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The Consequences of Doubling the Minimum Wage

The Case of Indonesia

Martin Rama

Results suggest that doubling Indonesia's minimum wage led to a 10 percent increase in average wages, a 2 percent decrease in wage employment, and a 5 percent decrease in investment. The disemployment effect appears to be considerable in small firms, but employment may actually increase in large firms.

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Summary findings

Minimum wages in Indonesia were tripled in nominal terms, and doubled in real terms, in the first half of the 1990s. Rama evaluates the effects of this hike on wage earnings, wage employment, and investment.

After describing Indonesia's minimum wage policy and surveying the literature on the effects of minimum wages, Rama applies relatively simple statistical tools to individual and aggregate data. He visually inspects the wage distribution for full-time laborers and employees to assess the extent of compliance with minimum wages. He uses regression analysis involving "minimalist" specifications and data aggregated by province to estimate the elasticity of wage earnings, wage employment, and investment with respect to the minimum wage.

A wide dispersion in the ratio of minimum wages to labor productivity across the 27 Indonesian provinces can be used to identify the effects of the minimum wage. The results suggest that minimum wages have a moderate effect on outcomes in Indonesia's labor market. Taken at face value, these results imply that doubling the minimum wage led to a 10 percent increase in average wages, a 2 percent decrease in wage employment, and a 5 percent decrease in investment. The disemployment effect appears to be considerable in small firms, but employment may actually increase in large firms.

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1. Introduction

After being largely symbolic for almost two decades, Indonesian minimum wages were tripled in nominal terms, and doubled in real terms, in the first half of the 1990s. Several reasons are usually mentioned to explain such a dramatic shift in labor market policies. Some observers point out to the role of international pressures, particularly out of concerns by US consumers and union members that Indonesia was violating workers' rights. In 1991, a well-known American shoe firm sourcing a large share of its worldwide production out of Indonesia was accused of benefiting from a degree of labor exploitation that would be considered unacceptable in any industrial country. In the following years, several complaints were filed under the Generalized Scheme of Preferences to deprive Indonesia of low tariffs on its exports to the US market. The withdrawal of investment guarantees to US companies that would ensue was a threat of potentially greater significance.

Domestic forces can also underlie the sudden increase in minimum wages. The government of Indonesia was genuinely concerned that workers were not sharing the fruits of economic growth. In spite of an outstanding economic performance, wages were (rightly or wrongly) perceived as lagging behind, due to the vast supply of labor coming out of rural areas. As the country approached the 50th anniversary of its independence, the inability to make workers benefit from sustained growth appeared as a short-coming that needed to be explicitly addressed. Also, there was a sense that industrial relations could follow the same path as in Korea, where the labor movement became increasingly sour as workers felt prosperity was being attained on their back. Given the extreme political violence Indonesia experienced in the 1960s, possible labor unrest was a legitimate source of concern.

Whatever the actual reasons underlying the change in labor market policies, the minimum wage hike was dramatic enough to raise doubts on its merits. The economic boom of recent years was heavily dependent on exports of labor-intensive products, such as textiles, garments, footwear and electronics. These industries, which were attracted to Indonesia partly because of low labor costs, could now face an incentive to relocate abroad. Even if existing firms did not relocate, new investments could be channeled to countries offering lower wages, such as Bangladesh or Vietnam. Moreover, for those firms staying in Indonesia, the increase in labor costs could encourage the adoption of less labor-intensive technologies. Although some claim it is time for Indonesia to move up the ladder, and not to base comparative advantage on cheap labor anymore, prospects could be bleak for low-skill workers.

The aim of this paper is to evaluate the impact of the minimum wage hike on wage earnings, wage employment and investment in Indonesia, in the first half of the 1990s. While economic theory sheds some light on the effects of raising the minimum wage, there is no clear consensus on the actual orders of magnitude, or even on the signs, of some of these effects. Few would consider that all workers stand to gain (or to lose, for that matter) from higher minimum wages, so that the problem is rather to put the gains and losses in balance. The resulting estimates, in turn, may help deciding whether minimum wages are "too" high, and which criteria should be used to revise them over time. Needless to say, any attempt to produce estimates of this sort is at best tentative. Data are always partial and scattered, while all empirical methodologies are subject to criticism. But in spite of these obvious shortcomings, some insight can still be gained from an empirical approach to the minimum wage issue.

This paper applies relatively simple statistical tools to both individual and aggregate data. Visual inspection of the wage distribution for full-time laborers and employees is used to assess the extent of compliance with minimum wages. A low percentage of earnings below the

legal minimum, and some clustering of these earnings at or around the minimum, can be interpreted as evidence that the minimum wage is binding. The larger the distortion of the wage distribution, the more likely that minimum wage policies will affect labor market outcomes. Regression analysis involving "minimalist" specifications and data aggregated at the provincial level is used, in turn, to estimate the elasticity of wage earnings, wage employment and investment with respect to the minimum wage. Indeed, one of the interesting features of Indonesia is the wide variation of legal minimum wages and actual labor market conditions across its 27 provinces. This variation allows to identify the effects of the minimum wage, much the same as variation across the 50 states allows it in the US.

The paper is organized as follows. The next section describes the Indonesian minimum wage policy, compares minimum wage levels to the average earnings and productivity of different sub-sets of workers, evaluates whether provincial minimum wage levels are affected by local labor market conditions and discusses the effectiveness of enforcement mechanisms. Section 3 presents the theoretical debate on the consequences of raising the minimum wage, reviews the empirical evidence from other countries, both industrial and developing, and summarizes the existing knowledge on this issue in the case of Indonesia. The following section uses data on individual earnings to evaluate whether minimum wages bite; in the process, it highlights wide disparities by province, gender, age group and sector of activity. Section 5 discusses the empirical methodology used to identify the effects of the minimum wage, taking advantage of the wide cross-province variation in the data. This methodology is applied in section 6 to the estimation of the overall impact of minimum wage hikes on the earnings of urban laborers and employees, as well as on wages in manufacturing. Based on the same approach, Section 7 evaluates the elasticity of wage employment with respect to the minimum wage, providing separate estimates for young workers and for workers in manufacturing; data on lay-

off requests at the provincial level are also analyzed. Section 8 quantifies the impact of minimum wage hikes on total investment and on foreign direct investment. Section 9 concludes.

2. The Minimum Wage Policy

a) Recent Developments

In 1989, new legislation was introduced in Indonesia to regularize the haphazard system of minimum wages that had been in force in most regions since the early 1970s. In the new system, minimum wages have to be set with reference to minimum physical needs, the cost of living and labor market conditions. The original goal of the government was to bring the minimum wage in line with the cost of a consumption bundle known as KFM by 1994. A broader consumption bundle, aimed at satisfying "subsistence" needs, rather than the bare "physical minimum", is now considered as the appropriate reference. This bundle, known as KHM, costs 15 to 20 percent more than the KFM. The new goal is to bring the minimum wage in line with the KHM by 1998.

Since consumption prices (hence, the cost of the bundles) and labor market conditions vary across different regions of Indonesia, different provinces have different minimum wages. The largest provinces may even have separate minimum wages for specific districts and, in some cases, for specific sectors of activity. Minimum wage variance across districts in the same province is low, however. The exception is Riau, where the free-trade-zone of Batam (an island near Singapore) has a much higher minimum wage than the rest of the province. Note however that the 1994 and 1998 targets of the minimum wage policy refer to the cost of the consumption bundles only, and the variation in this cost across provinces is quite low. Much lower, in any event, than the variation in average labor earnings or productivity across provinces.

Local labor market conditions influence the speed at which minimum wages converge to their long-run targets. These conditions are assessed by formally tri-partite councils operating at the provincial level. Most of the council members are from the provincial antenna of the Ministry of Manpower, which also appoints the delegates from employers and employees. In some cases, an informal survey of companies operating in the province may precede any decision. The council makes a minimum wage recommendation to the provincial governor, who may revise it to bring it in line with the long-run target of the government. The revised recommendation is sent to the Ministry of Manpower in Jakarta, which has the final word.

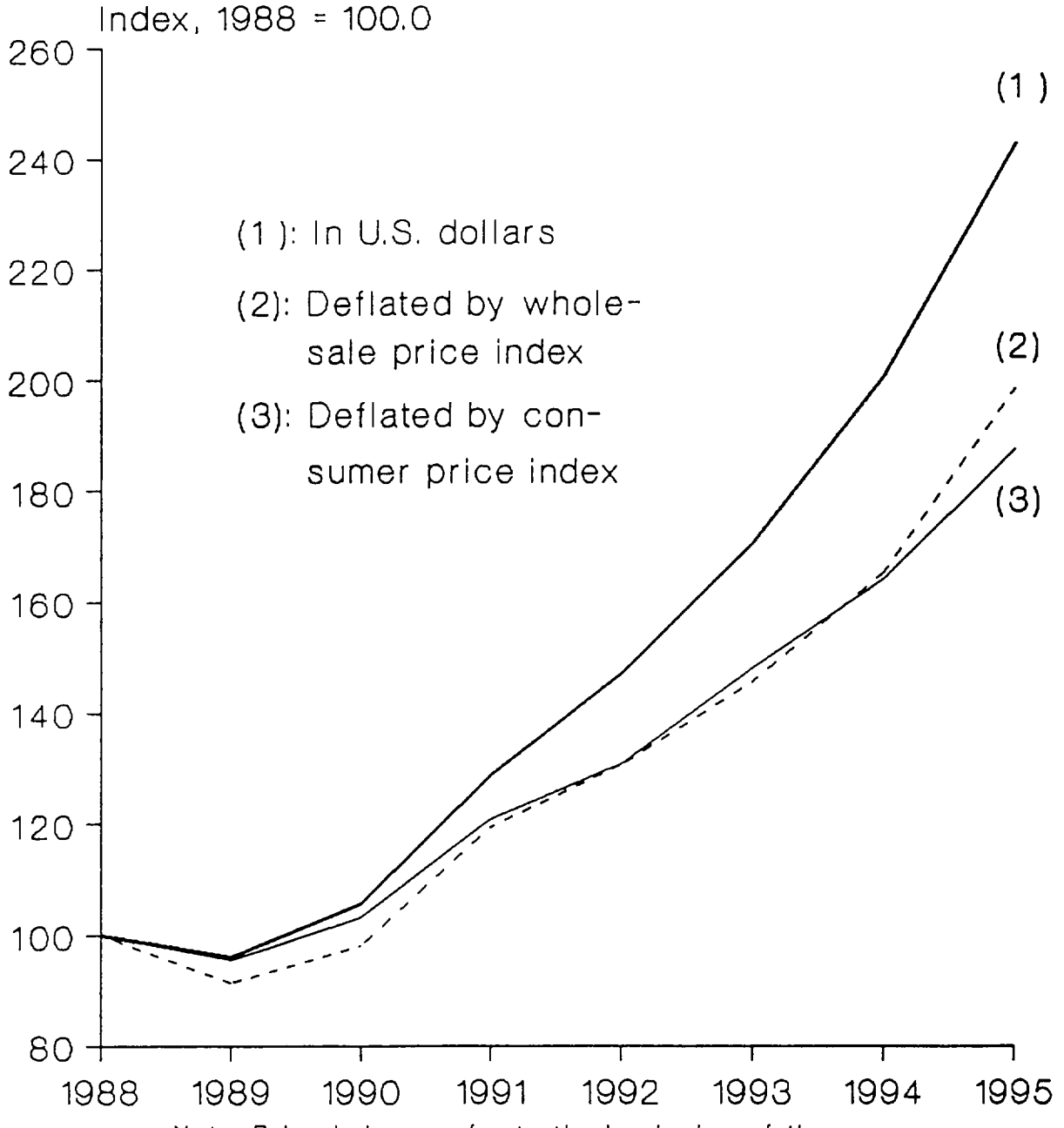
The increase in the average minimum wage under the new labor market policy was three-fold in nominal terms, and two-fold in real terms, as shown in Figure 1. The minimum wage reported in the Figure is an unweighted average across provinces, which corresponds to the standard Indonesian practice. However, the yearly figure used for each of the provinces is a time-weighted average of the most representative (often, the only) minimum wage in force, which is a less standard practice. For instance, if the yearly adjustment in a particular province and a particular year took place in April, the figure for such province and year is an average of the old and the new minimum wages, with weights one fourth and three fourths respectively. This criterion is used all along the paper, and it may explain some differences with official Indonesian sources. The resulting minimum wages figures by province are reported in the Appendix of the paper.

While the minimum wage hike of the first half of the 1990s is impressive, productivity and earnings also increased remarkably during the same period. Table 1 combines data from a variety of sources to compare the average minimum wage to a set of indicators measuring labor productivity and labor costs at the aggregate level, as well as for specific sub-sets of workers. The Table shows that the ratio of minimum wages to average wages declined between 1988 and

Figure 1

Minimum Wage in Real Terms

(All Indonesia Averages)



Note: Price indexes refer to the beginning of the year, while the exchange rate is an yearly average. The wholesale price index excludes oil exports.

Table 1

Minimum Wages Versus Average Wages and Productivity
(All Indonesia Averages)

Minimum wages as a fraction of	1988	1989	1990	1991	1992	1993	1994
Average productivity per worker							
Total output	0.199	0.175	0.177	0.200	0.215	0.198	0.217
Output excluding oil and gas	0.235	0.206	0.209	0.234	0.249	0.220	0.239
Value added in large manufacturing	0.062	0.051	0.051	0.061	0.057		
Value added in small manufacturing				0.256		0.355	
Labor costs per worker, by sector							
Wages of urban laborers & employees	0.349	0.333	0.319	0.379	0.398	0.380	0.424
Wages in manufacturing	0.352	0.337	0.372	0.440			
Labor costs in large manufacturing	0.278	0.253	0.255	0.275	0.254		
Labor costs in small manufacturing				0.761		0.931	
Labor costs per worker, by gender							
Wages of male urban laborers & employees	0.312	0.285	0.281	0.332	0.349	0.335	0.375
Wages of female urban laborers & employees	0.495	0.448	0.462	0.539	0.562	0.526	0.579
Wages of male workers in manufacturing	0.321	0.309	0.343	0.410			
Wages of female workers in manufacturing	0.474	0.449	0.488	0.567			

Note: All figures are calculated based on Indonesian averages. The data sources are national accounts (for rows 1 and 2), the labor force survey (rows 1, 2, 5, 9 and 10), the wage survey (for rows 6, 11 and 12), the survey of large manufacturing establishments (rows 3 and 7) and the survey of small scale manufacturing industries (rows 4 and 8).

1990, or even 1991, and then increased by about one third. If data for 1995 were available, the increase could be as much as one half. Such an increase is much smaller than the one depicted in Figure 1, but it is still unusually high by international standards. Note, however, that the ratio of minimum to average wages attained in 1995 may start declining gradually, given the policy target set for 1998 and the outstanding pace of productivity growth.

b) Are Minimum Wages Endogenous?

The role played by local councils in making recommendations to the Ministry of Manpower suggests that the level of minimum wages may be endogenous, in the sense of depending on the ability of firms to afford them. Endogeneity, in turn, has important implications. From a normative perspective, there would be less reason to worry about minimum wages. A higher minimum wage level would reflect an improvement in labor market conditions, rather than represent a threat to employment. Conversely, a down-swing in economic activity could be expected to lead, more or less automatically, to a decline in the real level of minimum wages. From a positive perspective, endogeneity implies that the standard estimates of the impact of minimum wages on other variables, such as wage earnings or employment, could be biased. The minimum wage hikes would represent "unnatural" experiments, making it necessary to control for the forces that led to the these hikes to obtain unbiased estimates.

Some evidence that minimum wage hikes are affected by local labor market conditions is presented in Table 2. The two sets of regressions in this Table link the annual change in the provincial minimum wage to the contemporary and lagged changes in the provincial average wage, and to the contemporary and lagged levels of the provincial employment-to-population ratio, respectively. The coefficients on the lagged variables are positive and statistically

Table 2

Minimum Wage Hikes and Local Labor Market Conditions

Explanatory variables	Dependent variable: change in the log of the minimum wage					
	(A)	(B)	(C)	(D)	(E)	(F)
Independent term	0.1473 (8.140)	0.1146 (4.497)	0.0671 (2.489)			
Change in the log of average earnings of laborers & employees	0.0987 (0.912)	0.1879 (1.574)	0.2472 (2.112)			
Same variable, lagged one year		0.1994 (1.690)	0.3008 (2.573)			
Same variable, lagged two years			0.3674 (3.617)			
Independent term				0.1550 (13.884)	0.1487 (12.893)	0.1487 (11.946)
Change in the log of the urban employment/population ratio				0.2890 (1.912)	0.4409 (2.668)	0.4355 (2.554)
Same variable, lagged one year					0.3567 (2.243)	0.3724 (2.021)
Same variable, lagged two years						0.0455 (0.290)
Adjusted R^2	- 0.001	0.014	0.097	0.017	0.040	0.031
F test	0.832	2.081	6.613	3.654	4.299	2.653
Number of observations	159	158	157	159	158	157

Note: There is one observation per province per year, as allowed by the data. Values in parentheses are "t" statistics.

significant in most of the regressions, which can be interpreted as evidence that minimum wages increase at a faster pace in provinces with tighter labor markets.

There are several reasons, however, to think that the minimum wage hikes of recent years were mostly "exogenous". First among these reasons is the nature of the political process that led to the new labor market policy. It would be difficult to find a more extraneous determinant of minimum wage increases than pressure from foreign governments and agencies. Clearly, influence activities by consumers and trade unions in the US were largely independent from the tightness of the labor market in Indonesia. Furthermore, the main domestic mechanism underlying minimum wage hikes was exogenous too. The targets set by the government, namely bringing minimum wages in line with the KFM consumption bundle by 1994, and with the KHM bundle by 1998, are indeed independent from local labor market conditions.

Additional support to the exogeneity hypothesis is provided by the data themselves. First, the coefficient of determination of the regressions reported in Table 2 is low. If minimum wages were endogenous, local labor market conditions would account for a large share of the variation in minimum wage hikes across provinces and years. But the coefficients of determination in Table 2 are often close to zero, and never exceed 0.1. Second, the range of variation of the ratios between minimum wages and average wages or average productivity, shown in Table 3, is wide. If ability to pay mattered, the variance of these ratios would not be much higher than the one observed over time, for all of Indonesia, in Table 1. But instead of disparities in the range of one third to one half between the highest and the lowest ratios, Table 3 displays maxima which are five to seventy times bigger than the corresponding minima.

The exogeneity of minimum wage hikes, and the wide dispersion observed in the ratios of minimum wages to average productivity and labor costs, greatly facilitate the estimation of the impact of minimum wages. Of course, part of the dispersion reported in Table 3 may be

Table 3

Minimum Wage Variance Across Provinces (in 1988-95)

Minimum wage as fraction of	Minimum	Maximum	Mean	Std. dev.	N. of obs.
Average productivity per worker					
Total output	0.028	0.739	0.249	0.127	186
Output excluding oil and gas	0.062	0.739	0.269	0.115	186
Value added in large manufacturing	0.025	0.406	0.077	0.059	132
Value added in small manufacturing	0.039	2.773	0.453	0.417	46
Labor costs per worker, by sector					
Wages of urban laborers & employees	0.177	0.585	0.349	0.076	186
Wages in manufacturing	0.183	0.649	0.384	0.097	102
Labor costs in large manufacturing	0.108	1.232	0.304	0.145	132
Labor costs in small manufacturing	0.229	6.618	1.407	1.219	45
Labor costs per worker, by gender					
Wages of male urban laborers & employees	0.165	0.543	0.318	0.068	186
Earnings of female urban laborers & employees	0.208	0.789	0.469	0.115	186
Wages of male workers in manufacturing	0.183	0.770	0.354	0.090	102
Wages of female workers in manufacturing	0.239	1.064	0.533	0.193	89

Note: The numbers in this table are descriptive statistics for the ratio between the minimum wage and either average wages or average labor productivity, as defined in Table 1.

either irrelevant or fictitious. For instance, provincial minimum wages may appear very low compared to total output per worker in some specific province, but not be so low when the output of an enclave activity such as oil and gas production is set aside. Also, part of the dispersion may be due to low quality data. For instance, results involving value added or labor costs per worker in small manufacturing firms must be interpreted with great caution. But even if some of the ratios in Table 3 were set aside, variation across provinces would still be much higher than variation across states in the US.

c) Applicability and Enforcement

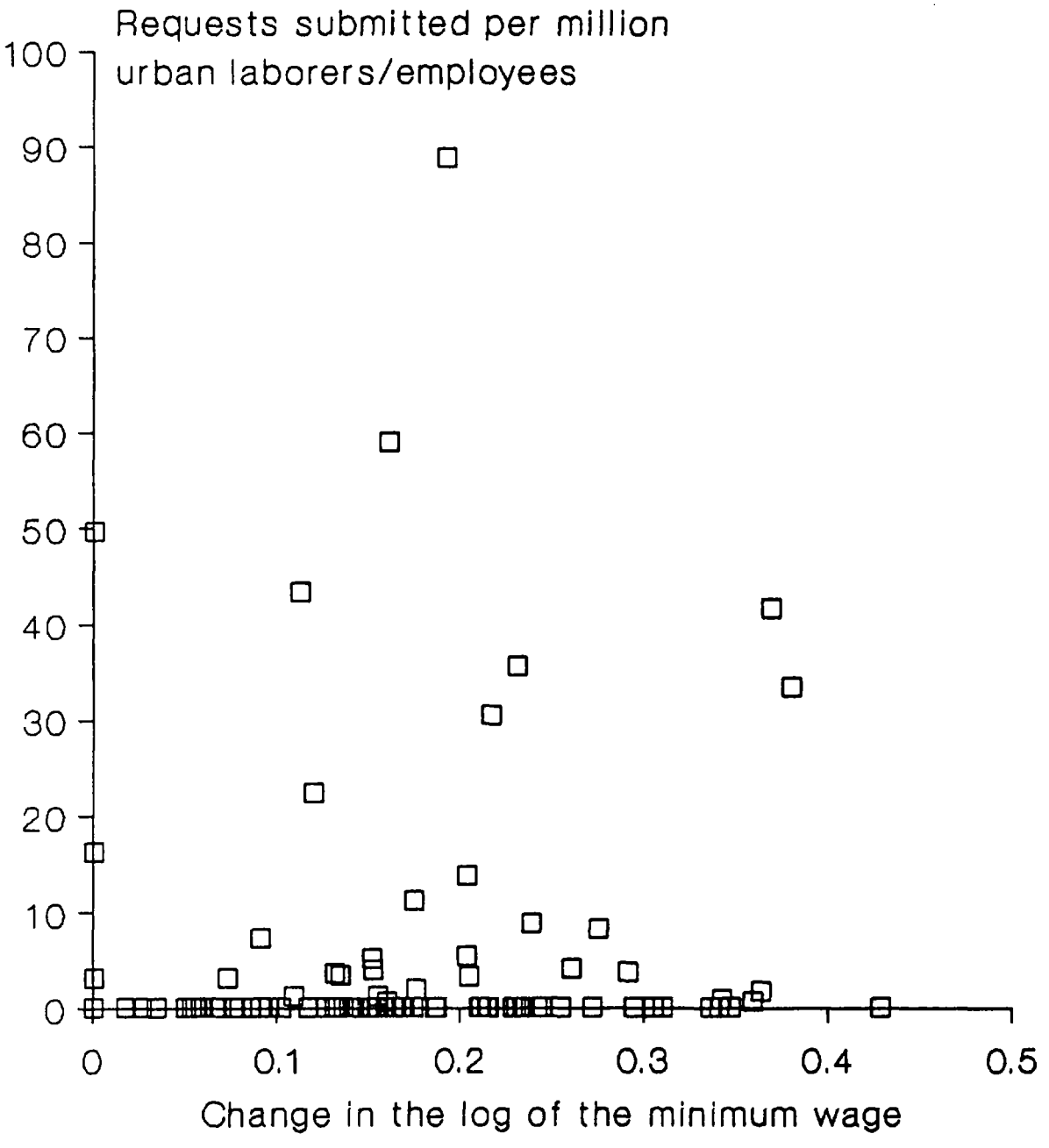
Minimum wages would have a limited impact on labor market outcomes if firms were not forced to comply. In the case of Indonesia, there are two main sources of non-compliance. First, firms that are unable to afford the minimum wage can request a "waiver" from the Ministry of Manpower. If authorized, they can postpone for one year the implementation of the new minimum wage level. But in order to obtain the waiver, these firms have to open their accounts for official scrutiny. This requisite may actually work as a deterrent, as suggested by the low number of requests submitted to the Ministry of Manpower. There have never been more than 135 of these requests per year, in a country that has about 20 thousand medium and large firms in manufacturing, not to mention other sectors of activity.

Moreover, requests for minimum wage waivers are not correlated with the size of minimum wage increases, as shown in Figure 2. Each square in this Figure corresponds to a specific province in a particular year. For the sake of clarity, the case of Kalimantan Timur in 1992 is not represented in the Figure. In that province and year, there were 238 requests for waivers per million urban wage earners, in spite of minimum wages growing at an average rate of "only" 20 percent per year. Regarding the other observations, a more elaborated analysis,

Figure 2

Requests for Minimum Wage Waivers

(by provinces, in 1992-95)



Note: The X-axis variable is an annual average over years t and t-1, while the Y-axis variable corresponds to year t.

involving not only the annual change in the provincial minimum wage but also the annual inflation rate and other relevant variables, could affect somewhat the pattern depicted in Figure 2. But the fact would remain that in most of the provinces and years there were no requests submitted at all. It is thus safe to conclude that minimum wage waivers are not a relevant source of non-compliance.

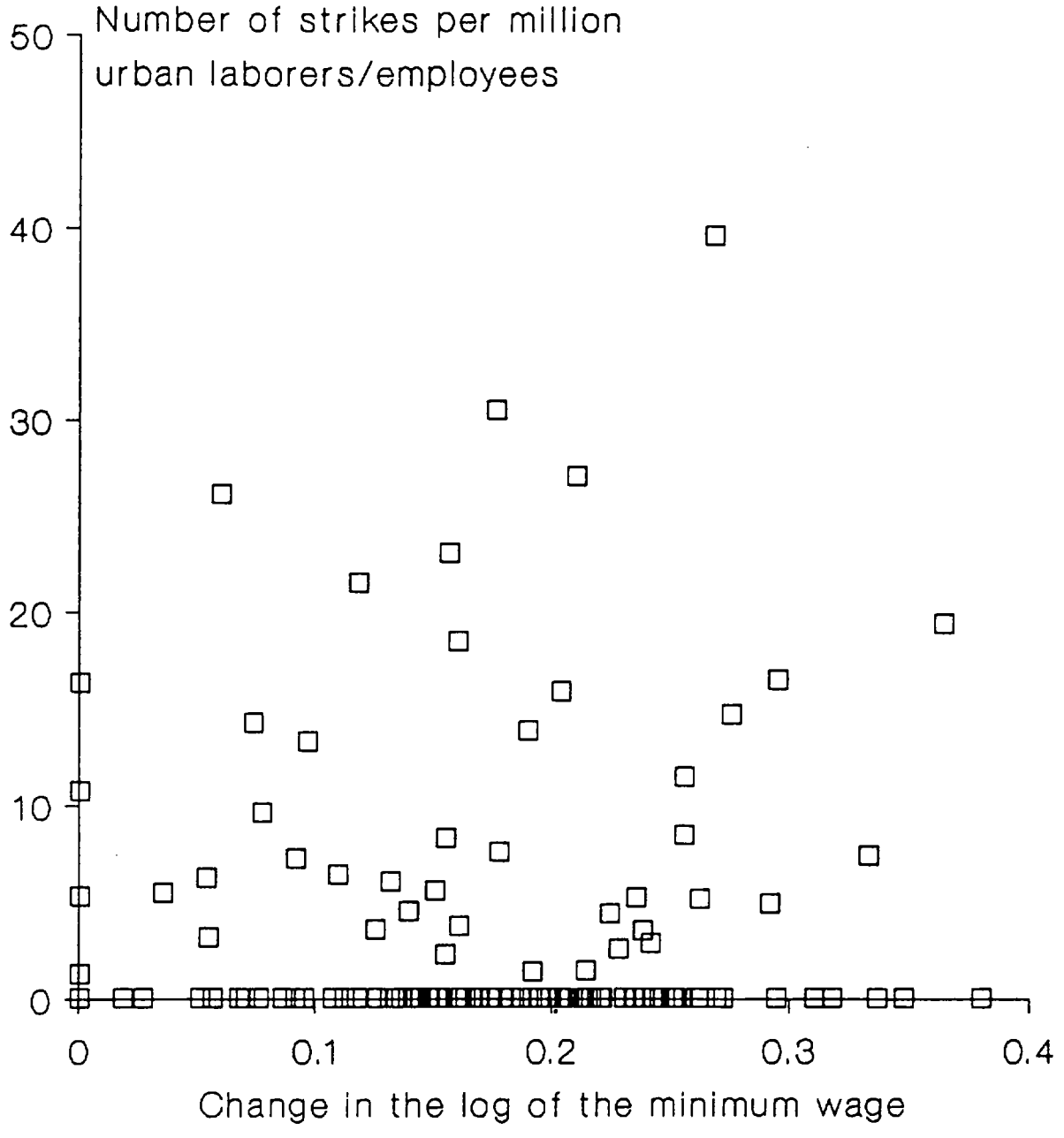
A second and more important reason why firms may not comply with minimum wages is the weakness of enforcement capabilities. In the case of Indonesia, this weakness became evident in 1994, when minimum wage adjustments were unusually high, and the period allowed to implement them was surprisingly brief. Many firms were unable or unwilling to pay higher wages, and a series of labor conflicts (some of them wild) erupted in several provinces. But the visibility of these conflicts should not lead to the conclusion that strikes in Indonesia are mostly driven by the lack of compliance with minimum wages. Even in 1994, only 103 out of the 296 strikes accounted for by the Ministry of Manpower were related in one way or another to minimum wages. The proportion had been similar in 1993, and it declined in the first half of 1995, when only 9 of a total of 37 strikes were due to the lack of compliance with minimum wages (for a description of industrial relations in Indonesia, see Agrawal, 1995).

The weak correlation which exists between minimum wage hikes and labor conflicts is highlighted by Figure 3. As in the previous Figure, a couple of observations are set aside for the sake of clarity. These observations correspond to Yogyakarta in 1994 and 1995, when there were 155 and 120 strikes per million urban wage earners respectively. In those years, the provincial minimum wage was growing at an annual rate of roughly 25 percent. But regardless of whether these two observations are taken into account or not, no clear pattern emerges from the Figure. As before, changes in the variables considered to explain the number of strikes

Figure 3

Strikes and Minimum Wage Hikes

(by provinces, in 1990-91 and 1993-95)



Note: The X-axis variable is an annual average over years t and t-1, while the Y-axis variable corresponds to year t.

cannot hide the fact that in most of the provinces and years there were no strikes at all, as shown by the heavy concentration of observations on the horizontal axis of the Figure.

While strikes do not appear to play a direct role in forcing firms to comply with higher minimum wages, they may have boosted compliance in some other, more indirect ways. The extended press coverage received by some of the wildest conflicts may have made firms more cautious of not upsetting their workers. Publicity is actually the main mechanism chosen by the government to enforce minimum wages. The black-listing of the companies that do not respect labor rights was announced in 1994, as a device "to develop good moral and ethic among Indonesian businessmen". In order to be dropped from the list, companies have to "confess guilty and pledge to apology" (the excerpts are from an article appeared in the first page of *The Indonesia Times*, on March 1st, 1995). Economic sanctions, by contrast, are not highly relevant. Transgressors of minimum wage laws incur a fine of approximately 50 US dollars, which is a low sum for large establishments.

3. Theory and the Available Evidence

a) A Partial Equilibrium Analysis

Assuming minimum wages are enforced, how do they affect labor market outcomes? The answer crucially depends on the nature of the labor market equilibrium. Two extreme cases are usually considered in the literature; they are identified in what follows as the neoclassical case and the monopsony case. In the neoclassical case, many firms compete for workers while a large number of individuals compete for jobs. As a result of this competition, none of the agents involved (neither a firm nor an individual) can affect the equilibrium wage. In the monopsony

case, by contrast, individuals still compete for jobs but there is only one firm operating in the local labor market. This firm has therefore some power to make wages.

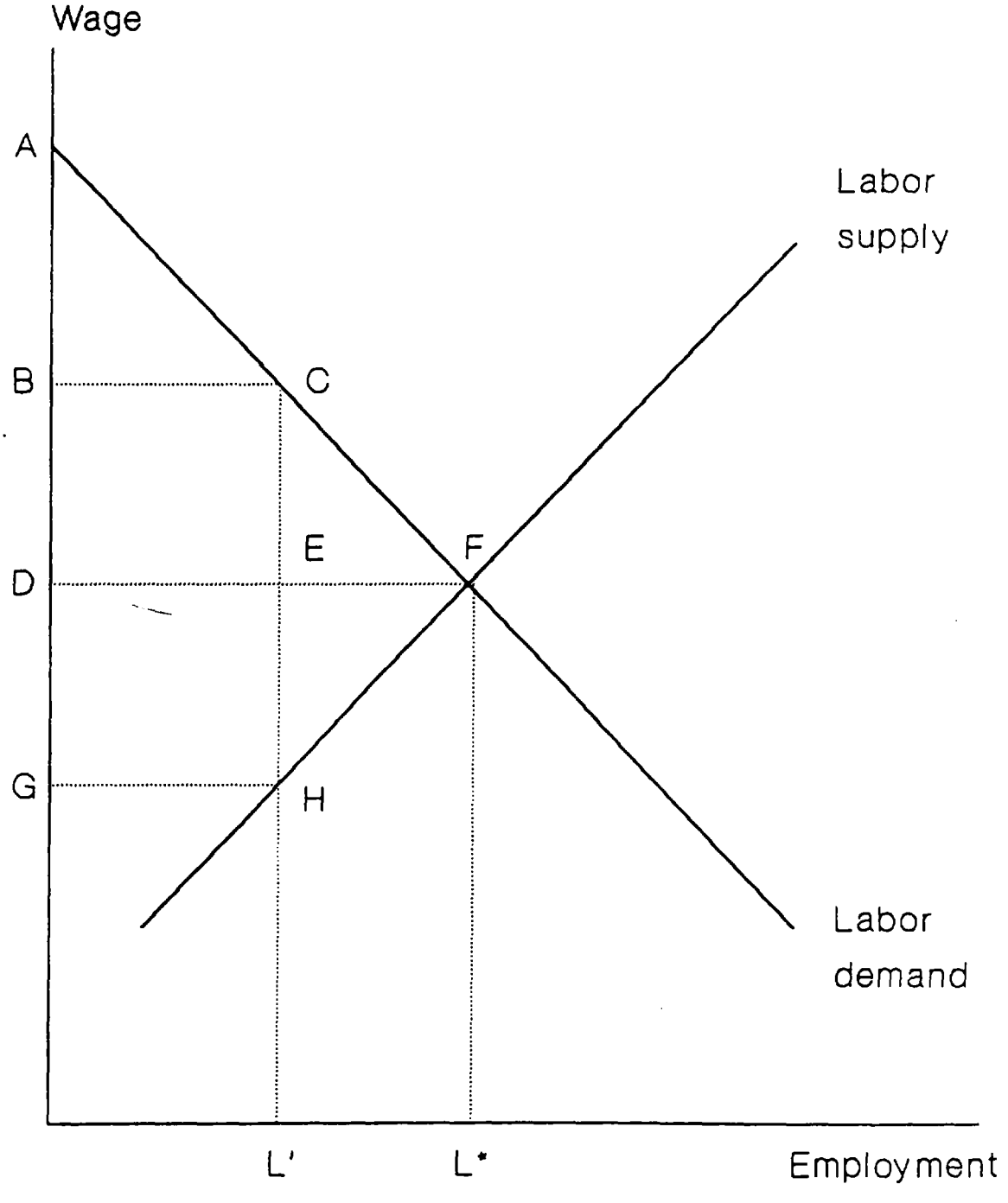
The consequences of imposing a minimum wage in each of the two cases are illustrated in Figure 4. The downward-sloping curve in this Figure represents the marginal productivity of labor. For a given stock of the other factors of production, the contribution to output of each additional worker is assumed to decrease as the total number of workers increases. Since no firm would hire a worker that costs more than he or she contributes to production, this curve can be interpreted as a labor demand schedule. The upward-sloping curve, in turn, represents the alternative earnings of the workers. To make the presentation simple, consider the case of a firm or a set of firms settling in a rural area. As the wages paid by the firm(s) increase, more villagers prefer to migrate to the local town and become wage earners. This curve therefore represents the labor supply schedule.

In the neoclassical case, all the firms operating in the area compete to attract villagers to their factories. Competition drives wages up to the point where the alternative earnings of the marginal villager become equal to his or her contribution to output in any of the competing firms. In terms of Figure 4, the equilibrium wage level is D and the equilibrium employment level is L*. What are the consequences of mandating a minimum wage? If the minimum is lower than D, it has no effect, because all workers make more than the minimum anyway. A minimum wage higher than D, in turn, would force firms to shed labor in order to increase its marginal productivity. In graphical terms, firms move upwards on the labor demand curve. For instance, if the minimum wage was set at level B, employment would fall from L* to L'.

In the monopsony case, by contrast, the only firm operating in the rural area can take advantage of the fact that a higher wage attracts more villagers to the town. In graphical terms, the firm chooses the point of the labor supply curve that maximizes its profits. As long as the

Figure 4

The Effects of the Minimum Wage



wage it sets is lower than D, a higher wage has two opposite effects on the firm's profits. On the one hand, profits increase because the firm succeeds in attracting more workers and these additional workers produce more than they are paid (i.e. they are "exploited"). On the other hand, profits decrease because the wage that has to be paid to each and everyone of the workers increases (i.e. they are all less "exploited"). In graphical terms, the optimal wage G, from the point of view of the firm, is the one that maximizes the profit area ACHG. The equilibrium employment level is therefore lower than L*; in the example it is equal to L'.

What happens if a minimum wage is introduced in the monopsony case? To exaggerate matters, consider a minimum wage that is set exactly at level D. If the firm keeps its employment at level L', the minimum wage makes its profits fall from ACHG to ACED. But now, the trade-off described in the previous paragraph does not apply anymore. There are L* villagers willing to work for a wage equal to D, so that the firm does not need to raise wages to increase its employment. Given that the marginal productivity of labor exceeds D when employment is L', hiring additional workers increases profits. In the example, profits are maximized when employment is equal to L*. More generally, in the monopsony case, a minimum wage within the range of values from G to D leads to an increase in employment.

. The neoclassical case and the monopsony case are not as different as it may appear at a first glance though. First of all, in both cases a minimum wage which is too low to be binding has no effects on either wages or employment; the only difference in this respect concerns what is considered "too low" in each of the two cases (less than D or less than G, respectively). Second, in both cases an increase of a binding minimum wage leads to an increase in the wages of those who have a job. As a result, profits decrease, and investment can be expected to fall. And third, in both cases a minimum wage which is too high (in terms of the Figure, higher than

D) leads to a decrease in employment. The controversy thus concerns the employment effects over a relatively narrow range of minimum wage levels only.

In the longer run, the prospects for workers depend not only on the way firms adjust their employment levels for a given capital stock, but also on the way they adjust their capital stock. In terms of Figure 4, the minimum wage hike may end up affecting investment decisions and, therefore, shifting the labor demand curve. The direction of this shift is unclear though. On the one hand, higher labor costs could lead to an increase in the capital intensity of production, hence in investment. On the other hand, higher labor costs could also imply lower profits, which in turn would reduce the incentive to invest. The two effects would be larger in the monopsony model than in the neoclassical model, but the net outcome would remain ambiguous in both.

A majority of economists believe the neoclassical model provides more useful insights into the workings of the labor market than the monopsony model does. Strictly speaking, the monopsony model applies only to one-company towns, and this is a quite uncommon setting. However, some claim that job search entails transaction costs which make most workers resemble the villagers of the example. For instance, job seekers who turn down an employment offer today may experience several weeks of unemployment before they get a new one. Moreover, the new offer will not necessarily be better than the current one. Therefore, the higher is the wage offered by the firm, the higher is the number of job seekers who will accept the offer. Each individual firm would thus face an upward-sloping labor supply curve, in spite of the large number of firms competing for workers. This theoretical argument being logically consistent, the relevance of each of the two models needs to be assessed on an empirical basis.

b) The International Evidence

In reviewing the international evidence on the effects of minimum wages, it is useful to distinguish between industrial countries, where enforcement capabilities are high, and developing countries, where non-compliance is widespread. In industrial countries, most of the studies published until the early 1990s indicate a negative impact of minimum wages on employment. In the US, these studies focus on teen-agers, who represent a large share of all minimum wage earners because of their lack of skills and work experience. The conventional wisdom is that the elasticity of teen-ager employment with respect to the minimum wage is in the order of -0.1 to -0.3. Taken literally, this means that if the minimum wage was doubled, teen-ager employment would fall by some 10 to 30 percent (see Brown, Gilroy and Cohen, 1982, Brown, 1988, and Neumark and Wascher, 1992).

More recent studies have challenged the conventional wisdom. A hotly debated piece compared changes in employment in the contiguous states of New Jersey and Pennsylvania, at a time when the minimum wage increased in the former but not in the latter. The study focused on employment in fast-food restaurants, which are the typical minimum wage employers in the US. Data from a telephone survey of some 400 of these restaurants indicated an expansion of employment in New Jersey, compared to the Pennsylvania control group (see Card and Krueger, 1994). The authors of the study view this result as evidence in favor of the monopsony model of the labor market.

Not surprisingly, the New Jersey-Pennsylvania experiment was subject to criticism. Particularly, payroll records from a smaller sample of fast-food restaurants, including some of those covered in the telephone survey, showed a decline, rather than an expansion, in New Jersey's employment (see Neumark and Wascher, 1995). The elasticity of employment to the

minimum wage estimated based on payroll records is very much in line with the conventional wisdom. However, the debate seems far from over. Some of the studies on which the conventional wisdom is based have also been criticized on methodological grounds (see Card and Krueger, 1995). In the same vein, a recent study for the UK concluded that the elasticity of employment to minimum wages was negligible, if not positive (see Dickens, Machin and Manning, 1994). But on the other hand, a careful study for Canada found disemployment effects even larger than those implied by the conventional wisdom (see Benjamin, 1995).

In the case of developing countries, the problem of getting reliable estimates of the effects of minimum wages is aggravated by low compliance with labor laws. Even in countries where administrative capabilities are relatively strong, such as Costa Rica, actual enforcement is lax. Individual data from household surveys shows that at least one third of the workers who are allegedly covered by minimum wage legislation in that country earn less than the legal minimum (see Gindling and Terrell, 1995). More disturbingly, roughly the same proportion earns less than the minimum wage in the uncovered sectors of the economy. These results indicate that the minimum wage is not an effective floor, and imply that minimum wage laws do not have the intended effect of protecting workers with little bargaining power from being "exploited".

Only in a few cases is it possible to find a developing country having the enforcement capabilities of an industrial country. Puerto Rico, whose minimum wage institutions are governed by the Congress of the US, is one of them. A well-known study estimated the elasticity of employment to the minimum wage in this country at approximately -0.5 (see Castillo-Freeman and Freeman, 1992). The problem in interpreting this result is that a strongly negative elasticity could be consistent with both the neoclassical and the monopsony model, given the unusually high level of minimum wages in Puerto Rico. The latter amount to almost half of the average wage in manufacturing, compared to roughly one quarter in the US

In more conventional developing country settings, where enforcement capabilities are much weaker, estimates of disemployment effects tend to be more mitigated. The contrast between Morocco, Mexico and Colombia is interesting in this respect. In Morocco, agricultural supply has been shown to increase with the rural minimum wage, which has been interpreted as evidence of labor reallocation from small units to larger establishments with some monopsony power (see Azam, 1994). In Mexico, where the minimum wage was a bare 13 percent of the average unskilled manufacturing wage by 1990, no disemployment effects could be found. But in Colombia, where the ratio was about 53 percent, the elasticity of unskilled employment to the minimum wage could be close to -0.1 (see Bell, 1995).

It is thus fair to conclude that evidence exists to support either of the two sides of the debate (see World Bank, 1995, chapter 11). This conclusion should come as no surprise. Whether minimum wages have a positive or a negative impact on employment depends on the structure of the labor market, the level at which the minimum wage is set, and the government's ability to enforce it. Since all three features may vary from country to country, extracting general lessons from the international evidence and applying them to the Indonesian case could be a meaningless exercise. Both the theoretical analysis and the international evidence provide a useful background, but a careful assessment of the Indonesian data cannot be skipped.

c) Previous Studies on Indonesia

There has been much debate in recent years about what happened to real wages in Indonesia. A fair summary of the outcome of this debate would probably involve the following two propositions: i) urban wages grew faster than agricultural wages, but ii) they grew less than urban labor productivity. The first of these propositions is documented by Manning (1994), who shows there has been no sustained upward movement in casual agricultural wage rates in the rice

sector, traditionally the most important employer of labor in Indonesia. The second one is slightly more controversial. While Nachrowi *et al.* (1995) claim workers have not shared the benefits from economic growth, Agrawal (1996) forcefully argues that average wage earnings and output per capita have expanded at roughly the same rate.

These two views are not totally incompatible though. Manning (1994) mentions a couple of reasons that may account for a rapid increase in urban wage *earnings*, in spite of less buoyant urban wage *rates*. First, Indonesian workers are increasingly educated. Part of the rise in wage earnings may thus reflect a composition effect, particularly in a context where skilled labor remains a scarce resource compared to the needs of modern sector firms. And second, many of the new jobs are in large establishments, where workers tend to earn a significant share of their income under the form of over-time payments and annual bonuses. In this respect, the relevant indicator to assess whether Indonesian workers shared the fruits of economic growth would neither be the basic wage rate nor total wage earnings per worker, but rather the average earnings per hour, including over-time and bonuses.

Beyond the controversy on the exact order of magnitude of the gains for urban wage earners, these gains admit two explanations. A first possibility is that Indonesia is not a labor surplus economy anymore. For a very long time, rural migration exerted a downward pressure on urban wages. The growth rate of the latter was thus determined by productivity growth in agriculture, in spite of much higher productivity growth in the expanding modern sector. Now that the fraction of agriculture in the total labor force has fallen for the first time below 50 percent, the turning point towards a labor scarce economy may have been reached, at least in some provinces and sectors. In this interpretation, the growth of urban wages would be mostly market driven, and it should accelerate in the coming years.

But Indonesia may still be a labor surplus economy, in which case the increase of wage earnings in recent years could be partly attributed to the minimum wage policy adopted in the late 1980s and early 1990s. This is the preferred explanation of Nachrowi *et al.* (1995), who claim that most firms in Jawa and Sumatera Utara paid their workers around the minimum wage in 1980-91, in spite of limited enforcement efforts by the government. It is also preferred by Manning (1994), who conjectures that at least part of the increase in real wages observed in the textile sector in the early 1990s might be attributed to government attention to minimum wages, especially in the textile sector.

A few studies have tried to assess the consequences of the recent minimum wage hikes in a more systematic way. One of them, by an author who has preferred to remain anonymous, includes a survey of seven managers in the footwear industry, four in garments and an official from a footwear textile association. All of the interviewees were quite clear that the factories they owned or dealt with paid the minimum wage or more, although they acknowledged most female workers earned the minimum only. Minimum wage hikes were not the number one concern of these factories though. More important problems were low labor productivity, trade barriers, difficulties getting licenses and permits, and general red-tape and bureaucratic delays.

A second study, by the Ministry of Manpower itself (Depnaker, 1995), diagnosed the textile industry in the districts of Majalaya and Pekalongan after various mass media reported it was under a threat of bankruptcy. The study covers the period 1993-95, based on a sample of 15 small and medium-size firms. All of the firms surveyed in Pekalongan were complying with the legal minimum wages, and had not varied their number of workers during the three-year period considered. The increase in minimum wages was not mentioned as a major source of concern by their managers, although it had led to an unambiguous decline in profits. In this respect, the

study mentions that managers in Pekalongan usually view their employees as their own relatives, and providing work as a religious obligation.

In Majalaya, by contrast, employment declined over the period 1993-95. Two out of the six companies surveyed in that district suppressed one shift, and one of them laid off almost three quarters of its personnel. The study claims this employment decline was due to the scarcity of raw materials, which led to a substantial cost increase. Three of the firms surveyed in Majalaya report the average monthly earnings of their workers, and these are clearly above the minimum wage indeed. However, no information on labor earnings is provided by the two firms that reduced their personnel. It is therefore unclear whether these two firms were hit by the minimum wage hike.

Finally, a 1995 survey of women workers in selected sectors included a few questions on compliance with the minimum wage (Pangestu, 1996). Overall, 78 percent of the respondents received base wages in line with the minimum legal requirement. The share was as high as 88 percent if food and transportation allowances are taken into account as well. However, the level of compliance varied much across plant sizes and sectors of activity. Only 30 percent of the workers in small firms, and 37 percent of those in medium-sized firms, were actually paid the legal minimum. Among the sectors surveyed, the lowest level of compliance (51 percent of the interviewees) was found in the shoe industry, and the highest in the textile industry.

4. Minimum Wages and the Wage Distribution

a) The Extent of Compliance

Individual data on the earnings of laborers and employees can be used to evaluate whether minimum wages are binding. These data provide information on how many wage

earners make less than the corresponding minimum, in spite of working full time. The lower the percentage of workers who earn less than the minimum, the higher the extent of *compliance*. These data also show whether or not the earnings of full time workers are concentrated at or around the legal minimum, i.e. whether the earnings distribution displays a discontinuity. Such a clustering of individual earnings would indicate an effective *enforcement* of minimum wages. In the absence of it, a small percentage of workers earning less than the legal minimum wage would only mean than the latter is set a relatively low level, not that it is binding.

The analysis of individual earnings data in this section is based on the 1993 labor force survey (*Sakernas*). Using data from 1993 is potentially illuminating for several reasons. First, minimum wages were already high at that time. The ratio of minimum wages to output per worker excluding gas and oil was 26 percent in 1993, compared to 21 percent three years earlier. Second, 1993 was probably a relatively "normal" year in terms of compliance. Particularly, the minimum wage increases of 1993 were not as sharp and unexpected as those of 1994. As a result, it may have been relatively easier for firms to adjust to the new situation.

The analysis focuses on laborers and employees aged 10 years or more who worked at least 35 hours in their main occupation during the week preceding the survey. The daily earnings of these workers are calculated based on their wages or salaries and hours of work in their main occupation. Consistency across responses is used to set aside "noisy" observations, thus leading to a sample of roughly 6,000 observations per quarter. Workers are classified according to their residence (urban or rural) and sector of activity. Given the limited relevance of minimum wages in rural areas, some of the results presented below correspond to urban wage earnings only. Earnings in manufacturing correspond to both urban and rural areas though, because the aggregate data to be used in the econometric analysis of sections 5 to 7 includes all establishments, regardless of their area of location.

The fraction of full-time laborers and employees with earnings below the minimum wage in 1993 is reported in Table 4. The figures indicate an uneven extent of compliance across regions. Overall, roughly 15 percent of all urban laborers and employees, and a similar fraction of the laborers and employees in manufacturing, earn less than the minimum. But the fraction is close to zero in some provinces, and as high as 40 percent in others. A similar variance can be observed in the case of female workers, and of workers aged 15 to 24. Figures for any of these two groups in some specific provinces should be interpreted with caution, due to the small size of the corresponding samples. But on average, it is clear that compliance is lower in the case of young workers, and much lower in the case of female workers.

b) Do Minimum Wages Bite?

The shape of the wage distribution can be used to evaluate whether minimum wages are actually enforced. In the absence of government intervention, the wage distribution can be expected to be relatively smooth, reflecting the underlying distribution of skills and other individual characteristics. However, if some of those who would have earned less than the minimum lose their job, while other get a pay increase, a discontinuity should appear. Visual inspection of the wage distribution usually allows identifying this sort of discontinuity. It is applied here to density functions drawn at the province level for each of the groups of workers considered in Table 4. Note that the drawing of the density functions already involves some "smoothing" of the data, so that visual inspection tends to under-estimate the effectiveness of enforcement.

Based on this exercise, it is safe to conclude that minimum wages do affect the shape of the wage distribution in many Indonesian provinces. In most cases, the steeper upward-sloping section of the density function corresponds to earnings at or around the minimum wage level.

Table 4

Compliance with the Minimum Wage by Provinces (in 1993)

Province	Fraction of full-time workers earning less than the minimum wage					
	Urban laborers & employees			Manufacturing laborers & employees		
	All	Female	Age 15-24	All	Female	Age 15-24
D.I. Aceh	0.064	0.124	0.234	0.072	0.174	0.080
Sumatera Utara	0.173	0.430	0.371	0.192	0.448	0.326
Sumatera Barat	0.060	0.114	0.148	0.163	0.399	0.228
Riau	0.048	0.202	0.176	0.074	0.221	0.139
Jambi	0.099	0.298	0.290	0.065	0.306	0.096
Bengkulu	0.131	0.359	0.298	0.172	0.552	0.298
Sumatera Selatan	0.076	0.143	0.230	0.124	0.000	0.199
Lampung	0.188	0.419	0.449	0.413	0.522	0.670
D.K.I. Jakarta	0.134	0.333	0.314	0.055	0.119	0.131
Jawa Barat	0.108	0.242	0.181	0.115	0.182	0.137
Jawa Tengah	0.218	0.468	0.379	0.212	0.380	0.287
Yogyakarta	0.010	0.239	0.172	0.121	0.276	0.187
Jawa Timur	0.212	0.415	0.375	0.182	0.314	0.250
Bali	0.198	0.380	0.378	0.394	0.646	0.492
Nusa Tenggara Barat	0.146	0.363	0.322	0.172	0.323	0.132
Nusa Tenggara Timur	0.178	0.315	0.595	0.444	1.000	1.000
Timor Timur	0.155	0.364	0.483	0.000	0.000	0.000
Kalimantan Barat	0.092	0.200	0.281	0.110	0.252	0.235
Kalimantan Tengah	0.060	0.100	0.197	0.033	0.235	0.095
Kalimantan Selatan	0.066	0.160	0.134	0.062	0.179	0.014
Kalimantan Timur	0.023	0.090	0.040	0.000	0.000	0.000
Sulawesi Utara	0.104	0.239	0.260	0.295	0.722	0.361
Sulawesi Tengah	0.136	0.263	0.460	0.141	0.000	0.000
Sulawesi Selatan	0.064	0.182	0.161	0.194	0.336	0.284
Sulawesi Tenggara	0.032	0.048	0.109	0.000	0.000	0.000
Maluku	0.068	0.221	0.313	0.015	0.078	0.078
Irian Jaya	0.111	0.235	0.309	0.259	0.669	0.199
All Indonesia	0.148	0.339	0.290	0.147	0.269	0.206

Note: The data are from the labor force survey. Note that the sample has less than ten observations for some groups of workers in D.I. Aceh, Sumatera Selatan, Nusa Tenggara Timur, Timor Timur, Kalimantan Tengah, Sulawesi Tengah, Sulawesi Tenggara, Maluku and Irian Jaya.

Quite often, this section is almost vertical, as shown in Figures 5 and 6, which correspond to urban wage earners in Jawa Barat and to workers in manufacturing in Kalimantan Tengah respectively. While these two cases could be deemed extreme, the pattern displayed in the Figures can be found in other provinces too, even for young and female workers.

There are of course some cases in which no discontinuity nor clustering of observations can be observed. Figure 7, which corresponds to urban wage earners in Bengkulu, is one of them. Also, for some provinces and sub-sets of workers the number of observations in the sample is too small to make any inference. However, it must be noted that for minimum wages to be relevant it is not necessary that all of the provincial wage distributions get distorted. The fact that at least some of them do is enough to indicate a potential impact on earnings and employment. The impact is probably larger nowadays, due to the publicity campaign undertaken since 1994 to make enforcement more effective.

5. Exploiting Cross-Province Variation in the Data

In practice, the effects of a minimum wage hike may be more blurred than in theory. To illustrate the point, consider what happens to average wages. Workers who used to make less than the new minimum may see their earnings adjusted up to the new level. Workers who initially made more than the new minimum may also get a pay increase, if the structure of relative wages within firms tends to be preserved. These upward adjustments of wages, in turn, can affect employment. Some of the workers may lose their jobs (as in the neoclassical model) whereas other individuals may be willing to work at the new wage rates (as in the monopsony model). Employment can also be affected if some firms react to the minimum wage hike by not complying anymore. All of these changes in employment have an impact on average wages too.

Figure 5

Wage Distribution for Jawa Barat
(All Urban Laborers and Employees, 1993)

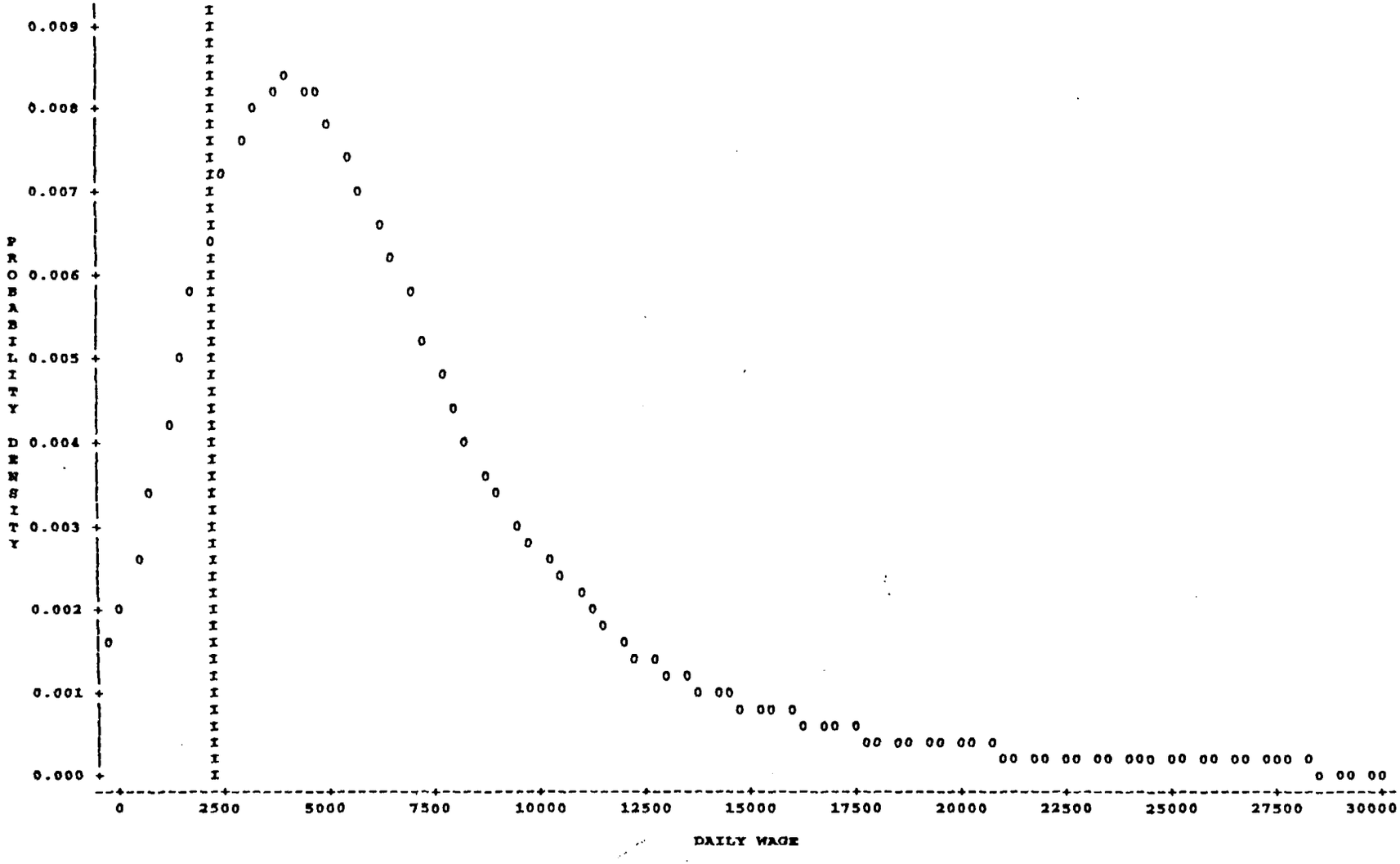


Figure 6

Wage Distribution for Kalimantan Tengah
(Manufacturing Laborers and Employees, 1993)

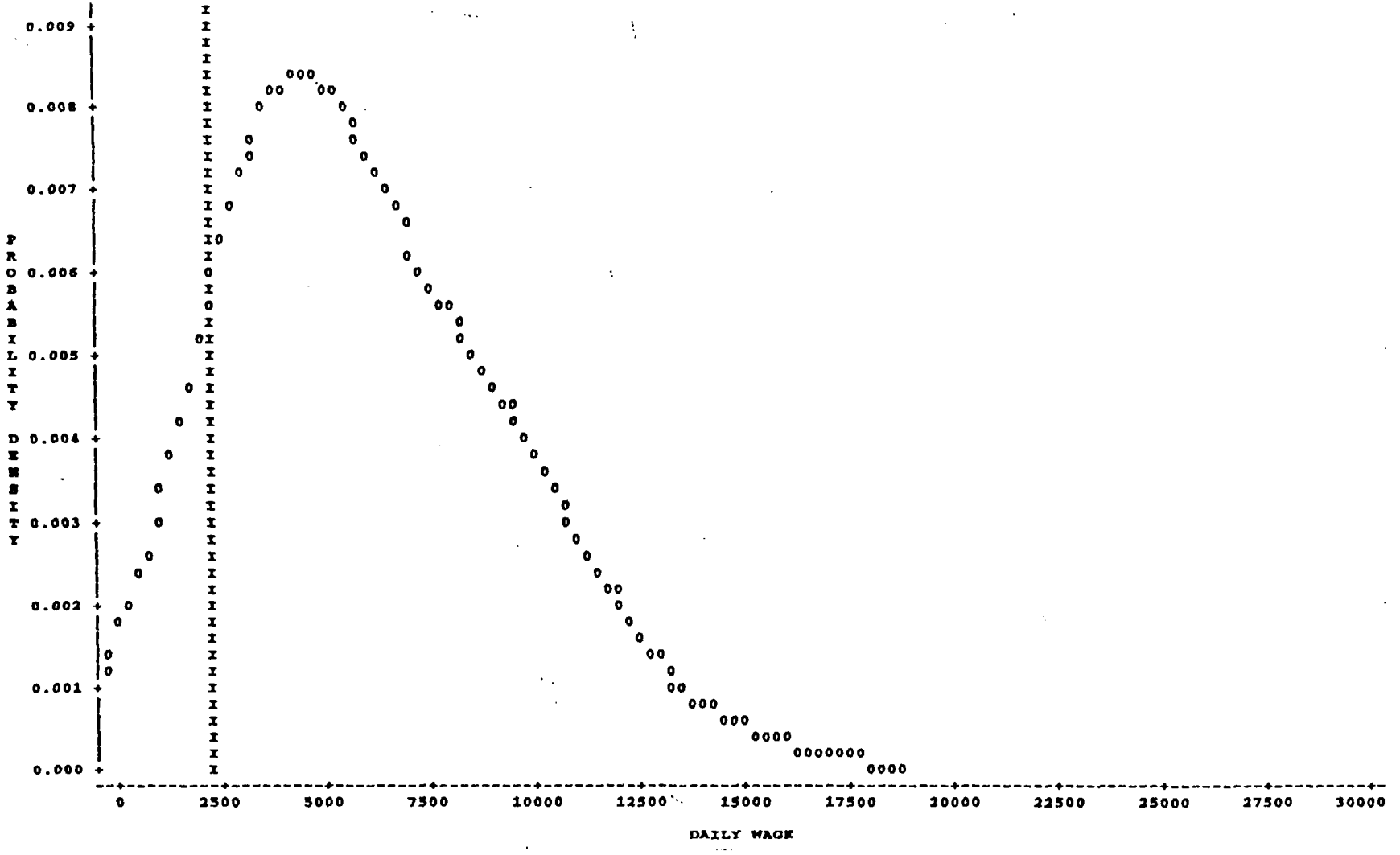
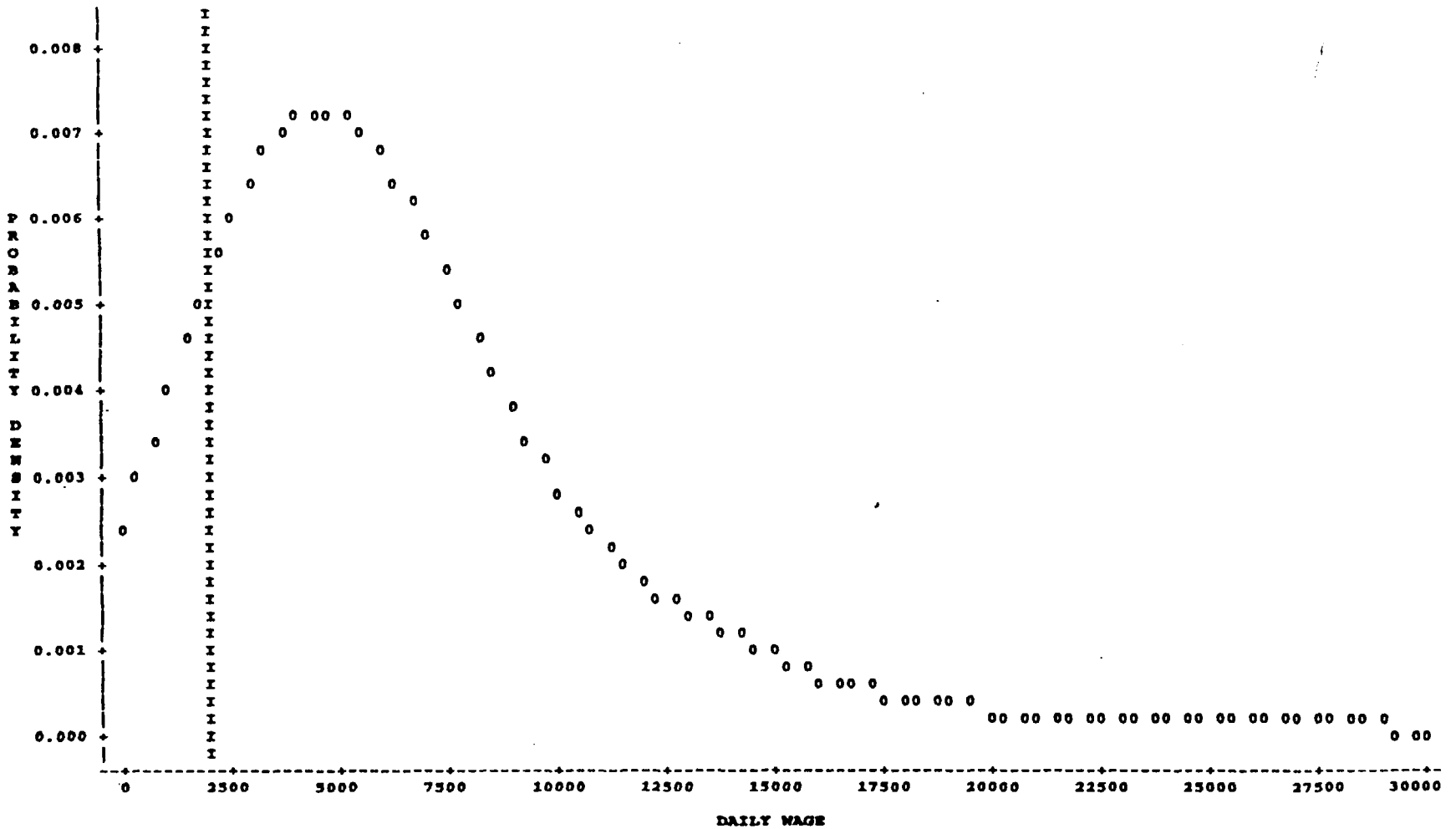


Figure 7

Wage Distribution for Bengkulu
(All Urban Laborers and Employees, 1993)



While disentangling the relative importance of each of the mechanisms at work may be an impossible task, estimating the overall impact of minimum wage hikes on average wages is still feasible. The variation of average and minimum wage increases across provinces can be used for this purpose. The implicit assumption in this respect is that average wages would grow at the same rate in all provinces in any specific year, if it was not by the effects of minimum wages growing at varying paces. Note that this assumption is not incompatible with differences in the *levels* of average wages and employment across provinces, even in the absence of any minimum wage. It is not incompatible with differences in the *growth rates* of average wages and employment across years either.

In econometric parlance, all of the estimates hereafter are based on the application of fixed effects models to aggregate data from the 27 provinces over several years. The specifications used boil down to some version of the following equation:

$$Z_{it} = f(MW_{it}) + \theta_i + \tau_t + \varepsilon_{it}$$

where Z_{it} is an economic outcome (say, the average wage) in province i and year t, MW_{it} is the minimum wage in force in the same province and year, θ_i is a province-specific effect, τ_t is a year-specific effect, and ε_{it} is a stochastic disturbance. The f(.) function involves no other aggregate variables than the minimum wage, to minimize estimation bias. Indeed, most of the variables that potentially affect labor market outcomes, such as economic activity, may in turn be affected by the minimum wage. In the "minimalist" approach adopted here, by contrast, all of the determinants of the outcome Z_{it}, except for the minimum wage, are assumed to be either province-specific (e.g. infrastructure, natural resources, demography...) or time-specific (e.g. macroeconomic policies, external shocks, the investment climate...).

Most of the rest of the paper is devoted to estimating the elasticity of function f(.) with respect to variable MW for a series of economic outcomes Z. For the sake of clarity, the main findings are summarized in the last two rows of all subsequent Tables. The first of these rows calculates the elasticity of function f(.) with respect to variable MW, taking the estimated regression coefficients at face value regardless of their individual statistical significance. Only when the model itself fails to pass the F-test at the 5 percent confidence level are the estimated coefficients treated as zeros. The second row, in turn, treats all non significant estimates as zeros, even if the model is not rejected.

The appropriate test to evaluate the statistical significance of the individual coefficients is guided by theory. When the predicted elasticity of function f(.) with respect to variable MW has the same sign in both the neoclassical model and the monopsony model, a one-tail t-test is applied to the relevant coefficients. Such is the case for average wages, because neither model predicts their decline as a result of an increase in minimum wages. A two-tail test is used, by contrast, when the two models lead to predictions which are either opposite (as in the case of employment) or of an ambiguous sign (as in the case of investment). The chosen level of significance for the t-test is 10 percent.

6. The Impact on Wages

a) Urban Wage Earnings

To analyze the impact of minimum wages on average wages, a particular version of the basic equation is used. The variable capturing the labor market outcome in this case is Z_{it} = Log W_{it}, where W_{it} is the average wage in province i and year t. The underlying "minimalist"

function is assumed to be of the form $f(.) = a_0 + a_1 t + a_2 MW_{it}$. Replacing in the basic equation, and taking differences, the following expression obtains:

$$\Delta \text{Log } W_{it} = a_1 + a_2 \Delta \text{Log } MW_{it} + \tau_t' + \varepsilon_{it}'$$

where $\Delta x = x_t - x_{t-1}$, $\tau_t' = \Delta\tau_t$ and $\varepsilon_{it}' = \Delta\varepsilon_{it}$. This equation is similar to the one used by Card and Krueger (1995, chapter 9) for the US, except that in the above specification the coefficient a_2 directly measures the elasticity of the average wage to the minimum wage. Note that the equation being in differences, the province-specific effects cancel out.

Indonesian labor force surveys provide valuable information on average wage earnings. Table 5 reports estimates of the above function when the earnings of urban laborers and employees (both total and by gender) are used to measure the dependent variable. The earnings data are from official publications, so that they include part-time workers, and not only full-time workers, as was the case for the 1993 earnings data analyzed in the previous section. However, the published data still allow to distinguish between urban and rural laborers and employees. Given the lack of enforcement of minimum wages in agriculture, the econometric work focuses on urban laborers and employees only.

All six specifications in Table 5 include two dummy variables to account for the uncommon patterns observed in the provinces of Riau and Timor Timur. Labor market outcomes in the former province may have been affected by the expansion of the free-trade zone of Batam, while the conflict over sovereignty in the latter province may have led to idiosyncratic policies. The coefficients multiplying these dummy variables are statistically significant in most specifications. By contrast, the time-specific effects are weak on an individual basis; hence the F-test performed to assess their joint significance. Based on the results of this test, the preferred specifications are (A) for wage earners of both sexes, (C) for male wage earners and (F) for

Table 5

Impact on Average Wage Earnings

Explanatory variables	Dependent variable: change in the log of nominal earnings of urban laborers & employees					
	Both sexes		Males		Females	
	(A)	(B)	(C)	(D)	(E)	(F)
Change in the log of the minimum wage	0.0888 (1.423)	0.0660 (1.190)	0.0920 (1.317)	0.0659 (1.076)	0.0602 (0.790)	0.1084 (1.657)
Independent term	0.0987 (5.718)	0.1123 (9.371)	0.1005 (5.187)	0.1118 (8.447)	0.0938 (4.448)	0.1112 (7.871)
Dummy variable for Riau	0.0549 (1.488)	0.0529 (1.331)	0.0668 (1.613)	0.0646 (1.469)	- 0.0144 (- 0.320)	- 0.0103 (- 0.220)
Dummy variable for Timor Timur	0.1000 (1.927)	0.1184 (2.137)	0.0867 (1.490)	0.1035 (1.690)	0.1525 (2.406)	0.1750 (2.680)
Year dummies	Yes	No	Yes	No	Yes	No
Adjusted R^2	0.166	0.025	0.133	0.016	0.120	0.041
F test for the regression	4.925	2.336	4.027	1.839	3.695	3.226
F test for year dummies	6.243		5.191		3.802	
Number of observations	159	159	159	159	159	159
Elasticity (point estimate)	0.089	Model	0.092	Model	0.060	0.108
Elasticity (significant only)	0.089	rejected	0.092	rejected	0.000	0.108

Note: There is one observation per province per year, as allowed by the data. Earnings data are from the labor force survey. Values in parentheses are "t" statistics. Statistical significance is assessed at the 5 percent for the F-test and at the 10 percent level for the one-tail t-test.

female wage earners. In all of these specifications, the elasticity of average wages with respect to minimum wages is in the order of 0.1.

To check whether the methodological approach adopted in the paper affects in any crucial way the estimated elasticities, less "minimalist" versions of the f(.) function were considered. The regressions in Table 6 are based on equation (F) in the previous Table, but they also add other "determinants" of the growth of average wages, including changes in population of working age, changes in average productivity (measured in various ways) and changes in consumer prices. All of these variables are defined at the provincial level. The interpretation of the associated coefficients is hazardous, because the f(.) function could be the reduced form of several, different structural models. But the elasticity of the average female wage with respect to the minimum wage remains very similar to the "minimalist" estimate.

b) Wages in Manufacturing

There are three sources of information on wages and labor costs in manufacturing at the provincial level. One of them is the national wages survey (*Survei Upah*), which collects data on the occupation and earnings of workers in several thousand establishments with 20 or more employees, mainly in manufacturing. The other two sources are plant level surveys of manufacturing firms which cover respectively medium and large establishments (*Survei Tahunan Perushaan Industri Besar dan Sedang*), and small establishments and cottage industries (*Statistik Industri Kecil*). While none of these last two sources reports data on actual wages, they both have information on the total wage bill and the number of wage earners, thus allowing the calculation of average labor costs per worker.

The three sources mentioned are available over a shorter period of time than the labor force survey. The last published issue of the wage survey corresponds to 1991, and the last

Table 6

Robustness of Estimates to Changes in Control Variables

Explanatory variables	Dependent variable: change in the log of nominal earnings of female urban laborers & employees				
	(A)	(B)	(C)	(D)	(E)
Change in the log of the minimum wage	0.1122 (1.693)	0.1176 (1.730)	0.1020 (1.567)	0.1024 (1.524)	0.0989 (1.469)
Independent term	0.1131 (7.569)	0.1525 (6.124)	0.0686 (2.411)	0.1841 (6.149)	0.1546 (3.772)
Dummy variable for Riau	- 0.0101 (- 0.215)	- 0.0528 (- 1.048)	- 0.0132 (- 0.282)	- 0.0293 (- 0.588)	- 0.0297 (- 0.595)
Dummy variable for Timor Timur	0.1747 (2.667)	0.1488 (1.885)	0.1787 (2.752)	0.1628 (2.072)	0.1632 (2.078)
Change in the log of urban population aged 10 and above	- 0.0328 (- 0.402)			- 0.0139 (- 0.174)	- 0.0208 (- 0.260)
Change in the log of nominal output per worker, excluding oil		- 0.3417 (- 1.860)			
Change in the log of output measured at constant prices				- 0.9024 (-2.605)	- 0.8583 (- 2.460)
Change in the log of consumer prices in the provincial capital			0.5762 (1.722)		0.3565 (1.052)
Adjusted R^2	0.035	0.037	0.053	0.055	0.056
F test	2.447	2.253	3.191	2.521	2.287
Number of observations	159	132	159	132	132
Elasticity (point estimate)	0.112	Model	0.102	0.102	0.099
Elasticity (significant only)	0.112	rejected	0.102	0.102	0.099

Note: There is one observation per province per year, as allowed by the data. Values in parentheses are "t" statistics. Statistical significance is assessed at the 5 percent level for the F-test, and at the 10 percent level for the one-tail t-test.

published issue of the survey of large establishments in manufacturing to 1992. Coverage is even more restricted in the case of the survey of small establishments, which was carried out in 1991 and 1993 only. Consequently, none of these three sources can account for developments in recent years, when minimum wages increased at a faster pace, and enforcement efforts were more consequent. It is important to keep in mind, however, that variation across provinces is much higher in Indonesia than variation over time. Therefore, some insight may still be gained from analyzing data from these three sources.

Estimates based on the national wages survey are reported in Table 7 for workers of both sexes, for males and for females respectively. Since neither the time-specific effects nor the dummy variables for Riau and Timor Timur were statistically significant, they were all excluded from the regressions. Note that equation (B) has no explanatory power, which would make sense if most of the male workers in manufacturing had earnings above the legal minimum in the late 1980s and early 1990s. Note also that equations (A) and (C) yield values of a_2 which are statistically significant, and very much in accordance with the results reported in Table 5 for urban laborers and employees as a whole.

The analysis was replicated with data from the two plant level surveys. The most salient result was the lack of explanatory power of the model in any of the specifications. Two hypotheses can be offered to explain the rejection of the model. One of them concerns the poor quality of the data, and it almost surely applies to small firms. Indeed, the survey of small establishment reports a dramatic decline of the average labor cost per worker (in nominal terms) in several provinces between 1991 and 1993, which is very unlikely. The other hypothesis refers to compensating changes in wages, and it could have some relevance in the case of large manufacturing firms. If labor costs include wages and allowances, a mandated increase in wages

Table 7

Impact on Average Wages in Manufacturing

Explanatory variables	Dependent variable: change in the log of nominal wages in manufacturing		
	Both sexes	Males	Females
Change in the log of the minimum wage	0.1065 (2.103)	0.0602 (0.927)	0.1418 (1.741)
Independent term	0.0474 (4.418)	0.0476 (3.615)	0.0517 (3.101)
Adjusted R^2	0.039	- 0.002	0.030
F test	4.053	0.860	3.033
Number of observations	76	76	66
Elasticity (point estimate)	0.107	Model	Model
Elasticity (significant only)	0.107	rejected	rejected

Note: There is one observation per province and per year, as allowed by the data. Values in parentheses are "t" statistics. Statistical significance is assessed at the 5 percent level for the F-test and at the 10 percent level for the one-tail t-test. The year dummies and the dummy variables for Riau and Timor Timur were excluded from the specifications in this table because they were not significant.

can be offset, at least in principle, by a similar reduction in allowances. This hypothesis should not be pushed too far though, in light of the strictly positive elasticities reported in Table 7.

7. The Impact on Employment

a) Urban Wage Employment

A particular version of the basic equation presented above can be used to analyze the impact of minimum wages on employment. Unlike the previous version of the equation, used to analyze the impact on average wages, this one is specified in levels rather than in differences. Let the relevant labor market outcome be the ratio of employment to population, i.e. $Z_{it} = L_{it}/N_{it}$. A minimalist version of the f(.) function would be $f(.) = b_1 + b_2(MW_{it}/R_{it})$, where R is an indicator of labor productivity. The equation to be estimated is therefore:

$$L_{it}/N_{it} = b_1 + b_2 (MW_{it}/R_{it}) + \theta_i + \tau_t + \varepsilon_{it}$$

This equation is almost identical to the one used by Neumark and Wascher (1992) in the case of the US. Although coefficient b_2 in this equation does not directly measure the elasticity of employment with respect to the minimum wage, such elasticity can be calculated as $b_2\mu/\lambda$, where μ is the sample mean of MW_{it}/R_{it} and λ the sample mean of L_{it}/N_{it}.

In what follows, five different indicators of labor productivity are used. Some of them are closer to the marginal productivity of labor, while others reflect average productivity. The main interest of relying on a variety of indicators is to check the robustness of the results. For instance, the estimated coefficient b_2 could be significantly negative when using one of the indicators of labor productivity, but significantly positive when using some other indicator. In

this case, no reliable inference could be drawn from the regressions. Conversely, the estimated coefficient b_2 could be statistically insignificant for any of the productivity indicators, but have the same sign for all of them. This consistency of results could be seen as evidence that minimum wages do affect employment.

The marginal productivity of labor is measured through either wages or labor costs, defined as in the previous section. The wage variables considered are the average earnings of urban laborers and employees of both sexes (from the labor force survey) and the average wages of workers of both sexes in manufacturing (from the wage survey). The labor cost variable considered is the average labor cost per worker in large manufacturing firms. The average productivity of labor, in turn, is measured by value added per worker in either manufacturing or all sectors excluding the production of oil and gas. Data for value added and employment in manufacturing are from the survey of large firms. Data for value added in all sectors are from national accounts, while total employment numbers are from the labor force survey.

Regression results for the ratio of urban wage employment to urban population of working age are reported in Table 8. The estimated elasticity of employment with respect to minimum wages is statistically significant in only one of the specifications, but it has the same sign (negative) in four of them and is close to zero in the fifth one. So, if anything, higher minimum wages reduce wage employment in Indonesia, as the neoclassical model would predict. It is more difficult to decide what the order of magnitude of this effect is. The average elasticity is - 0.025 or - 0.014 depending on whether the estimated coefficients are taken at face value or treated as zeros when they lack statistical significance.

The analysis is replicated in Table 9 for young urban wage employment, with the population variable defined accordingly. As in industrial countries, the jobs of those who have lower skills and less experience are more likely to be at stake when the minimum wage

Table 8

Impact on Urban Wage Employment

Explanatory variables	Dependent variable: urban laborers & employees aged 10 and above/ urban population aged 10 and above				
	(A)	(B)	(C)	(D)	(E)
Mininum wage/average earnings of urban laborers & employees	- 0.0204 (- 0.861)				
Minimum wage/average wage in manufacturing		0.0057 (0.157)			
Minimum wage/labor costs per worker in large manufacturing			- 0.0151 (- 0.846)		
Minimum wage/value added per worker in large manufacturing				- 0.0215 (- 0.530)	
Minimum wage/GDP per worker excluding oil and gas					- 0.0553 (- 1.865)
Province dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.832	0.842	0.826	0.825	0.835
F test	28.74	19.63	21.03	20.93	29.34
Number of observations	186	102	132	132	186
Elasticity (point estimate)	- 0.033	0.010	- 0.022	- 0.008	- 0.070
Elasticity (significant only)	0.000	0.000	0.000	0.000	- 0.070

Note: There is one observation per province and per year, as allowed by the data. Values in parentheses are "t" statistics. Statistical significance is assessed at the 5 percent level for the F-test and at the 10 percent level for the two-tail t-test. All specifications include an independent term.

Table 9

Impact on Urban Wage Employment of Ages 15 to 24

Explanatory variables	Dependent variable: urban laborers & employees aged 15 to 24/ urban population aged 15 to 24				
	(A)	(B)	(C)	(D)	(E)
Mininum wage/average earnings of urban laborers & employees	0.0259 (0.876)				
Minimum wage/average wage in manufacturing		- 0.0794 (-1.581)			
Minimum wage/labor costs per worker in large manufacturing			- 0.0038 (- 0.156)		
Minimum wage/value added per worker in large manufacturing				- 0.0174 (- 0.313)	
Minimum wage/GDP per worker excluding oil and gas					- 0.0447 (- 1.203)
Province dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.896	0.882	0.870	0.870	0.897
F test	49.35	26.95	29.20	29.23	49.59
Number of observations	186	102	132	132	186
Elasticity (point estimate)	0.062	- 0.228	- 0.008	- 0.010	- 0.082
Elasticity (significant only)	0.000	0.000	0.000	0.000	0.000

Note: There is one observation per province and per year, as allowed by the data. Values in parentheses are "t" statistics. Statistical significance is assessed at the 5 percent level for the F-test and at the 10-percent level for the two-tail t-test. All specifications include an independent term.

increases. The analysis of individual data from the 1993 labor force survey, in section 5, confirmed that workers in this age group get lower wages than the average Indonesian worker. However, the disemployment effect of the minimum wage does not appear to be stronger for them than for the average Indonesian worker. Again, the estimated elasticity is negative in four of the regressions, but it is not statistically significant in any of them. The average elasticity is -0.053 or zero, depending on how non significant estimates are treated.

b) Employment in Manufacturing

The effects of the minimum wage on employment in manufacturing vary dramatically depending on the size of the establishments. The results in Table 10 suggest that large manufacturing firms fit the monopsony model of the labor market. While none of the estimated b_2 coefficients is statistically significant, they are all five positive. The average elasticity implied by the estimated coefficients is about 0.075, it these coefficients are taken at face value. It is nil, however, if non statistically significant coefficients are treated as zeros.

It should be noted that one of the estimated b_2 coefficients, in specification (C), may be biased upwards though. To make the point clear, assume employment in large manufacturing is over-estimated by the survey for some specific province and year, while total labor costs are appropriately measured. As a result of this measurement error, the average labor cost per worker in manufacturing will be under-estimated, and the ratio of minimum to average wages over-estimated. Therefore, both the endogenous and the exogenous variable will appear to be larger than they actually are, and coefficient b_2 will be over-estimated. While the similarity of the elasticities obtained in three out of five specifications suggests that measurement error bias may not be very relevant in the case of specification (C), more research is needed to check the robustness of the results obtained for large manufacturing.

Table 10

Impact on Wage Employment in Large Manufacturing

Explanatory variables	Dependent variable: wage employment in large manufacturing/ urban population aged 10 and above				
	(A)	(B)	(C)	(D)	(E)
Mininum wage/average earnings of urban laborers & employees	0.0168 (0.807)				
Minimum wage/average wage in manufacturing		0.0135 (0.553)			
Minimum wage/labor costs per worker in large manufacturing			0.0170 (1.413)		
Minimum wage/value added per worker in large manufacturing				0.0218 (0.791)	
Minimum wage/GDP per worker excluding oil and gas					0.0001 (0.004)
Province dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.883	0.902	0.884	0.883	0.883
F test	32.76	32.95	33.24	32.75	32.52
Number of observations	132	102	132	132	132
Elasticity (point estimate)	0.119	0.110	0.110	0.035	0.001
Elasticity (significant only)	0.000	0.000	0.000	0.000	0.000

Note: There is one observation per province per year, as allowed by the data. Values in parentheses are "t" statistics. Statistical significance is assessed at the 5 percent level for the F-test, and at the 10 percent level for the two-tail t-test. All specifications include an independent term.

The pattern is dramatically different in the case of small establishments and cottage industries. Because of data availability, only two of the five indicators of labor productivity can be used in this case. But both of them yield negative values for the coefficient b_2, as shown by Table 11, and the implied disemployment effects appear to be large. Since none of the estimates of coefficient b_2 is statistically significant, the hypothesis that minimum wages do not affect employment in small manufacturing firms cannot be rejected. But if the obtained estimates are taken at face value, the average elasticity of employment to the minimum wage would be -0.644, very much in accordance with the neoclassical model of the labor market.

c) Lay-off Requests

Lay-off requests provide an opportunity to check whether and how employment in large firms is affected by minimum wages. Firms in Indonesia are not allowed to reduce their personnel unless authorized to do so by the Ministry of Manpower. Interestingly, most of the firms that submit lay-off requests are large, as indicated by the sizable number of workers who are affected (around 30, on average). Smaller firms are less likely to hire permanent workers and, therefore, they are also less likely to resort to lay-offs when they need to adjust their personnel. Of course, changes in employment result not only from lay-offs, but also from the recruitment of new workers. Nevertheless, lay-offs tend to be more prevalent when the level of employment decreases, and less common when it increases.

It is a priori unclear whether the number of lay-offs should be treated as a function of the level of minimum wages, or rather as a function of its variation. The partial equilibrium analysis introduced in section 3 to discuss the neoclassical and the monopsony cases suggests it is variation that matters. In this analysis, workers are hired or fired once and for all as employment increases or decreases respectively. However, firms may not adjust immediately to their optimal

Table 11

Impact on Wage Employment in Small Manufacturing

Explanatory variables	Dependent variable: wage employment in small manufacturing firms/ urban population aged 10 and above	
	(A)	(E)
Mininum wage/Average earnings of urban laborers	- 0.0125 (- 0.770)	
Minimum wage/GDP per capita excluding oil		- 0.0437 (- 1.643)
Province dummies	Yes	Yes
Year dummies	Yes	Yes
Adjusted R^2	0.932	0.939
F test	23.92	26.71
Number of observations	46	46
Elasticity (point estimate)	- 0.336	- 0.951
Elasticity (significant only)	0.000	0.000

Note: There is one observation per province per year, as allowed by the data. Values in parentheses are "t" statistics. Statistical significance is assessed at the 5 percent level for the F-test, and at the 10 percent level for the two-tail t-test. All specifications include an independent term.

employment level if firing costs are significant. In this case, short-run increases in the level of the minimum wage may have little or no effect on lay-offs. It is rather the cumulated effect of these increases over time, as captured by the level of the minimum wage, that matters.

To account for the effects of both the level and the change in the level of minimum wages, the two following versions of the employment equation are used:

$$F_{it}/L_{it} = c_1 + c_2 (MW_{it}/R_{it}) + \theta_i + \tau_t + \varepsilon_{it}$$

$$F_{it}/L_{it} = c_1' + c_2' \, \Delta(MW_{it}/R_{it}) + \theta_i + \tau_t + \varepsilon_{it}$$

where F_{it} is the number of workers affected by the lay-off requests submitted to the Ministry of Manpower in province i and year t, and L_{it} is the corresponding number of urban wage earners.

The results obtained when estimating these two equations are presented in Tables 12 and 13 respectively. The estimated coefficient c_2 is negative in four of the five specifications, and significantly so in one of them. Coefficient c_2' is also negative in most of the specifications, and significantly so in one. Both high minimum wages and increasing minimum wages are therefore associated with a lower number of lay-offs, after controlling for province- and year-specific effects. Taking into account the previous results on employment levels (from Table 10), it is safe to conclude that employment in large Indonesian firms did not suffer from the minimum wage hikes. If anything it increased, as predicted by the monopsony model of the labor market.

8. The Impact on Investment

Whether minimum wages affect investment is an issue that can be addressed using the following version of the basic equation:

Table 12

Lay-offs and the Level of Minimum Wages

Explanatory variables	Dependent variable: workers affected by lay-off requests/ urban laborers & employees				
	(A)	(B)	(C)	(D)	(E)
Mininum wage/average earnings of urban laborers & employees	0.0060 (0.889)				
Minimum wage/average wage in manufacturing		- 0.0081 (- 0.745)			
Minimum wage/labor costs per worker in large manufacturing			- 0.0001 (- 0.023)		
Minimum wage/value added per worker in large manufacturing				- 0.0217 (- 2.427)	
Minimum wage/GDP per worker excluding oil and gas					- 0.0022 (- 0.246)
Province dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.589	0.802	0.817	0.835	0.632
F test	7.139	8.673	13.12	14.58	7.065
Number of observations	134	52	80	80	134
Elasticity (point estimate)	0.616	- 0.826	- 0.008	- 0.453	- 0.173
Elasticity (significant only)	0.000	0.000	0.000	- 0.453	0.000

Note: There is one observation per province per year, as allowed by the data. Data on lay-offs are for period July t- June t+1, while all other variables are for year t. Values in parentheses are "t" statistics. Statistical significance is assessed at the 5 percent level for the F-test, and at the 10 percent level for the two-tail t-test. All specifications include an independent term.

Table 13

Lay-offs and Changes in Minimum Wages

Explanatory variables	Dependent variable: workers affected by lay-off requests/ urban laborers & employees				
	(A)	(B)	(C)	(D)	(E)
Annual change in mininum wage/average earnings of urban laborers & employees	0.0027 (0.496)				
Annual change in minimum wage/ average wage in manufacturing		- 0.0003 (- 0.033)			
Annual change in minimum wage/labor costs per worker in large manufacturing			- 0.0004 (- 0.142)		
Annual change in minimum wage/value added per worker in large manufacturing				- 0.0112 (- 1.709)	
Annual change in minimum wage/GDP per worker excluding oil and gas					0.0018 (0.250)
Province dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.584	0.798	0.814	0.825	0.584
F test	6.984	8.457	12.78	13.64	6.965
Number of observations	133	52	79	79	133
Elasticity (point estimate)	0.015	- 0.004	- 0.002	- 0.014	0.004
Elasticity (significant only)	0.000	0.000	0.000	- 0.014	0.000

Note: There is one observation per province per year, as allowed by the data. Data on lay-offs are for period July N-June N+1, while all other variables are for year N. Values in parentheses are "t" statistics. Statistical significance is assessed at the 5 percent level for the F-test, and at the 10 percent level for the two-tail t-test. All specifications include an independent term.

$$I_{it}/Y_{it} = d_1 + d_2 (MW_{it}/R_{it}) + \theta_i + \tau_t + \varepsilon_{it}$$

In this equation, I_{it} represents investment in province i and year t, and Y_{it} is the corresponding output level. Investment can be measured in two different ways. Data from national accounts provide an accurate picture of total capital accumulation by both domestic and foreign agents. Data from foreign direct investment approvals are more noisy, because some of the projects fail to materialize, but they probably indicate how the country is perceived abroad.

The results obtained when estimating the equation above with each of the two investment series are reported in Tables 14 and 15 respectively. The results are somewhat more mitigated than in the previous Tables, in the sense that the sign and size of the elasticities varies considerably depending on the specification. The overall effect is most likely to be negative in the case of total investment, however. The average elasticity of the latter variable with respect to the minimum wage is - 0.040 if the estimated coefficients are taken at face value, or - 0.059 if non significant coefficients are treated as zeros. Moreover, the only statistically significant coefficient in Table 14 is negative too, and its order of magnitude is considerable. But the negative effect is not so obvious in the case of foreign direct investment. None of the relevant coefficients in Table 15 is significant indeed, which suggests that minimum wages may not affect the way Indonesia is perceived abroad.

9. Conclusions

At a first glance, the results of the empirical analysis in this paper indicate minimum wage effects are quite moderate in Indonesia. Wage distributions display only minor clusters of observations at or around the minimum wage, and for some provinces and groups of workers these clusters are hardly visible. Regression analysis leads to barely significant coefficients in

Table 14

Impact on Total Investment

Explanatory variables	Dependent variable: gross capital formation/GDP				
	(A)	(B)	(C)	(D)	(E)
Mininum wage/average earnings of urban laborers & employees	0.0822 (0.859)				
Minimum wage/average wage in manufacturing		0.0522 (0.433)			
Minimum wage/labor costs per worker in large manufacturing			- 0.0796 (- 1.432)		
Minimum wage/value added per worker in large manufacturing				0.0091 (0.071)	
Minimum wage/GDP per worker excluding oil and gas					- 0.2915 (- 2.367)
Province dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.856	0.854	0.858	0.855	0.863
F test	26.20	21.44	26.58	25.98	27.62
Number of observations	132	102	132	132	132
Elasticity (point estimate)	0.105	0.076	- 0.092	0.003	- 0.293
Elasticity (significant only)	0.000	0.000	0.000	0.000	- 0.293

Note: There is one observation per province per year, as allowed by the data. Values in parentheses are "t" statistics. Statistical significance is assessed at the 5 percent level for the F-test, and at the 10 percent level for the two-tail t-test. All specifications include an independent term.

Table 15

Impact on Foreign Direct Investment

Explanatory variables	Dependent variable: approved foreign direct investment/GDP				
	(A)	(B)	(C)	(D)	(E)
Mininum wage/average earnings of urban laborers & employees	- 0.1236 (- 1.108)				
Minimum wage/average wage in manufacturing		- 0.2255 (- 1.392)			
Minimum wage/labor costs per worker in large manufacturing			0.0886 (0.661)		
Minimum wage/value added per worker in large manufacturing				0.0315 (0.134)	
Minimum wage/GDP per worker excluding oil and gas					0.0237 (0.145)
Province dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.250	0.158	0.195	0.191	0.242
F test	2.801	1.641	2.009	1.982	2.728
Number of observations	147	83	105	105	147
Elasticity (point estimate)	- 1.022	- 2.295	0.574	0.047	0.137
Elasticity (significant only)	0.000	0.000	0.000	0.000	0.000

Note: There is one observation per province per year, as allowed by the data. Values in parentheses are "t" statistics. Statistical significance is assessed at the 5 percent level for the F-test and at the 10 percent level for the two-tail t-test. All specifications include an independent term.

many of the specifications, and the implied elasticities turn out to be small. But this weakness of the minimum wage effects should come as no surprise. Even in countries with strong enforcement capabilities, like the US, these effects are not large. The same should be true, a fortiori, in developing countries (see Freeman, 1993, and Rama, 1995).

Put against this background, the mere fact that some consistent patterns emerge from the empirical analysis in this paper deserves to be highlighted. A convenient way to summarize these patterns is to predict what would happen to average wages, wage employment and investment if the government of Indonesia decided to double minimum wages once more. This conceptual experiment can be interpreted as a change in the minimum wage target set for 1998, from the cost of the KHM consumption bundle to twice this cost. Needless to say, the experiment only yields, at best, the signs and orders of magnitude of the ensuing effects. Moreover, it implicitly assumes that current effects would be similar to those estimated for the first half of the 1990s.

If the estimates in the paper are to be taken literally, doubling the minimum wage would make average wages increase by about 10 percent, urban wage employment fall by 2 percent, and total investment fall by 4 to 6 percent. Foreign direct investment may not be affected by the minimum wage hike, but if anything it would fall. These figures are simple averages over the estimated elasticities with respect to minimum wages.

While the decline of total investment suggests the economic performance of Indonesia could deteriorate in the long run, wage earners as a whole would gain in the short run. The (positive) elasticity of average wage earnings with respect to the minimum wage is higher, in absolute terms, than the (negative) elasticity of wage employment. Again, taking the figures literally, doubling the minimum wage would increase the total wage bill by some 8 percent. This aggregate gain hides important individual losses though. Those workers who manage to keep

their jobs would benefit from the minimum wage hike, but others would be fired, or not hired, as a result of it.

Disparities are also large across firms. The overall reduction in wage employment appears to be driven by small firms, while large firms may actually see their employment increase. On of the striking features of the Indonesian case is that large manufacturing firms appear to behave as predicted by the monopsony model of the labor market. Consequently, in the short run workers in these firms would gain on two counts: their wages would increase and they would not risk losing their jobs. These workers are therefore the only obvious winners from the minimum wage hike.

Which policy goals can be attained by redistributing income towards workers in large firms? Clearly, this kind of redistribution would not help much in terms of poverty alleviation. In developing countries, wage earners in the modern sector are usually non-poor, and Indonesia is no exception in this respect (see Huppi and Ravallion, 1991, and Mason and Baptist, 1996). On the other hand, this kind of redistribution would be consistent with the goal of defusing a confrontational approach to industrial relations. Workers in large firms are more likely to get unionized than those in small firms, so that their bitterness has potentially larger consequences. However, the impact of the minimum wage hike on investment suggests that other, less distortive ways of attaining this same goal should be considered.

More generally, the results in this paper indicate the Indonesian minimum wage policy should be revised in three directions. First, minimum wage increases should proceed at a slower pace than in the first half of the 1990s, hence allowing productivity gains to gradually erode the ratio of minimum to average wages. Second, more attention should be given to local labor market conditions, so as to avoid penalizing employment and investment in provinces where labor productivity is much lower than the Indonesian average. And third, enforcement efforts

should be concentrated in large firms only, since these are the ones where disemployment effects are less likely. A more severe enforcement of minimum wages in small establishments, by contrast, could lead to a fall in wage employment.

References

Agrawal, N. (1995): "Indonesia: Labor Market Policies and International Competitiveness", *Policy Research Working Paper Series*, 1515, the World Bank, Washington, DC.

Agrawal, N. (1996): "The Benefits of Growth for Indonesian Workers", *draft*, The World Bank, Washington, DC.

Azam, J.P. (1994): "Effects of Minimum Wages in Developing Countries: an Exploration", background paper for the 1995 World Development Report, *draft*, World Bank, Washington, DC.

Bell, L. (1995): "The Impact of Minimum Wages in Mexico and Colombia", *Policy Research Working Paper*, The World Bank, Washington, DC.

Benjamin, D. (1995): "Minimum Wages in Canada", *draft*, University of Toronto.

Brown, C. (1988): "Minimum Wage Laws: Are They Overrated?", *Journal of Economic Perspectives*, 2(3), p. 133-147.

Brown, C., C. Gilroy and A. Cohen (1982): "The Effect of the Minimum Wage on Employment and Unemployment". *Journal of Economic Literature*, 20, p. 487-528.

Card, D. and A. Krueger (1994): "Minimum Wages and Employment: a Case Study of the Fast-Food Industry in New Jersey and Pennsylvania", *American Economic Review*, 84(4), p. 772-793.

Card, D. and A. Krueger (1995): *Myth and Measurement: the New Economics of the Minimum Wage*, Princeton University Press, Princeton, NJ.

Castillo-Freeman, A. and R. Freeman (1992): "When the Minimum Wage Really Bites: the Effect of the US-Level Minimum on Puerto Rico", in G. Borjas and R. Freeman (eds.): *Immigration and the Work Force*, University of Chicago Press, Chicago, IL.

Depnaker (1995): "Observation Study of the Textile Industry in Majalaya and Pekalongan" (in Bahasa Indonesia), *draft*, Institute of Manpower Planning and Development, Department of Manpower, Jakarta.

Dickens, R., S. Machin and A. Manning (1994): "The Effects of Minimum Wages on Employment: Theory and Evidence from the UK", *NBER Working Paper Series*, 4742, Cambridge, MA.

Freeman, R. (1993): "Labor Market Institutions and Policies: Help or Hindrance to Economic Development", *World Bank Economic Review*, Proceedings of the Annual Conference on Development Economics, p. 117-144.

Gindling, T.H. and K. Terrell (1995): "The Nature of Minimum Wages and Their Effectiveness as a Wage Floor in Costa Rica", *World Development*, 23(8), p. 1439-1458.

Huppi, M. and Ravallion (1991): "The Sectoral Structure of Poverty During an Adjustment Period: Evidence for Indonesia in the Mid-1980s", *World Development*, 19(12), p. 1653-1678.

Manning, C. (1994): "What Has Happened to Wages in the New Order?", *Bulletin of Indonesian Economic Studies*, 30(3), p. 73-114, Jakarta.

Mason, A. and J. Baptist (1996): "How Important Are Labor Markets to the Welfare of the Poor in Indonesia?", *draft*, The World Bank, Washington, DC.

Nachrowi, D.N., D. Fergus and C.B. Dwiwati (1995): "Labor Market Issues in Indonesia: an Analysis in a Globalization Context", *Journal of Population*, 1(1), p. 71-105, University of Indonesia, Jakarta.

Neumark, D. and W. Wascher (1992): "Employment Effects of Minimum Wages and Subminimum Wages: Panel Data on State Minimum Wage Laws", *Industrial and Labor Relations Review*, 46, p. 55-81.

Neumark, D. and W. Wascher (1995): "Effect of New Jersey's Minimum Wage Increase on Fast-Food Employment: a Re-evaluation Using Payroll Records", *NBER Working Paper Series*, 5224, Cambridge, MA.

Pangestu, M. (1996): "Preliminary Findings of the Women Workers Survey", *draft*, Centre for Strategic and International Studies, Jakarta.

Rama, M. (1995): "Do Labor Market Policies and Institutions Matter? The Adjustment Experience in Latin America and the Caribbean", *Labour*, p. S243-S269.

World Bank (1995): "Workers in an Integrating World", *World Development Report*, Oxford University Press, Washington DC.

Appendix

Average Minimum Wage by Province
(in Rupiah per day)

	1988	1989	1990	1991	1992	1993	1994	1995	1996
D.I. Aceh	1400	1400	1828	2133	2133	2483	2829	3413	3763
Sumatera Utara	1200	1200	1626	1930	2447	2963	3371	4088	4500
Sumatera Barat	1000	1000	1300	1600	1750	1900	2350	3063	3513
Riau Luar Batam	1865	1865	1933	2000	2700	2700	3000	3888	4488
Riau Pulau Batam				5550	5550	5850	6750	6750	5513
Jambi	1100	1100	1100	1650	2025	2400	2650	3225	3525
Bengkulu	1300	1300	1300	1300	1650	2000	2750	3375	3763
Sumatera Selatan	1100	1100	1225	1600	1600	2242	2592	3375	3763
Lampung	1050	1050	1108	1750	1750	2450	2679	3375	3725
DKI Jakarta	1600	1600	1850	2200	2500	3000	3800	4400	5050
Jawa Barat	750	750	975	1550	1933	2200	3300	4275	5050
Jawa Tengah	780	780	780	1395	1600	1900	2525	2925	3300
Jogyakarta	700	700	783	900	1192	1425	2050	2688	3113
Jawa Timur	813	813	1012	1409	2110	2250	2813	3525	3925
Bali	1200	1200	1500	1850	2125	2500	3100	3750	4163
Nusa Tenggara Barat	650	650	921	1300	1467	1800	2213	2800	3175
Nusa Tenggara Timur	1000	1000	1150	1600	1600	2100	2267	2800	2900
Timor Timur				2000	2000	2000	2750	3600	4100
Kalimantan Barat	1400	1400	1400	1600	1800	2175	2563	3375	3725
Kalimantan Tengah	1000	1000	1000	1200	1600	2350	2650	3463	4038
Kalimantan Selatan	950	1050	1150	1225	2275	2275	2819	3375	3725
Kalimantan Timur	1000	1000	1200	1600	1800	2400	3038	3963	4500
Sulawesi Utara	850	850	850	1233	2000	2000	2525	3113	3250
Sulawesi Tengah	700	700	775	1017	1263	1750	2163	2675	3100
Sulawesi Selatan	1000	1000	1000	1321	1683	1750	2163	2900	3325
Sulawesi Tenggara	750	750	1033	1599	1862	2125	2631	3213	3575
Maluku	1000	1000	1467	1800	1800	2175	2633	3625	4025
Irian Jaya	1600	1700	1800	2150	2400	3408	3917	4688	5050

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