas contractors Coefficient on *TREATMENT*	
	Large enterprises (at least 100 workers)	All enterprises
Textiles, footwear, and apparel only	0.212 (2.30)*	0.224 (2.68)**
Food, beverages, and tobacco	0.169 (0.55)	0.121 (0.40)
Wood and furniture	−0.162 (0.73)	−0.086 (0.50)
Paper products	−0.072 (0.24)	−0.085 (0.28)
Chemicals and petroleum products	−0.014 (0.11)	−0.122 (0.92)
Nonmetallic mineral products	0.057 (0.19)	0.173 (0.44)
Basic metal industries	−0.094 (0.25)	0.011 (0.03)
Fabricated metal products and machinery	−0.110 (0.87)	0.024 (0.18)
Other manufacturing	−0.618 (2.96)**	−0.365 (1.35)

Notes: *Z*-statistics in parentheses. We use nearest neighbor matching as outlined by Abadie et al. (2004). Enterprises matched to the treatment group on the basis of export and foreign status, location, size, output growth, growth in capital stock, growth in material inputs, educational attainment of the workforce, TFPG, and investments in technology. *TREATMENT* defined as a foreign-owned or exporting enterprise located in treatment districts.

** Indicates significance at the 1 percent level.

* Indicates significance at the 5 percent level.

covariates all the controls discussed earlier except the minimum wage (which is not included because of our concern about possible endogeneity and which is highly collinear with location). Enterprises in the control group are matched to the treatment group on the basis of foreign ownership and export status, location, size, output growth, growth in capital stock, growth in material inputs, educational attainment of the workforce, TFPG, and investments in technology.

It is not possible, in the context of our matching estimation, to allow for multiple treatment effects simultaneously. Consequently, in Table 4 *TREATMENT* is simply defined as being a foreign-owned *or* exporting enterprise (*FOREXP*) located in districts with anti-sweatshop activism. The impact of activism on wages estimated using nonlinear matching is remarkably similar to the OLS results reported in the first two columns of Table 3. In the first row of Table 4, anti-sweatshop activism is associated with real wage increases of between 21 and 22 percent. In the remaining rows of Table 4, we substitute for TFA with all other manufacturing sectors for treatment and show that the effects are significant and positive only for TFA enterprises.

The results in Table 1 through Table 4 suggest that wages increased systematically more for large exporting and foreign-owned TFA plants in treatment districts relative to other plants with similar characteristics. Below, we explore whether these wage gains had potentially adverse

effects, such as employment losses and falling investment, or caused plants to shut down operations in Indonesia.

III. Other Outcomes

A. *Employment*

The classic approach to minimum wages suggests that an increase in mandated wages should lead to a fall in employment, as employers are driven up their labor demand curve. Prior to the 1990s, standard textbook treatments of minimum wages reported that imposing a wage floor would lead to adverse consequences for employment. However, David D. Card and Alan B. Krueger (1994, 1997) argue that the imposition of a minimum wage need not have negative employment consequences if there are imperfections in the labor market. These imperfections include the following possibilities: (i) the existence of monopsony employers; (ii) search costs for employers; and (iii) efficiency wages. If any of these three imperfections characterizes the local labor market, an increase in the minimum wage (or an increase in compliance with the existing minimum wage) could lead to an increase or no change in employment.

This unorthodox finding, which has caused an enormous debate among labor economists, has interesting implications for labor market policies in developing countries. If policymakers can raise wages by increasing the statutory minimum or encouraging compliance with the existing minimum without increasing unemployment, then minimum wage policies could become a powerful tool for combating poverty. This was precisely the thinking behind a 1995 World Bank report that strongly recommended the introduction of a national minimum wage to reduce poverty in Trinidad and Tobago.

A number of papers test the impact of minimum wages on employment in developing countries (see, for example, Eric Strobl and Frank Walsh 2000; Linda A. Bell 1997; William F. Maloney and Jairo A. Nuñez 2001; Martin Rama 1996; SMERU Research Institute 2001). All these studies suggest there is a widespread lack of compliance with the legislated minimum wage.

In Table 5, we repeat the type of analysis presented in Tables 1A–C and use the same type of difference-in-difference approach adopted by Card and Krueger (1994) to examine the impact of minimum wages and anti-sweatshop activism on employment in Indonesia. The first row reports the number of production workers in 1990, and the second row reports the number of production workers in 1996. The third row reports the difference for all plants, while the fourth row reports the difference in employment between 1990 and 1996 only for plants with data on employment in both years. Columns 1 through 3 report employment for TFA establishments, columns 4 through 6 for other establishments, and the last three columns compare the two groups.

Across domestic TFA enterprises, the mean number of employees fell slightly, from an average of 95 employees per plant to an average of 90 employees per plant. Columns 2 and 3 show that TFA employment growth was concentrated in foreign-owned and exporting enterprises. Between 1990 and 1996, foreign-owned and exporting plants added nearly 400 production workers, on average. In contrast, establishments in other sectors grew very little. Columns 7 through 9 report the difference-in-difference, which is the difference in the change in employment across TFA and non-TFA firms between 1990 and 1996. Focusing on rows 3 and 4 and columns 8 and 9, we see that exporting and foreign-owned TFA plants increased employment by 300 to 400 workers more than other plants. The results in Table 5 suggest that anti-sweatshop activism vis-à-vis TFA enterprises did not appear to hurt their employment, at least relative to growth in employment of other types of enterprises.

Tables 6A and 6B repeat the analysis in a regression context. We replace the log of production worker wages with the log of production worker employment as the dependent variable. The

Table 5—Average Production Worker Employment per Establishment in 1990 and 1996

	Textiles, footwear, and apparel establishments			Other establishments			Difference		
	Domestic[a] (1)	Always foreign[b] (2)	Always exporting[c] (3)	Domestic[a] (4)	Always foreign[b] (5)	Always exporting[c] (6)	(1)–(4) (7)	(2)–(5) (8)	(3)–(6) (9)
1. Mean employment in 1990, all available observations	94.82 (5.53)	737.75 (97.87)	403.64 (45.99)	62.39 (1.60)	288.67 (24.43)	399.60 (24.71)	32.42 (4.24)	449.08 (70.26)	4.04 (52.75)
2. Mean employment in 1996, all available observations	90.00 (4.74)	1,126.97 (109.79)	765.97 (66.37)	61.60 (1.60)	353.50 (19.73)	297.14 (12.73)	28.40 (4.08)	773.47 (67.44)	468.82 (42.65)
3. Change in mean employment, 1990-1996	−4.82 (7.3)	389.22 (197.70)	362.33 (118.17)	−0.79 (2.31)	64.83 (33.99)	−102.46 (26.18)	−4.03 (4.23)	324.39 (70.5)	464.79 (52.9)
4. Change in mean employment balanced sample[d]	14.69 (15.51)	561.99 (237.76)	432.67 (143.82)	12.17 (4.09)	119.68 (54.88)	117.98 (49.59)	2.48 (5.3)	442.3 (91.5)	314.69 (60.0)
5. Change in mean log employment, all observations	0.03 (0.03)	0.23 (0.20)	0.22 (0.10)	−0.02 (0.01)	0.19 (0.08)	−0.37 (0.06)	0.05 (0.02)	0.04 (0.11)	0.59 (0.07)
6. Change in mean log employment, balanced sample	0.08 (0.05)	0.54 (0.17)	0.45 (0.19)	0.09 (0.02)	0.30 (0.11)	0.18 (0.09)	−0.01 (0.02)	0.24 (0.16)	0.12 (0.12)

Note: Standard errors in parentheses.
[a] A plant that is neither foreign-owned nor exports the entire period.
[b] Includes some foreign equity over the entire period.
[c] Exports some share of output over the entire period.
[d] Defined as establishments present in both 1990 and 1996.

coefficients on *FOR* × *TREATMENT* and *EXP* × *TREATMENT* are positive and sometimes significant. With or without controls, the results are consistent across specifications. There is no evidence that either treatment is associated with employment declines. In fact, employment growth was generally higher for TFA exporters and foreign-owned enterprises, including those operating in districts where anti-sweatshop activists targeted Nike, Reebok, and Adidas.

However, the results in Tables 6A and 6B show a robust and negative impact of the minimum wage increase on employment growth. In column 3, the coefficient on the minimum wage increase is −0.123, which suggests that a 100 percentage point increase in the minimum wage would be accompanied by a 12.3 percentage point decline in employment. In our sample, the mean increase in the minimum wage measure was 50 percent, indicating an employment loss of 6 percent. The different specifications presented in columns 3 and 4 of Table 6A and columns 1 through 5 of Table 6B suggest that a 100 percentage point increase in the real minimum wage would be accompanied by employment declines of 12 to 36 percent. The significant negative impact on employment needs to be seriously considered in any campaign to increase the mandated minimum wage or to increase compliance with the minimum wage.[17]

[17] Indonesia, however, is an unusual case: most countries do not experience 100 percent real increases in the value of the minimum wage over a five-year period.

Table 6A—OLS Long Difference-in-Difference Estimation: Regressing Production Worker Employment Differences for 1990–1996 on the Minimum Wage Gap, Plant Characteristics, and Other Controls
(*Dependent variable: Log production worker employment in 1996–log production worker employment in 1990*)

	Ownership dummies only (1)	Ownership dummies only (2)	All controls (3)	Treatment excludes textiles (4)
Foreign [a]	0.196	—	—	—
	(3.50)**			
Exporter [b]	0.067	—	—	—
	(2.19)*			
Foreign or Exporter	—	0.121	0.019	0.024
(FOREXP)		(4.37)**	(0.79)	(1.08)
TREATMENT [c]	−0.016	−0.015	0.002	0.032
	(0.51)	(0.46)	(0.13)	(1.14)
Foreign × TREATMENT	0.104	—	—	—
	(1.07)			
Exporting × TREATMENT	0.106	—	—	—
	(0.70)			
FOREXP × TREATMENT	—	0.104	0.098	0.104
		(0.92)	(1.88)	(1.35)
Minimum wage[d]	0.009	0.004	−0.123	−0.125
	(0.19)	(0.10)	(8.77)**	(8.86)**
Observations	6,165	6,165	5,920	5,920
R^2	0.01	0.01	0.32	0.32

Notes: Treatment defined as belonging to TFA sector. Robust *t*-statistics in parentheses. Constant term included but not reported here.

[a] Includes some foreign equity over the entire period.

[b] Exports some share of output over the entire period.

[c] Treatment is defined as an establishment in the TFA sector.

[d] Defined as the log of the minimum wage in 1996 less the log of the minimum wage in 1990, unless the plant pays above the 1996 minimum wage in 1990, in which case the minimum wage change is set equal to zero.

** Indicates significance at 1 percent level.

* Indicating significance at 5 percent level.

B. *Other Outcomes: Output Growth, Investment, Productivity, Profits, and Exit*

The evidence in Tables 1 through 6 points to strong positive effects of anti-sweatshop campaigns on wage growth for production workers and insignificant effects on employment. We might, however, expect other adverse outcomes to be adversely affected. Table 7 reports the impact of treatment on output growth, investment, productivity, and profits. Consistent with the insignificant effects on employment, the first two columns of Table 7 show that output growth for the two treatment groups was not significantly different than for other enterprises. However, profits were significantly and negatively affected. Growth in profitability for foreign-owned TFA firms in the treatment districts was significantly lower than for similar plants. Lower growth in profits appeared to be linked to lower growth in capital stock and lower productivity growth, at least for foreign-owned TFA plants in treatment districts.

In Tables 8A and 8B we explore whether the pressures imposed by anti-sweatshop activists induced more firms to shut down operations. We estimate the probability of exit in period $t + 1$ as a function of plant and worker characteristics in period t, using annual data. If the pressures imposed by anti-sweatshop activities led to higher exit or relocation abroad, then the benefits of

Table 6B—OLS Long Difference-in-Difference Estimation: Regressing Production Worker Employment Differences for 1990–1996 on the Minimum Wage Gap, Plant Characteristics, and Other Controls
(*Dependent variable: Log production worker employment in 1996–log production worker employment in 1990*)

	All TFA firms (1)	No minimum wage as a control (2)	Large firms only (3)	Footwear and apparel firms only (4)	FA enterprises, large firms only (5)	FA enterprises, large firms only (6)
Foreign or exporter [a] (FOREXP)	0.044	0.074	−0.012	0.077	0.086	0.113
	(1.69)	(2.39)*	(0.60)	(1.52)	(1.22)	(1.76)
TREATMENT [b]	0.006	0.011	−0.031	0.083	0.044	0.059
	(0.16)	(0.35)	(0.94)	(3.07)*	(0.91)	(1.21)
FOREXP × TREATMENT	0.156	0.125	0.162	0.091	0.056	0.028
	(2.87)**	(2.55)*	(3.21)**	(1.13)	(0.56)	(0.34)
Minimum wage[c]	−0.179	—	−0.116	−0.345	−0.357	—
	(3.99)**		(6.09)**	(5.32)**	(3.58)**	
Observations	1,123	1,123	535	500	214	214
R^2	0.47	0.46	0.54	0.60	0.66	0.65

Notes: Treatment defined as operating in treatment districts, TFA enterprises only. Robust *t*-statistics in parentheses. Constant term included but not reported here.

[a] Includes some foreign equity over the entire period, or exports some share of output over the entire period.

[b] Treatment is defined as locating in a district where Nike, Adidas, or Reebok contractors operate.

[c] Defined as the log of the minimum wage in 1996 less the log of the minimum wage in 1990, unless the plant pays above the 1996 minimum wage in 1990, in which case the minimum wage change is set equal to zero.

** Indicates significance at 1 percent level.

* Indicating significance at 5 percent level.

higher wages could be offset by a higher probability of job loss. We begin with the whole sample, with results from a probit estimation of the likelihood of exit reported in column 1 of Table 8A. If the treatment is defined as belonging to the TFA sector, there is no evidence that exporters or foreign-owned firms are more likely to shut down. In fact, foreign-owned plants in general are less likely to exit, as indicated by the significant and negative coefficient of −0.01 in the first row and column of Table 8A.

Andrew B. Bernard and Frederic Sjoholm (2004) point out that not taking into account the size of a plant is misleading, because small plants are much more likely to exit than large plants. In particular, they point out that in the Indonesian data, plants with fewer than 20 workers were eliminated from the sample after 1989, changing the composition of the sample in favor of larger plants, which are less likely to exit. One possibility is that exporters and foreign-owned plants in the TFA sector are less likely to exit because they are significantly larger than other plants. To address this possibility, in column 2 we include only those plants with at least 100 workers. The coefficients are unaffected; foreign-owned enterprises in the treatment group were significantly less likely to exit during the sample period. Minimum wages have about the same impact as before, raising exit probabilities significantly.

In columns 3, 4, and 5, we restrict the analysis to TFA plants and define *TREATMENT* as operating in districts with Nike, Reebok, and Adidas contractors. Columns 3 and 4 show that foreign-owned plants located in the treatment districts are also less likely to exit—2 percent less likely than other plants. These lower probabilities of exit for foreign-owned enterprises are consistent with the unconditional exit probabilities depicted in Figure 2. However, higher minimum wages did increase the probability of exit, with a 10 percent increase in the real minimum wage leading to a higher probability of plant exit by 0.6 to 1.1 percent.

Table 7—The Impact of Treatment on Other Outcomes: Output Growth, Change in Capital Stock, TFPG, and Profits
(*Dependent variable is indicated in columns below*)

	Output growth (1)	Output growth (textiles, footwear and apparel only) (2)	Growth in capital stock (3)	Growth in capital stock (textiles, footwear, and apparel only) (4)	TFPG (5)	TFPG (textiles, footwear, and apparel only) (6)	Change in profits (7)	Change in profits (textiles, footwear, and apparel only) (8)
Foreign [a]	0.038	0.156	0.266	0.022	−0.044	0.140	0.034	−0.008
	(0.92)	(2.75)**	(4.09)**	(0.18)	(1.32)	(3.31)**	(2.77)**	(0.54)
Exporter [b]	−0.010	0.066	−0.111	0.174	−0.020	−0.018	−0.014	0.033
	(0.39)	(0.62)	(2.36)*	(1.56)	(1.38)	(0.26)	(1.58)	(1.21)
TREATMENT [c]	−0.011	0.075	0.005	0.174	−0.015	0.044	0.006	0.035
	(0.67)	(1.90)	(0.15)	(4.98)**	(1.99)	(2.03)	(0.83)	(9.67)**
Foreign × TREATMENT	0.100	−0.082	−0.244	−0.077	0.095	−0.172	−0.062	−0.05
	(2.62)**	(1.02)	(2.67)**	(0.63)	(3.77)**	(3.84)**	(3.80)**	(2.13)*
Exporting × TREATMENT	0.023	−0.092	0.133	−0.248	−0.007	−0.019	0.018	−0.039
	(0.57)	(0.88)	(1.90)	(1.67)	(0.19)	(0.25)	(0.85)	(1.88)
Observations	6,165	1,173	6,165	1,173	5,920	1,123	5,915	1,135
R^2	0.71	0.79	0.24	0.31	0.05	0.10	0.20	0.28

Notes: Robust *t*-statistics in parentheses. Constant term included but not reported here. Definitions for TFPG and profits given in Tables 1B and 1C.

[a] Includes some foreign equity over the entire period.

[b] Exports some share of output over the entire period.

[c] In columns 1, 3, 5, and 7, treatment is defined as an establishment in the TFA sector. In columns 2, 4, 6, and 8, treatment is defined as locating in a district where Nike, Adidas, or Reebok contractors operate.

** Indicates significance at 1 percent level.

* Indicating significance at 5 percent level.

In column 5 we turn to an analysis of plants with fewer than 100 employees. Small TFA exporters in treatment districts are 4.5 percentage points more likely to exit than other small TFA exporters. These results are statistically significant and suggest that *TREATMENT* is associated with a higher probability of plant shutdown for small exporters. Table 8B excludes controls for worker characteristics and minimum wages. Since worker characteristics are recorded for only three years in the 1990s, including worker characteristics restricts the sample to surviving plants or plants exiting after 1995, when worker characteristics were first recorded. In this larger sample, the evidence is consistent with a lower probability of exit for foreign-owned enterprises, including both TFA and non-TFA foreign plants.[18]

However, the evidence is consistent with higher exit probabilities for small TFA exporters in the treatment group, as indicated in the last columns of both Tables 8A and Table 8B. While exporters in general were less likely to exit, small TFA exporters operating in the treatment districts were significantly more likely to exit than other small TFA exporters, with a 15.5 percent

[18] Our results are somewhat different from those of Bernard and Sjoholm (2004), who find that foreign-owned plants in Indonesia are more footloose than other plants. Our results suggest that foreign-owned plants are *less* footloose. This could be because the number of foreign-owned enterprises in Indonesia in the 1980s—Bernard and Sjoholm examine data that end in 1989—was small and consequently a few plants could lead to large rates of entry and exit. Our data focus on the 1990s, when there were many more foreign-owned plants in Indonesia.

Table 8A—Determinants of Exit: Probit Estimates 1988–1996
(*Coefficients are derivatives*)

	All firms (1)	Large firms with at least 100 employees (2)	TFA firms only (3)	Large TFA firms (4)	Small TFA firms (5)
Foreign [a]	−0.010	−0.002	−0.006	0.001	−0.019
	(2.18)*	(0.68)	(1.47)	(0.16)	(0.52)
Exporter [b]	0.006	−0.000	0.001	0.000	0.020
	(0.81)	(0.11)	(0.13)	(0.07)	(1.34)
TREATMENT [c]	0.009	0.010	−0.005	−0.000	−0.015
	(4.48)**	(3.01)**	(0.77)	(0.00)	(1.47)
Foreign × TREATMENT	−0.007	−0.007	−0.021	−0.015	—
	(0.84)	(1.30)	(2.00)*	(2.68)**	
Exporting × TREATMENT	−0.005	−0.002	0.005	0.001	0.045
	(0.98)	(0.59)	(0.33)	(0.08)	(3.48)**
Change in minimum wage	0.075	0.059	0.087	0.056	0.108
	(2.61)*	(3.37)**	(2.36)*	(2.98)**	(1.96)*
Observations	81,840	28,438	15,847	7,004	8,748

Notes: Includes controls for educational attainment of employees. Dependent variable is a dummy variable equal to one if the plant exits and equal to zero if the plant survives in period $t + 1$. All independent variables are from period t. Observations are annual data taken from the full unbalanced panel for 1990 through 1996. Robust z statistics in parentheses. Reported coefficients are the change in the probability of exit, evaluated at the sample mean. All specifications include the full set of controls from the previous tables.

[a] Includes some foreign equity over the entire period.

[b] Exports some share of output over the entire period.

[c] In columns 1 and 2 treatment is defined as an establishment in TFA sector. In the other columns treatment is defined as locating in a district where Nike, Adidas, and Reebok operate.

** Indicates significance at 1 percent level.

* Indicating significance at 5 percent level.

higher probability of exiting compared to other enterprises. This significantly higher probability of exit is consistent with the unconditional exit probabilities depicted in Figure 2.

One possibility is that TFA exporters are simply more volatile, exhibiting higher rates of entry as well. However, we find that this is not the case. Unreported results show that during the 1990s, not only were TFA plants more likely to exit, but entry rates dropped as well. Higher rates of entry by TFA plants relative to other sectors were followed by a fall in entry rates, which by the end of the 1990s were comparable to non-TFA plants. Additional unreported probit regressions confirm that there was less entry into the TFA sector, particularly among exporters.

If entry fell and exit rates rose for exporting TFA plants, how can we account for the fact that total employment in TFA plants did not fall? In other words, how can we explain that TFA production worker employment as a percentage of total manufacturing employment increased at the same time that exit became proportionately higher? The reason, as shown in Table 5, is that remaining TFA plants—particularly exporters and foreign-owned plants—increased production worker employment by as much as 50 percent. Employment increases within surviving plants compensated for higher exit by some TFA enterprises.

C. *Does Better Compliance with Minimum Wage Laws Explain the Observed Wage Gains?*

An important question remains: were the wage increases in treatment firms simply a result of better compliance with the rising minimum wage? We address this question in Table 9. The

Table 8B—Determinants of Exit: Probit Estimates 1988–1996
(*Coefficients are derivatives*)

	All firms (1)	Large firms with at least 100 employees (2)	Small firms with fewer than 100 employees (3)	TFA firms only (4)	Large TFA firms (5)	Small TFA firms (6)
Foreign [a]	−0.043	−0.019	−0.049	−0.060	−0.034	−0.079
	(6.78)**	(3.47)**	(4.86)**	(8.50)**	(4.62)**	(0.98)
Exporter [b]	−0.032	−0.024	0.017	−0.027	−0.009	−0.020
	(2.47)**	(2.15)*	(1.14)	(1.31)	(1.05)	(0.42)
TREATMENT [c]	0.018	0.017	0.025	−0.018	0.002	−0.032
	(3.92)**	(2.75)**	(5.16)**	(0.92)	(0.18)	(1.56)
Foreign × TREATMENT	−0.024	−0.023	−0.019	−0.013	−0.028	0.020
	(2.85)**	(2.69)**	(0.36)	(0.64)	(1.96)*	(0.16)
Exporting × TREATMENT	0.016	0.021	−0.019	0.032	0.002	0.155
	(0.99)	(1.71)	(0.50)	(1.29)	(0.19)	(2.20)*
Change in minimum wage	—	—	—	—	—	—
Observations	93,757	30,988	62,719	18,367	7,657	10,666

Notes: Excludes controls for average wages, minimum wage changes, and educational attainment of employees. Dependent variable is a dummy variable equal to one if the plant exits and equal to zero if the plant survives in period $t + 1$. All independent variables are from period t. Observations are annual data taken from the full unbalanced panel for 1990 through 1996. Robust z statistics in parentheses. Reported coefficients are the change in the probability of exit, evaluated at the sample mean. All specifications include the full set of controls from the previous tables.

[a] Includes some foreign equity over the entire period.

[b] Exports some share of output over the entire period.

[c] In columns 1, 2, and 3, treatment is defined as an establishment in the TFA sector. In the other columns, treatment is defined as locating in a district where Nike, Adidas, or Reebok contractors operate.

** Indicates significance at 1 percent level.

* Indicating significance at 5 percent level.

first three columns report the change in compliance with the statutory minimum wage as a function of treatment, controlling for plant and worker characteristics. The dependent variable is the change in compliance between 1990 and 1996, where compliance is a dummy variable equal to one if the firm's average production worker wage exceeded the statutory minimum wage in that district. The results in column 1 show that if *TREATMENT* is defined as the TFA sector, then foreign or exporting treatment firms increased compliance with the minimum wage by 15.1 percentage points relative to the control (firms in other sectors). If *TREATMENT* is defined as operating in districts targeted by anti-sweatshop activism, then the results in columns 2 and 3 indicate that *TREATMENT* led to increased compliance by 12.4 to 37.1 percent relative to other TFA firms. The first three columns of Table 9 suggest that the anti-sweatshop movement was associated with a large and significant increase in compliance with the minimum wage.

The next four columns of Table 9 measure the contribution of higher minimum wage compliance to the wage increases associated with *TREATMENT*. To do this, we add a triple interaction term between foreign-ownership or export status *FOREXP*, *TREATMENT*, and the minimum wage gap. If activism led to higher wages by increasing compliance with the minimum wage, then this interaction term should capture that effect and the coefficient on *FOREXP* × *TREATMENT* should become small in magnitude and insignificant. The results presented in columns 4 through 7 show that this is indeed the case.

The coefficient on *FOREXP* × *TREATMENT* becomes insignificant and close to zero, while the coefficient on the triple interaction is large in magnitude and significant. These results suggest

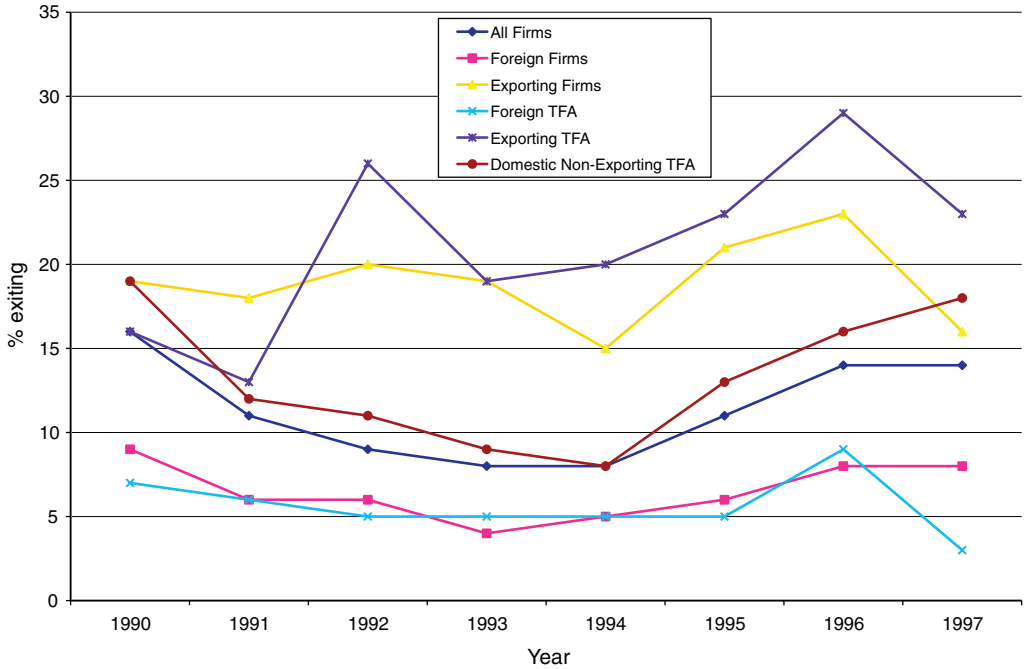

FIGURE 2. PERCENTAGE OF FIRMS EXITING IN YEARS 1990–1997

that anti-sweatshop activism led to higher wages primarily by increasing compliance with the minimum wage. In columns 8 and 9, we add the triple interaction to the employment regressions from Tables 8A and 8B. The inclusion of the additional term does not affect the results, suggesting that, while anti-sweatshop activism was associated with additional wage growth, it was not associated with greater employment declines, or with falling employment stemming from more vigilant compliance with the minimum wage. While, on average, the large minimum wage increases were associated with falling employment, the increasing compliance of establishments targeted by anti-sweatshop activism was not. Combining the results presented in Tables 6 through 9 suggests that plants targeted by the campaigns either raised wages, cut profits, and maintained employment, or simply exited the industry.

IV. Conclusion

During the 1990s, anti-sweatshop activists campaigned to improve working conditions and raise wages for workers in developing countries. Indonesia, which had more Nike contractors than any other country apart from China during this period, was a primary target for these activists. The Indonesian government also greatly increased the minimum wage throughout the 1990s. This paper analyzes the impact of these twin interventions on labor market outcomes in Indonesian manufacturing. The results suggest that on top of the large wage increases induced by minimum wage changes, real production worker wages rose an additional 10 to 20 percent for TFA relative to non-TFA establishments. Within the TFA sector, plants targeted by anti-sweatshop activists experienced even larger real wage increases. Large TFA establishments in treatment districts increased production worker wages by as much as 30 percent relative to other

Table 9—Impact of Compliance with Minimum Wages on Wage and Employment Outcomes

	Dependent variable is change in compliance with minimum wage			Dependent variable is change in the log of production wages				Dependent variable is change in the log of production workers	
	All enterprises and all controls	Textiles, footwear, and apparel only	Footwear and apparel only	All enterprises and all controls	All enterprises with at least 100 employees	Textiles, footwear, and apparel only	Footwear and apparel only	All enterprises	Textiles, footwear, and apparel only
Foreign or Exporter (FOREXP)[a]	0.027	0.082	−0.113	−0.002	−0.068	0.044	−0.130	0.019	0.041
	(1.43)	(0.97)	(1.07)	(0.08)	(1.65)	(1.13)	(1.18)	(0.80)	(1.55)
TREATMENT[b]	−0.105	0.106	0.009	−0.049	0.020	0.194	0.239	0.030	−0.026
	(7.14)**	(7.43)**	(0.48)	(1.60)	(0.37)	(2.62)*	(4.06)**	(0.97)	(0.27)
FOREXP × TREATMENT	0.151	0.124	0.371	0.007	−0.047	−0.021	0.111	0.003	0.159
	(2.90)*	(1.47)	(3.44)**	(0.08)	(0.43)	(0.31)	(1.14)	(0.04)	(1.10)
Minimum wage[c]	−0.082	−0.142	0.027	0.659	0.678	0.696	0.999	−0.121	−0.197
	(1.10)	(1.23)	(0.12)	(6.95)**	(5.75)**	(9.46)**	(5.45)**	(8.00)**	(3.54)**
TREATMENT × minimum wage	—	—	—	0.020	−0.077	−0.223	−0.375	−0.044	0.046
				(0.47)	(0.72)	(3.57)**	(3.38)**	(1.58)	(0.55)
TREATMENT × FOREXP × min wage	—	—	—	0.177	0.287	0.165	0.271	0.164	−0.002
				(1.61)	(2.07)*	(6.49)**	(2.67)*	(2.61)*	(0.01)
Observations	5,875	1,114	494	5,920	2,431	1,123	500	5,920	1,123
R^2	0.10	0.13	0.16	0.23	0.23	0.29	0.34	0.32	0.47

Notes: Robust t statistics in parentheses. Constant term included but not reported here. Compliance is a zero-one dummy variable equal to one if the establishment's average production worker wage is above the district statutory minimum wage.

[a] Includes some foreign equity or exports over the entire period.

[b] In columns 1, 4, 5, and 8 treatment is defined as an establishment in the textiles, footwear, and apparel (TFA) sector. In the remaining columns, treatment is defined as locating in a district where Nike, Adidas or Reebok contractors operate.

[c] Defined as the log of the minimum wage in 1996 less the log of the minimum wage in 1990, unless the plant pays above the 1996 minimum wage in 1990, in which case the minimum wage change is set equal to zero.

** Indicates significance at 1 percent level.

* Indicating significance at 5 percent level

plants. As we show in the paper, much of the wage increases within targeted plants reflected higher compliance with the minimum wage relative to non-TFA or nontreatment plants after the onset of the anti-sweatshop campaigns.

One question that naturally arises is how such large real wage increases could be sustained without adverse consequences for employment.[19] We examine whether these higher wages led firms to cut employment or shut down operations. Our results suggest that the minimum wage increases led to employment losses for production workers across all sectors in manufacturing. While anti-sweatshop activism did not have additional adverse effects on employment within the TFA sector, it did lead to falling profits, reduced productivity growth, and plant closures for smaller exporters.

[19] It is important to keep in mind that for a well-known brand name such as Nike, labor costs from developing country factories in 1998 accounted for only about 4 percent of the total cost of a $90 shoe (see http://cbae.nmsu.edu/~dboje/NIKfaqcompensation.html). This interview with Nike is from 1998, but is no longer part of Nike's "official" Web site.

It is important to note that the wage gains documented in this paper could be temporary. In the late 1980s and early 1990s, the TFA sector in Indonesia was booming, as suppliers from higher-cost East-Asian locations shifted operations to lower-cost locations nearby. Yet in the last ten years, footwear and apparel companies such as Nike have shifted to vendors in other low-wage countries, including China, Vietnam, and Cambodia. Vietnam has now replaced Indonesia as the second largest vendor location (after China), as measured by the number of workers employed in Nike supplier factories. While Nike continues to use Indonesian contract factories to source 20 percent of its footwear operations, this share will continue to fall if factories in Vietnam produce lower-cost and higher-quality goods.

Many research and policy questions remain unanswered. Designing anti-sweatshop campaigns in such a way as to make wage gains and better factory conditions sustainable, without endangering employment or leading plants to relocate elsewhere, is challenging. The new anti-sweatshop activism emphasizes the introduction of "living wages," which are significantly harder to define and consequently to implement, compared to codes of conduct focused on compliance with minimum wages. Extending the type of analysis presented in this paper to other countries would also be informative.

Appendix

Table A1—Minimum Wages in Dataset in Indonesia, 1988–1999

Year	Consumer price index with 1996 = 100	Minimum wage in nominal values (hundreds of rupiahs)	Minimum wage in 1996 values (hundreds of rupiahs)	Minimum wage in US dollars	Exchange rate in rupiahs per dollar
1988	0.527	351	667	388	1,717
1989	0.561	355	634	355	1,787
1990	0.604	503	833	443	1,882
1991	0.661	633	957	484	1,982
1992	0.711	717	1,008	492	2,051
1993	0.780	832	1,066	509	2,095
1994	0.846	1,193	1,409	652	2,160
1995	0.926	1,418	1,531	684	2,239
1996	1.000	1,560	1,560	644	2,348
1997	1.067	1,699	1,592	539	2,953
1998	1.680	1,963	1,167	118	9,875
1999	2.027	2,308	1,138	146	7,809

Table A2—Firm-Specific and District-Specific Determinants of the Minimum Wage for 1990–1996
(*Dependent variable: Log of the minimum wage*)

	(1)	(2)	(3)	(4)	(5)
Dummy for location in treatment district	0.074 (1.70)	0.138 (4.25)**	0.073 (1.70)	—	0.103 (2.20)*
TFA sector dummy	−0.006 (0.29)	−0.0004 (0.02)	—	−0.006 (0.27)	−0.034 (1.15)
Output growth	0.003 (1.58)	0.002 (1.38)	0.003 (1.58)	0.003 (1.58)	0.005 (1.45)
Total factor productivity growth	−0.009 (1.81)	−0.005 (1.05)	−0.009 (1.81)	−0.009 (1.82)	−0.018 (2.15)*
Lag log production wages	0.007 (2.37)*	0.010 (3.40)**	0.007 (2.37)*	0.007 (2.37)*	0.009 (1.45)
Wholesale price index	−0.070 (1.69)	−0.073 (1.72)	−0.070 (1.69)	−0.071 (1.68)	−0.150 (2.59)*
Consumer price index	0.659 (14.15)**	0.800 (16.08)**	0.658 (14.17)**	0.659 (14.05)**	0.687 (11.80)**
Foreign-ownership	0.000 (0.51)	0.000 (0.81)	0.000 (0.51)	0.000 (0.51)	0.000 (0.11)
Export share of sales (0 to 100)	−0.0001 (2.80)**	—	−0.0001 (2.80)**	−0.0001 (2.78)**	−0.0002 (2.44)*
Tariffs	—	—	—	—	0.0001 (0.48)
Observations	84,204	89,247	84,204	84,204	42,047
R^2	0.62	0.67	0.62	0.81	0.63

Notes: *t*-statistics in parentheses. All regressions estimated taking into account fixed effects at the level of the individual establishment, with errors clustered at the district level and robust standard errors. Year dummies included in all specifications. Establishment-specific determinants of the log minimum wage include output growth, TFPG as defined in Tables 1B and 1C, TFA sector dummy, production wages, foreign ownership, and the export share of sales. In column 5 the number of observations is cut in half due to the fact that tariff information is available for only half the observations.

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