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The Impact of Labor Market Regulations

Lyn Squire

Sethaput Suthiwart-Narueput

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Summary findings

Squire and Suthiwart-Narueput investigate the impact of labor market regulations in settings where compliance is incomplete. They review some stylized facts about labor market behavior, present an analytical model that may explain such behavior, and provide a checklist for assessing the distortionary impact of a regulation such as the minimum wage.

They take as their starting point the limited evidence about the distortionary effects of such regulations and argue that there may be natural limits on the efficiency losses engendered by labor market regulations.

First, the regulations may not be binding at market equilibrium. For example, minimum wages may be set so low that they are ineffective.

Second, even if they are binding, the relevant elasticities of supply and demand may be so low that the regulations have little impact on efficiency.

Third, even if the regulations are binding and elasticities are sizable, compliance may be low.

Squire and Suthiwart-Narueput argue that *the likelihood of compliance will be greatest when the regulations are binding and the relevant elasticities are sizable*. That is, if the distortionary costs of regulations are not rendered insignificant by the first two reasons, then the returns to noncompliance will be high and, other things being equal, employers will evade or avoid the regulations, thereby minimizing the impact on efficiency.

The argument rests on profit maximization subject to a hard budget constraint. Public enterprises, which are not concerned only with profit maximization and often have softer budget constraints than the private sector, may be more willing to conform to profit-reducing regulations, but in this case the authors argue that compliance may reduce already-existing efficiency losses.

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THE IMPACT OF LABOR MARKET REGULATIONS

Lyn Squire

Sethaput Suthiwart-Narueput

Policy Research Department
World Bank

This paper investigates the impact of labor market regulations in a setting with incomplete compliance. It takes as its starting point the limited evidence regarding the distortionary costs of labor market regulations and argues that there may exist natural limits to the efficiency losses engendered by such regulations. The paper reviews some stylized facts regarding labor market behaviour, presents an analytical model which may explain such behaviour, and provides a checklist for assessing the distortionary impact of such regulations as minimum wages.

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I. INTRODUCTION

Does labor market regulation in developing countries result in significant efficiency losses? In his survey paper Freeman (1992) expressed surprise that there was not more evidence on the distortionary costs of labor market regulation: "The first surprise was that studies designed to support the distortionist view of labor markets in developing countries failed to make a stronger empirical case than they did" (p.139).

There are several possible explanations for this result. First, the regulations may not be binding at the market equilibrium. Second, even if they are binding, the relevant elasticities of supply and demand may be so low that their impact on efficiency is small. And third, even if the regulations are binding and the elasticities are sizable, compliance may be low.¹ In this paper we focus on the third reason and argue that:

- ◆ **The likelihood of noncompliance will be greatest when the regulations are binding and the relevant elasticities are sizable.**

That is, if the distortionary costs of regulations are not rendered insignificant by the first two reasons, then the returns to noncompliance will be high and, other things being equal, employers will either evade or avoid the regulations thereby minimizing the impact on efficiency.

The argument obviously depends on a comparison of the returns to noncompliance (increased profits) relative to its costs (penalties or transaction costs) and presumes some form of profit-maximizing behavior subject to tight budget constraints. This might be a fair approximation to the private sector reality of developing countries but in many instances public sector enterprises have been an important form of industrial organization and it can be argued

On this point, Freeman (1992) notes that "If extensive unemployment results, the minimum will often be unenforceable because both workers and employers will have incentives to collude to avoid the law and save jobs" (p. 128).

that such enterprises are not concerned exclusively with profit maximization and frequently face very soft budget constraints. This suggests that public enterprises may be more willing to conform with profit-reducing regulations. But, we will argue that the very same factors leading to this outcome may also imply that compliance does not have the efficiency costs that arise in the case of private producers. The second proposition explored in this paper therefore is:

- ◆ **Although more likely to comply with labor market regulations, public enterprise compliance may actually reduce efficiency losses.**

Taken together, the two propositions suggest that natural limits exist to the efficiency losses engendered by labor market regulations.

For concreteness of discussion, the paper focusses on minimum wage legislation. The approach, however, could be easily recast to deal with other forms of intervention (hiring and firing regulations for example). The procedure followed is to review some empirical evidence and stylized facts regarding labor market behavior and then provide an analytical model which may explain such behavior. The goal is to provide a framework and checklist for assessing the distortionary impact of such labor market regulations as minimum wages and for selecting case studies for future in-depth research.²

The remainder of the paper comprises four sections. Section II outlines recent trends in minimum wages throughout the developing world. Against this background, Section III explores the first proposition. It focusses on private sector behavior and: provides empirical evidence and stylized facts regarding non-compliance; derives an analytical explanation for such behavior; and establishes the conditions under which the distortionary impact is likely to be high. Section IV

This is consistent with Freeman's (1992) conclusion that "More can be learned....from detailed case studies than from cross-country time series regression with weak data" (p. 139).

fulfills the same function for the second proposition. The final section summarizes by means of a checklist for assessing the likely distortionary impact of minimum wage legislation.

II. RECENT TRENDS

The view that real minimum wages consistently rose in the seventies and consistently fell in the eighties is not fully borne out by the available data (see Table 1). The conventional view is most accurate in the case of Latin America. Although it is difficult to observe any trend in the seventies, real minimum wages did fall throughout most of the region in the eighties and in some cases by substantial amounts - by about one half to one third in most countries. A similar picture might emerge for Africa were more data available. As it is, the evidence reveals a mixed picture in both the seventies and eighties and even where there are declines in the eighties the fall is much less than in Latin America - only about 20 percent. A relatively stable situation emerges for the three Asian countries - movements up and down stay within 20 percent of the 1980 base.

Table 1: Real Minimum Wages: 1970-90

Region	1970	1975	1980	1985	1990
Latin America					
Argentina	182	185	100	113	50
Bolivia	99	130	.	33	31
Brazil	90	94	100	84	51
Chile	64	61	100	63	88
Colombia	77	78	100	108	107
Costa Rica	88	77	100	112	121
Ecuador	49	51	100	61	44
Guatemala	118	96	100	85	61
Honduras	.	122	100	90	74
Mexico	91	91	100	67	42
Nicaragua	.	119	100	47	.
Panama	119	116	100	101	99
Paraguay	151	140	100	.	.
Peru	118	115	100	54	21
Uruguay	124	143	100	94	69
Venezuela	.	85	100	95	65
Asia					
Philippines	101	65	100	82	83
Sri Lanka	73	84	100	94	.
Thailand	.	84	100	117	117
Africa					
Algeria	56	69	100	.	.
Benin	.	143	100	91	.
Botswana	.	85	100	113	.
Burkina Faso	79	87	100	87	101
Congo	.	157	100	96	.
Cote d'Ivoire	104	114	100	84	.
Gabon	90	107	100	90	84
Ghana	415	509	100	144	114
Kenya	119	121	100	68	.
Malawi	.	119	100	120	.
Mauritius	.	.	100	104	.
Morocco	.	98	100	118	132
Niger	.	87	100	70	81
Senegal	99	111	100	78	78
Togo	143	131	100	80	80
Tunisia	.	77	100	110	100
Zaire	805	599	100	164	.

Source: Anker, R., T. Butare and A. Marinakis. 1992. "Minimum Wages in Developing Countries: Trends and Determinants."

A more interesting statistic for present purposes, however, is the change in the minimum wage relative to the distribution of wages in the economy. As a crude indication of this, Table 2 reports the growth of the real minimum and average manufacturing wage. It reveals that in most countries during the 1980s, minimum wages have become less binding - only 5 out of 17 countries had real minimum wages growing faster than real average wages. What is also noteworthy is that this appears to have been brought about by falling real minimum wages than by rising real average wages.

Table 2: Percentage Changes in Real Average and Minimum Wages

	Average (1)	Minimum (2)	(1) - (2)
Latin America (1980-87)			
Argentina	-0.5	20.8	-21.3
Brazil	2.3	-35.3	37.6
Chile	-6	-42.4	36.4
Colombia	19.3	13	6.3
Costa Rica	-7.7	18.1	-25.8
Guatemala	-22.7	-38.9	16.2
Honduras	-8	-16	8
Mexico	-43.3	-43.17	8.4
Paraguay	-1.9	20	-21.9
Peru	-10.8	-39.2	28.4
Uruguay	14	10.9	3.1
Africa (1980-86)			
Burundi	4.74	-3.53	10.7
Kenya	40.6	54.6	-14
Mauritius	-22.8	-41.2	18.4
Malawi	3.7	-24	27.7
Asia (1980-88)			
Sri Lanka	-11.4	-6.2	-5.2
Thailand	86.4	12.2	74.2

Source: ILO (1990), Wages, Labour Costs and their Impact on Adjustment, Employment and Growth.

III. PRIVATE SECTOR RESPONSE

This section establishes that there exist natural limits to the impact of minimum wage legislation because of incomplete compliance by private firms. For the purpose of this paper, impact is defined as a change in the demand for labor. An increase in a perfectly enforced and binding minimum wage would lead unambiguously to a fall in the demand for labor. With incomplete compliance, the demand for labor could fall, remain constant, or even increase. This section identifies the circumstances in which these different outcomes will hold.

The Facts

Fact 1: The extent of noncompliance with minimum wage regulations is widespread and significant. The evidence indicates that noncompliance occurs in a variety of countries and is significant even among developed countries with the proper apparatus--established book-keeping and reporting procedures, for example--for regulatory enforcement.³ Analyzing 1973 data for the **United States** Ashenfelter and Smith (1979) find that among those who would have earned less than the minimum in the absence of legislation, only 64 percent were in compliance with the legislation. For **California** in 1989, Card (1991) found that noncompliance was as high as 46 percent if one considers only those workers directly affected by the increase of the minimum wage. Turning to developing countries, household survey data for **Mexico** reveal that in 1988 16 percent of all full-time male workers in the informal sector were paid below the minimum, and as many as 66 percent of female workers in various sectors (Bell, 1994).⁴ In

³ Non-compliance is a general phenomenon that applies to all mandated standards and taxes. A focus on labor market legislation is warranted because the widespread dispersion of firms makes enforcement especially difficult in this case.

This is significant given the large size of the informal sector: only 18.2% of all enterprises in 1988 were estimated to have been fully meeting all legal requirements regarding inscription and contributions (Standing and Tokman, 1991).

Colombia, 4.7 percent of even large manufacturing enterprises in 1983 reported not to comply with the minimum wage legislation (Bell, 1994). In **Morocco** more than 50 percent of the firms paid their unskilled workers less than the minimum wage in 1986 (Harrison, 1993). In sub-Saharan Africa, the extent of noncompliance is even more striking. A recent survey of 300 informal sector firms in **Niger** revealed that 293 did not comply with minimum wage regulations (Morrison, 1993). In **Swaziland**, 242 out of 290 failed to comply.

Fact 2: The pattern of noncompliance is consistent with the observation that it increases with the costs of compliance and falls with the costs of enforcement. Because the observed extent of non-compliance represents an equilibrium response to both the costs of compliance and the costs of enforcement, it is difficult to disentangle the two. In certain instances, however, it may be possible to separately identify the two effects through careful interpretation of time-series and cross-section data coupled with some assumptions.

There are several cases which indicate that noncompliance increases with the costs of compliance for the firm. Considering only those people directly affected by the minimum wage, noncompliance with the minimum wage in **California** rose from 31 percent in 1987 to 46 percent in 1989 with the increase in the minimum wage from \$3.35 to \$4.25 per hour.⁵ Since the intensity of enforcement is not likely to have changed significantly in such a short period of time and median wages rose only by 7.6 percent, much of the increase in noncompliance is likely to be due to the increased costs of complying with the higher minimum wage. In **Puerto Rico**, noncompliance (in the entire population) rose from around 20 percent in 1979 to 35

Noncompliance in the entire population, however, was less than 2% (Card, 1991).

percent in 1983 with the increase in the minimum from \$2.56 to \$3.35.⁶ Again, assuming that the intensity of enforcement remained more or less the same, this suggests that noncompliance increased as the cost of compliance to the firm increased. Conversely, in Mexico noncompliance decreased as the costs of noncompliance fell due to a fall in real minimum wages during the 1980s. The ratio of the minimum to average wage for blue collar workers fell from 0.42 to 0.34 from 1984 to 1989, while the percentage of large manufacturing firms paying average wages below the minimum similarly fell from 3.0 to 1.9 percent (Bell, 1994). If the structure of enforcement did not change markedly, this would indicate that noncompliance fell along with the decrease in the costs of complying with minimum wage regulations.⁷ In general, cross-country comparisons are clearly more problematic since the structure of enforcement could differ significantly across countries. However, since the enforcement system in both California and Puerto Rico are under the U.S. Department of Labor and are therefore likely to be similar, the significantly higher ratio of noncompliance in Puerto Rico could be attributed largely to the relative costs of compliance: the ratio of minimum to average earnings was 63 percent in Puerto Rico but only 34 percent in the U.S. as a whole in 1987.

The pattern of noncompliance is also consistent with the observation that it varies with the ease of enforcement. While it is unclear how enforcement costs vary over time, there are sound reasons for believing that they vary across the population of firms and workers at a given point in time. For example, because enforcement costs (on both a per firm as well as per

Noncompliance in Puerto Rico is likely to have been significantly higher if one considers that only 64% of the workers were covered by the minimum wage legislation and those workers not covered are usually employed in the informal sector and smaller enterprises (see Freeman, 1992).

Indeed, given the increase in the number of firms over time, one would expect compliance to fall unless the enforcement budget were increased commensurately.

worker basis) are likely to be higher for small firms: operating in the informal sector, it is not surprising that we find significantly higher noncompliance among this group. In Mexico, the percentage of full-time male workers with wages below the minimum was over 16 percent in the informal sector, but less than 3 percent in the formal sector (Bell, 1994). In Morocco, wage histograms show that noncompliance among enterprises with less than 20 employees is significantly higher than among larger enterprises (Harrison, 1993).

Of course, this pattern is also consistent with higher compliance costs for the firm.⁸ Smaller, informal sector firms typically hire more unskilled labor than skilled, more younger workers than older, and more women than men relative to larger firms in the formal sector. To the extent that labor markets are segmented, these smaller, informal sector firms could face higher efficiency losses from compliance since the average wage for these demographic groups is lower and their elasticity of labor demand higher. It is therefore not surprising that compliance is significantly lower among these demographic groups. In California in 1987, 67 percent of those who earned less than the minimum were 24 years of age or younger, 37 percent were Hispanics and 67 percent were female (Card, 1991). In Mexico, despite a decline in real minimum wages noncompliance with the minimum remained significantly high in the informal sector, in the south, among women, and among people with little or no education. Noncompliance in the south was 29 percent among full-time workers in the informal sector but only 8.2 percent among the same group in Mexico City. Noncompliance among full-time male workers in the informal sector with no education was 26.5 percent but only 2 percent for those in the same sector with education of 16 years and more (Bell, 1994). Wage histograms for

The two effects are difficult to distinguish formally without structural estimation.

Morocco also show that noncompliance among unskilled female workers is significantly higher than for men (Harrison, 1993).

While cross-country comparisons do not allow the effects of compliance and enforcement costs to be distinguished, they can nonetheless be revealing. Differences in noncompliance between sub-Saharan and other countries are very striking. In contrast to the non-compliance figures for Niger and Swaziland cited above, the same study found only 49 out of 503 firms in **Thailand**, and 29 out of 269 in **Ecuador** to be in noncompliance with minimum wage regulations (Morrison, 1993). That minimum wages have considerably less bite in Mexico relative to Colombia also indicates that the incentives for noncompliance are much higher in the latter. Annual industrial surveys for manufacturing firms in both countries show that in Mexico only 10 percent of the firms reported to pay average blue collar wages less than 1.5 times the minimum wage whereas 29 percent of Colombian firms paid average unskilled wages less than 1.5 times the minimum in 1986 (Bell, 1994).

Fact 3: Firms can and do legally avoid minimum wage legislation. Widespread noncompliance is not surprising in view of the numerous means for avoiding such regulations in a manner much more difficult to detect than outright evasion. Many countries exempt teenagers, apprentices, workers on training and part-time workers from the minimum wage legislation. In **Morocco**, for instance, firms are allowed to pay as little as 50 percent and 80 percent of the minimum wage for 14 or 15-year olds and 17 or 18-year olds, respectively, which provides significant incentives for legal avoidance. The renewal of temporary contracts is a common form of avoiding compliance in **Mexico**. This form of avoidance is particularly widespread in large-scale industries and among such government controlled enterprises as the petroleum monopoly, which is probably due to the fact that evasion is more difficult and risky

in these sectors and for these enterprises (see Standing and Tokman, 1991). The survey of informal sector firms conducted by Morrisson (1993) shows that even when firms formally comply with minimum wage regulations de jure, they may avoid them de facto by hiring "false apprentices" or failing to pay overtime. In Jamaica, Algeria and Thailand compliance with the minimum wage legislation was significantly higher than compliance with regulations regarding the payment of overtime. In Jamaica, while 58 percent of firms reported complying with minimum wages, only 21 percent complied with the payment of overtime. Similarly, in Algeria and Thailand 54 percent and 77 percent complied with minimum wages while only 46 percent and 64 percent, respectively, complied with the payment of overtime.⁹

The Model

The patterns of compliance described above represent equilibrium outcomes that reflect both the behaviour of private firms and the regulator's strategy of enforcement. The analysis of Ashenfelter and Smith (1979) illustrates this point well. Their analytical model predicts that "firms employing low-wage workers and for which wage changes produce large employment adjustments have the greatest incentives to violate the law". But, this incentive "is more than fully offset by the higher probability of government detection that results from the government's enforcement strategy".

Instead of modelling the full equilibrium, the analysis presented below captures the interaction between firms and regulator by assuming that the former face a known probability of inspection. This approach is followed for two reasons. First, there is no empirically established view regarding the regulator's objective function. And second, fairly obvious

These percentages are only of firms which responded.

candidates -- such as minimizing evasion or maximising net financial returns from inspection -- lead to little change in the analysis other than the replacement of a known probability of inspection by the distribution of enforcement costs by type of firm . We also suspect that enforcement strategies are severely circumscribed by very few staff resources and limited budgets. This, however, is no more than a suspicion which we hope to test by means of a small survey of Departments of Labor in selected developing countries. Even in the case of the U.S. Department of Labor, there are only 800 federal wage and hour inspectors nationwide to cover about 2.6 million employers. In these circumstances, many of the investigations -- around three-quarters -- are in response to complaints. Inspection and enforcement are likely to be even weaker in developing countries. In Bangladesh, the 1991 annual report of the Ministry of Labor and Manpower Inspectorate only mentions two investigations under the Minimum Wages Act. Neither do higher inspections necessarily translate into greater enforcement. While 411 violations were detected in 1988, 518 in 1989, and 610 in 1990, there were only 13 prosecutions in 1990 and 3 in 1991. (World Bank, 1994).

It is also important to consider the nature of noncompliance. Some firms may fail to comply with minimum wage legislation by legal avoidance while others may engage in outright evasion. Firms following the former route -- for example by subcontracting, hiring only temporary workers or young workers to whom the legislation does not apply -- can be expected to incur various training or transaction costs which have to be incorporated in any assessment of the welfare effects of the legislation. Firms following the second route on the other hand may not incur real resource costs but will of course face possible punitive action if they are investigated. The model allows for both possibilities.

Firm Options

Assume a size distribution of profit-maximizing firms differentiated by a productivity parameter θ_i .¹⁰ We assume that θ_i is unobservable and has a cumulative distribution $G(\theta)$ with support $[\underline{\theta}, \bar{\theta}]$. The government introduces a minimum wage into this setting. Firms have three options. First, pay the minimum. Second, legally avoid the minimum through various costly actions such as subcontracting, hiring part-time workers, etc. And third, evade. The expected payoffs for each option are:¹¹

$$(1) \quad \text{where } E \pi_i = \begin{cases} \pi(\theta_i, \bar{w}) & ; \text{ if comply} \\ (1-\beta)\pi(\theta_i, w) + \beta\{\pi(\theta_i, \bar{w}) - \Gamma\} & ; \text{ if evade} \\ \pi(\theta_i, w) - A & ; \text{ if avoid} \end{cases}$$

$$\text{X} \quad \pi(\theta_i, w) = \max_{K, L} p\theta_i F(K, L) - wL - rK$$

¹⁰ Because we model a single production technology, the possibility that labor market legislation influences choice of technology is not captured. While potentially important, it is not obvious that labor market legislation by itself is likely to be a main determinant of technology choice.

¹¹ The formulation for the payoff under evasion reflects beginning of period inspection and the fact that the model deals with an instant in time. During that instant, a potential evader either ends up evading for the entire instant or being caught on suspicion as it were and both complying and paying the penalty for the entire instant.

and w is the market wage; \bar{w} is the minimum wage; β the probability of inspection; Γ the penalty; and A the fixed cost associated with avoidance.¹² We assume throughout that $\bar{w} > w$ and define units in such a way that w and \bar{w} incorporate non-wage benefits as well.

From (1), firms will evade rather than comply if

(3)

$$\pi(\theta_i, w) - \pi(\theta_i, \bar{w}) > \frac{\beta\Gamma}{1-\beta}$$

and will evade rather than avoid if

(4)

$$\pi(\theta_i, w) - \pi(\theta_i, \bar{w}) < \frac{A - \beta\Gamma}{\beta}$$

We know from (2) and the envelope theorem that the derivative of the left hand side (LHS) of the above inequalities with respect to θ_i is positive for $\bar{w} > w$. Given the direction of the

¹² Both Γ and A could be made functions of employment. Consider, for example, $A(L) = AL$ and $\Gamma(L) = \Gamma L$. In the case of A , the transactions costs could simply be treated as an extra wage cost per worker. This would then influence the FOC for labor demand and yield a payoff from avoidance of $\pi(\theta_i, w-A)$. In the case of Γ , the penalty could be imposed on the number of workers employed when the firm evades. Labor demand under evasion becomes $L(\theta_i, w+\beta\Gamma)$. The payoff from evasion can then be expressed as $(1-\beta)\pi(\theta_i, w+\beta\Gamma) + \beta[\pi(\theta_i, \bar{w}) - \Gamma L(\theta_i, w+\beta\Gamma)]$. The payoff from compliance remains unchanged. Since these payoffs make direct comparisons of outcomes more problematic, we proceed with the setup described in the main text for simplicity.

inequalities in (3) and (4), it follows that we will only observe firms (an interval of θ_i) seeking to evade if

(5)

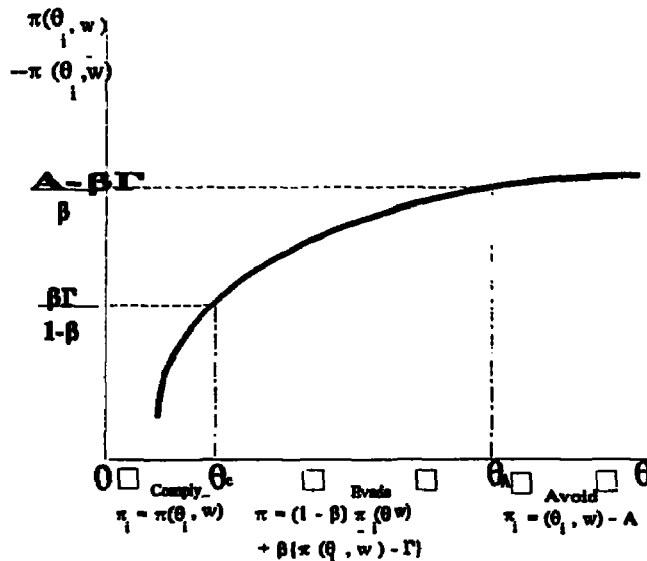
$$\frac{A}{\Gamma} > \frac{\beta}{1-\beta}$$

From inequality (5), the likelihood that firms will evade rather than avoid increases as the cost of avoiding (A) increases. It also increases relative to both compliance and avoidance as the probability of inspection β and the size of the penalty Γ increase. Assuming inequality (5) holds, denote the values of θ_i which satisfy (3) and (4) with equality as θ^C and θ^A , respectively. Then firms with $\theta_i < \theta^C$ comply; those with $\theta^C \leq \theta_i \leq \theta^A$ evade; and those with $\theta^A < \theta_i$ avoid (see Figure 1). In other words, low-productivity firms will tend to comply; high-productivity ones will tend to avoid; and those in the middle range will evade.^{13 14} If, on the other hand,

¹³ It should be noted that in our paper we model an economy with a single technology where differences in firm size stem only from productivity differences. In reality, of course, firms differ in size because of technological as well as productivity differences (i.e., unproductive firms making petrochemicals tend to be larger than productive ones making garments). Our model is therefore consistent with an empirical observation that larger firms tend to comply while smaller ones evade in an economy with multiple sectors and technologies.

¹⁴ For a given production technology, we could also consider the implications of allowing the probability of inspection to be higher for larger firms, i.e., let β be strictly increasing in θ_i . Both the LHS and RHS of inequality (3) will be increasing in θ_i . If the RHS term still intersects the LHS from above, then the analysis is unchanged and we still have a picture similar to Figure 1. If β is so low for small firms and increases so sharply in θ_i that it intersects the LHS from below, however, then the smallest firms—those with $\theta_i \leq \theta^C$ —will instead be evaders. Firms with $\theta_i > \theta^C$ will comply rather than avoid if $\pi(\theta_i, w) - \pi(\theta_i, \bar{w}) \leq A$. Denote the θ_i which sets this to equality as $\theta^{A'}$. For A sufficiently large, we therefore get the result that firms with $\theta_i \leq \theta^C$ evade, those with $\theta^C < \theta_i \leq \theta^{A'}$ comply, and those with $\theta_i > \theta^{A'}$ avoid. While potentially more attractive, note that this pattern of firm behaviour requires strong assumptions on the shape of β . In the absence of additional information on regulator behaviour, we maintain the simplifying assumption that β is constant. The qualitative results carry through.

inequality (5) does not hold, then there will be no evaders and firms will either comply or avoid with the choice depending on a comparison between the difference in profits -- the LHS of inequalities (3) and (4) -- and A, the fixed, transactions cost. For the remainder of the paper, we assume that inequality (5) holds since this is the more interesting case.



Regulator Options

Inequality (3) shows that the regulator can influence the degree of compliance through two variables - the probability of inspection, and the severity of the penalty. Other things equal, the regulator can minimize noncompliance by increasing these two variables. The regulator can also influence the composition of noncompliance (see inequality (4)). But here the regulator has an additional instrument for determining the split between evasion and avoidance -- the

precision and comprehensiveness of the relevant labor legislation. This works through the fixed transactions cost, A . As loopholes in the legislation are progressively closed, so the transaction costs associated with avoidance are likely to increase. This will reduce avoidance relative to evasion (but leave non-compliance unchanged) whereas increases in β and Γ will increase avoidance relative to evasion (and reduce overall non-compliance).

Taking stock of these results, we conclude:

- Increases in the probability of inspection β raise θ^C and lower θ^A . The proportion of firms complying and avoiding increases, while the proportion evading decreases. Increases in the per firm penalty Γ have a similar effect.
- Increases in the specificity of the labor legislation raise θ^A . The proportion of firms avoiding decreases and the proportion of firms evading increases.

Although the regulator has sufficient instruments to eliminate evasion and avoidance, the empirical evidence makes clear that regulators choose not to do this. This in turn must reflect both the objectives of the regulator and the costs of enforcement. Depending on the objective, the real costs associated with avoidance may also influence the regulator's view of the relative merits of evasion and avoidance. As noted earlier, factual information on enforcement costs and an understanding of regulator strategy are interesting areas for future research.

Labor Market Outcomes

We are now in a position to examine the first proposition of this paper: Does the likelihood of non-compliance increase as the (binding) minimum wage increases and as the elasticity of labor demand increases? We first establish that this is indeed so. Second, we derive the circumstances in which an increase in a binding minimum wage results in increased

demand for labor. And third, we discuss the implications of these results for the efficiency losses arising from labor market regulation.

Consider expression (3) defined with equality. Because the LHS is increasing in both \bar{w} and θ , an increase in \bar{w} will therefore decrease θ^c .¹⁵ To get at the impact of changes in elasticity, we conduct a second-order Taylor series expansion on the LHS of (3) around (w, θ^c) . With some manipulation, this yields

(6)

$$L(w, \theta^c) (\bar{w} - w) - \frac{1}{2} \frac{L(w, \theta^c)}{w} (\bar{w} - w)^2 e$$

where $e < 0$ is labor elasticity. Note that this is increasing in the absolute value of e as well as in θ , since $\partial L / \partial \theta \geq 0$. An increase in the absolute value of e therefore implies a decrease in θ^c . Thus, the likelihood of noncompliance does increase with both the minimum wage and the elasticity of demand for labor.

We now examine the effect of an increase in the minimum on labor demand. Total labor demand $L^D(\cdot)$ is given by

$$(7) \quad L^D(\cdot) \equiv \int_{\underline{\theta}}^{\theta^c(\cdot)} -\pi_w(\theta_i, \bar{w}) dG(\theta) d\theta + \int_{\theta^c(\cdot)}^{\bar{\theta}} -\pi_w(\theta_i, w) dG(\theta) d\theta$$

We can also demonstrate this formally using the implicit function theorem.

where the first integral corresponds to complying firms and the second to noncomplying ones.

After some manipulation and simplification, the effect on labor demand of increasing \bar{w} is given

by

(8)

$$-\theta_{\bar{w}}^c (L(\theta^c, w) - L(\theta^c, \bar{w})) + \int_{\underline{\theta}}^{\theta^c} \frac{\partial L(\theta, \bar{w})}{\partial \bar{w}} dG(\theta) d\theta$$

where $\theta_{\bar{w}}^c$ is the partial of θ^c with respect to \bar{w} .

This result fits with intuition. The product of the first two terms is positive and represents the increase in the proportion of non-complying firms (recall that $\theta_{\bar{w}}^c$ is negative) multiplied by the increase in labor demand as (each) firm switches from compliance to non-compliance. The integral is negative and captures the decrease in labor demand from complying firms — those in the interval from $[\underline{\theta}, \theta^c]$ — due to higher minimum wages. Since the latter term is a second-order effect compared to the former, (8) could well be positive and an increase in the minimum wage could increase labor demand due to lower compliance. However, this depends upon the size of the gap between the minimum and market wages. The expression is likelier to be positive the greater the gap between minimum and market wages since $L(\theta^c, w) - L(\theta^c, \bar{w})$ is larger and the proportion of complying firms smaller. If the minimum wage is close to the market wage, however, then the proportion of complying firms is large and the expression is likely to be negative since the effect of decreased labor demand among compliers will dominate. We therefore have a Laffer-curve type relationship between the minimum wage and labor demand due to incomplete compliance. This contrasts markedly with the outcome in a

world of complete compliance, where raising the minimum wage unambiguously lowers labor demand and increases unemployment.

What are the implications of these results for the efficiency losses usually associated with labor regulations? There are at least three effects of an increase in minimum wages assuming enforcement costs remain fixed: i) the increase in the distortion for complying firms; ii) the reduction in costs of distortions as firms switch from being compliers to being noncompliers; and iii) the increased transaction costs as firms switch from being evaders to being avoiders. The first two arise immediately from (8) while the third derives from expression (4) defined with equality.¹⁶ As with labor demand, these results imply that efficiency losses could increase, stay constant, or fall as the minimum is increased. Moreover, the likelihood of a reduction in efficiency losses will increase with the size of the existing distortion because, as we saw above, this is one of the factors determining the likelihood of an increase in labor demand. This points, therefore, to the existence of natural limits on the magnitude of efficiency losses.

These results have two clear implications for policy. First, while the efficiency losses from compliance can arguably be justified on equity grounds because it results in a transfer to workers, it is unlikely that governments will be willing to incur the costs (enforcement costs and efficiency losses) associated with full compliance. There is likely to be therefore an optimal degree of non-compliance. And second, since there are no compensating equity gains from avoidance relative to evasion and yet there are real resource costs associated with the former, the optimum should be characterized by zero avoiders. This suggests that it is preferable to

Because the LHS of (4) is identical to that of (3), an increase in \bar{w} reduces θ^A and increases avoidance.

reduce legal avoidance rather than evasion.¹⁷ This in turn requires a greater focus on tightening legislation to cut back on legal avoidance rather than outright increases in inspections and penalties per se.

IV. INTRODUCING PUBLIC ENTERPRISES

In this section we examine the impact of labor market regulations on public enterprises which we assume operate according to a different objective function and effectively face a looser budget constraint. We follow the same procedure as before and first introduce some empirical material to substantiate the basic argument and then proceed to a more formal presentation.

The Facts

Fact 1: Public enterprise (PE) employment and wage bills have often grown very rapidly in developing countries. After a strong increase in PE employment during the 1960s and 1970s, the share of PE employment in total employment has remained relatively constant between 5 percent and 6 percent worldwide between 1978 and 1991 (see Table 3). But regional differences in PE employment remain large. Between 1986 and 1991, the share of PEs in total employment in Africa was 18.1 percent, significantly larger than the corresponding share in Latin America (3.7 percent) and Asia (4.7 percent). This share was as high as 46.4 percent in Niger, 45.3 percent in Senegal and 37.2 percent in Zambia.

Table 3: Weighted Average Share of Public Enterprises in Employment, 1978-91
(Percentage)

This has to be counterbalanced with the fact that the avoiding firms are larger than the evading ones in our setup and will therefore incur higher distortionary costs from compliance.

	1978-85	1986-9	1978-91
World	5.55	5.28	5.43
Latin America and Caribbean	4.07	3.67	3.90
Africa	17.55	18.07	17.77
Asia	4.92	4.68	4.82

Note: Only a subset of countries within each region were used for deriving World Averages. LAC Regional Average excludes Argentina, Brazil, Ecuador, Grenada, Trinidad and Tobago. Africa Regional Average excludes Burundi, Cote D'Ivoire, Egypt, Kenya, Malawi, Niger, Senegal, Seychelles and Tanzania. Asia Regional Average excludes Indonesia, Myanmar, Sri Lanka and Vietnam. 3 year moving average estimates were used to complete our time series in case of missing values when deriving regional averages. Regional Weighted Averages were obtained using GDP in current U.S. dollars as weights.

Source: A. Galal, *Public Enterprises in Developing Countries*, 1994.

Even in those countries where real wages in the public sector have declined, these reductions have often been more than offset by an increase in public sector employment. In her study on public sector pay and employment policies Nunberg found an excessive wage bill to be a major problem for the majority of countries where the World Bank pursues government pay and employment interventions (Nunberg, 1988). In Egypt, for example, the wage bill grew from 22 percent of government expenditures in the mid 1970s to 33 percent in the late 1980s (Banerji and Sabot, 1993).

Fact 2: Public enterprises are often assigned employment goals, are required to act as model employers, and may be required to serve as employers of last resort. While governments seek to protect real wages for workers, when this is not possible they may instead attempt to protect employment by (i) cutting spending on non-wage items, (ii) compressing the wage structure, and (iii) cutting real wages.

Public enterprises act as model employers and seek to protect workers against declines in the wage rate. In Morocco, overall productivity in formal manufacturing fell between 1985

and 1990. However, while the productivity decline was larger in the public sector, real wages in the public sector rose 0.4 percent per year while they fell 2.3 percent in the private sector even though the former were already higher to begin with (Harrison, 1993). In Bangladesh, five out of seven PEs sampled had increases in average labor costs which outpaced productivity increases. A PE producing steel billets and plates had increases in average labor costs of 55 percent between 1985 and 1992 while the value of output per worker actually fell by 18.6 percent. (World Bank, 1994)

When operating under tight financial constraints, however, governments may seek to protect employment by reducing spending on material. The ratio of wage to non-wage public expenditures has been increasing in many countries with fiscal constraints, which indicates growing distortions and imbalances in the input mix of public sector production. In Liberia, for example, the wage bill in relation to revenues increased from 36 percent in 1977 to 66 percent in 1981 (Lindauer, 1988).

The government may also compress the wage structure to protect employment of lower paid workers. Lindauer, Meesook and Suebsaeng (1987) have found significant salary compression for a number of African countries. In Ethiopia, for example, whereas the lowest real salaries in the public sector fell only by 37 percent between 1975 and 1985, real wages fell by nearly 70 percent for those with the highest salaries (ILO, 1990). In Zambia the salary ratio between the highest and lowest skilled civil service employee fell from 19.2 percent in 1970 to 6.9 percent in 1983 (see Lindauer, 1988). As a consequence, the wage difference for skilled labor between private and public sectors has become particularly high. For Venezuela, an ILO study for 1985 found that top civil servants earned only about 40 percent to 80 percent of the

wages of managers in private enterprises. In **Thailand** in 1982 the differential for top positions in both sectors was as high as 350 percent (Lindauer, 1988).

Lastly, since there is a negative tradeoff between employment and the wage bill when governments are financially constrained, governments may resort to reducing real wages to protect employment. There has been a considerable reduction in real wages in Africa. Public sector wages for the lowest salary groups fell by 45 percent between 1975 and 1985, whereas the highest salaries in the public sector fell by more than 60 percent in average during the same period. In **Somalia**, for instance, the real value of the lowest salary and the highest salary in the civil service in 1985 were only 5.2 percent and 4.0 percent of their 1975 value, respectively (ILO, 1990).

Public enterprises may also be required to act as employers of last resort. To reduce unemployment, governments often guarantee jobs and provide funds to hire graduates which make these employees costless for PEs. In **Egypt**, such a policy has resulted in the significant overmanning (Gelb et. al., 1991). Similar employment policies are also found in Senegal, Togo, CAR, Guinea, Mali and Sudan where university graduates are automatically hired by public institutions.

Collectively, the above has not surprisingly resulted in considerable overmanning among PEs in many countries. A comparison of public and private manufacturing enterprises in **Turkey** has shown the existence of significant labor and capital surplus among the former: the ratio of public to private labor and capital inputs per unit of output was 1.97 and 1.66, respectively (Gelb et. al., 1991).¹⁸ A study of ministries in a West African country found that

A. Gelb, J. B. Knight, R. Sabot, Public sector employment, rent seeking and economic growth, *The Economic Journal*, Sept. 1991, pp. 1187 ff.

6,000 of the total staff of 6,800 was redundant (Ozgediz, 1983). Overmanning in the public sector of Egypt was found to be as high as 40 percent in 1976. In part, this reflected the provision of funds to hire graduates which made these employees costless for PEs (Gelb, 1991). As a consequence, whereas employment in Egypt's private sector grew only by 7.8 percent, it rose by 24.5 percent in PEs during 1976-86 (Banerji and Sabot, 1993). Overmanning in particular sectors is estimated to be as high as 93 percent in the spinning industry in Egypt, 54 percent in the transport sector of Ghana, 91 percent in the Bombay port of India, and 40 percent in the railways sector of Turkey (Banerji and Sabot, 1993).

Fact 3: Public enterprises are frequently not expected to make a profit. As indicated above, non-economic objectives such as employment or equity appear to outweigh efficiency considerations. Not surprisingly, this has made PEs a significant burden on the government budget. Gross operating profits of PEs in nearly all developing countries were significantly negative (Galal, 1994). Negative gross operating profits were between 2 percent and 3 percent of GDP in Africa and Asia for the period 1978-91. There was little or no improvement during the 1980s in Asia or Africa. Only in Latin America did gross operating profits improve significantly between 1978 and 1991, from negative gross operating profits of more than 1 percent of GDP between 1978 and 1985 to a small surplus between 1986 and 1991.

The Model

In contrast to the pure profit-maximizing behavior of the private sector, public enterprises are assumed to maximize a modified measure of profits

$$(9) \quad \pi(\theta_i; \lambda w) = \max_L p \theta_i F(K, L) - \lambda wL - rK$$

where λ is an exogenously given measure reflecting the net influence of a concern with employment generation on the one hand and recognition of the need for fiscal discipline on the other. If λ equals one, the government has no special employment objective and/or the fiscal constraint dominates. In this case, public enterprises are required to maximize profits. With a more pressing national employment objective and a more relaxed fiscal situation, λ may approach zero, at which point labor becomes costless to the enterprise. This will imply overmanning and a drain on the central budget. In exceptional circumstances, λ could be negative. With this background, the remainder of this section discusses first, the question of public enterprise compliance with minimum wage regulations under different institutional arrangements, and then the relationship between public enterprise compliance and efficiency.

Unlike private firms, the choices open to public enterprises with respect to labor market regulations may be more severely circumscribed. We can distinguish three different institutional arrangements. First, there may be a central wage-fixing and wage-paying body which applies to all public enterprises. In this case, PEs will comply since they have no choice. Second, each public enterprise may have the capacity to choose between the minimum and the market wage, but the effective penalty or probability of inspection may be higher for public enterprises. If it is easier for government regulatory authorities to ensure payment of fines by public than private firms, for example, the effective penalty Γ will be higher for the former. Recourse to non-pecuniary measures—e.g., firing of public managers—could also result in higher effective penalties for public than private firms. Alternatively, the probability of inspection β could differ. Labor may be more aware of its rights in a public enterprise or have a higher expectation that its grievances will receive due attention. If so, the frequency of complaints, and

hence of inspections, may be greater for public enterprises. These factors increase the likelihood of compliance.

A final possibility is that the determination of wage payments is left to the enterprise as before but the effective penalty and probability of inspection are the same for public and private firms. Since this is the case that offers the most immediate comparison with private firms, we pursue it here to see whether public enterprises are more likely to comply than their private counterparts. If the answer is "yes" then, we know that public enterprises are more likely to comply than private firms for all institutional arrangements because public enterprise compliance will be lowest for the particular one under study.

To examine this issue, we note that the general form of the results for PEs is identical to that for private firms. In particular, we can derive inequalities similar to (3) and (4) to determine whether PEs will comply, evade, or avoid. The only difference is that the LHS of these equalities will reflect the modified objective function:

(10)

$$\pi (\theta_i ; \lambda w) - \pi (\theta_i ; \lambda \bar{w})$$

In both cases the RHS is the same for PEs as for private firms, and so, as before, we will observe evaders among public enterprises if inequality (5) holds. In the following, we assume that it does hold.

These similarities (RHS) and differences (LHS) allow us to shed light on whether PEs are more or less likely to comply than private firms. To see this, note that (i) the relevant

margin is the compliance/evasion one, and (ii) from (9), for $\lambda = 1$, the private and public firm problems are identical. Therefore, if (10) is decreasing in λ , then we know that PEs -- for which in general $\lambda < 1$ -- will have less incentive to evade and a greater incentive to comply than private firms.¹⁹

Let $L(w, \theta; \lambda)$ solve (9). Then, (10), which reflects the incentive to evade, can be written as

(11)

$$-\lambda [wL(w, \cdot) - \bar{w}L(\bar{w}, \cdot)] + p\theta_1 [F(\bar{K}, L(w, \cdot)) - F(\bar{K}, L(\bar{w}, \cdot))]$$

To assess how the incentive to evade changes with the degree of fiscal discipline and the concern with employment, differentiate (11) with respect to λ . Using the envelope theorem, this yields $\bar{w}L(\bar{w}, \cdot) - wL(w, \cdot)$. With inelastic (elastic) labor demand, this expression is positive (negative), and the incentive to evade decreases (increases) as the social concern with employment increases and/or fiscal discipline is relaxed and λ is reduced. Thus, PEs are more likely to comply with minimum wage legislation than their private sector counterparts in situations where the demand for labor is inelastic. Empirical estimates of the wage elasticity of labor demand in manufacturing typically produce absolute values well below one,²⁰ indicating that in general PEs are indeed more likely to comply with labor market regulations than private firms even when confronted with the same regulatory environment.

Ceteris paribus, obviously. In particular, this holds for a given θ .

²⁰ See, for example, the estimates provided in Tables 7 and 8 in Bell (1994) or in Table 10 in Revenga (1994).

If PEs are more likely to comply with minimum wage legislation than private firms, then is it the case that efficiency losses are greater for PEs? Here we show that the factor that leads to the result on compliance also has implications for the efficiency impact. To see this, consider the relationship between PE compliance and labor demand. The FOC for a complying PE is given simply by

$$\theta_{iPF_L}(K, L) = \lambda \bar{w}$$

while that for an equivalent non-complying private firm is given by the same LHS expression set equal to w . Denote the latter solution as L^* . The complying PE therefore hires less (more) labor than L^* if $\lambda \geq w/\bar{w}$ ($\lambda < w/\bar{w}$).²¹ This reflects the fact that λ and w exert opposing forces on labor demand -- λ increases labor demand while w reduces it.

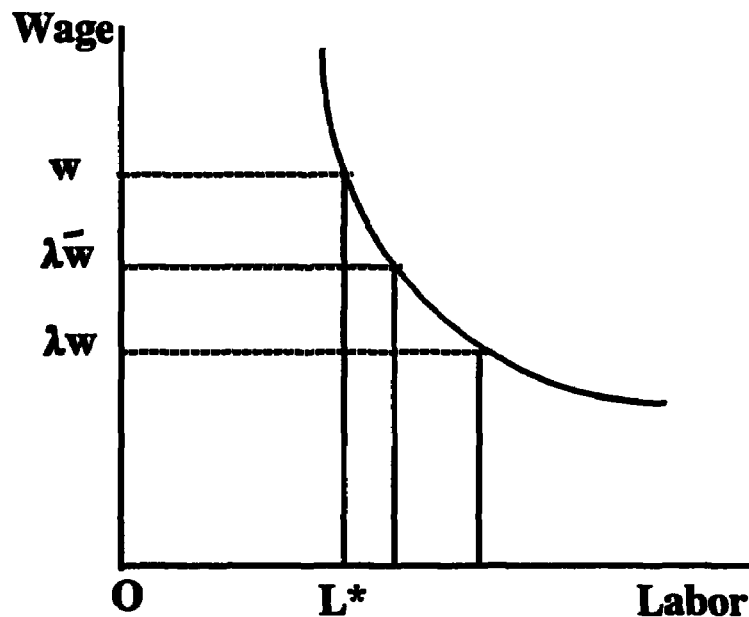
Evaluated purely from the standpoint of productive efficiency, it appears reasonable to assume that efficiency losses increase the further away L is from L^* .²² It follows that the introduction of a minimum wage could reduce efficiency losses for complying public enterprises as they move from a situation of excess labor demand to one closer to the free-market equilibrium (see Figure 2). Thus, $\lambda < w/\bar{w}$ is sufficient but not necessary for compliance by PEs to reduce efficiency losses.²³ This is in marked contrast with private firms, where

Since $\bar{w} > w > 0$, $w/\bar{w} \in (0,1)$ while λ ranges from $[1, \infty)$, we know that there exists a critical value $\lambda^* = w/\bar{w}$.

Evaluating this from a welfare standpoint requires an assessment in terms of the alternative PE objective function.

PE compliance does not always reduce efficiency losses because such firms could end up hiring so fewer workers that efficiency losses are greater than under non-compliance. Recall that for $\lambda = 1$ public enterprise behavior is identical to private firm behavior. Since we know that compliance results in efficiency losses for private firms, we know that public enterprise compliance at $\lambda = 1$ results in

compliance increases efficiency losses. This has noteworthy implications for policy. It suggests that from the standpoint of improving compliance, it is preferable to focus on public rather than private enterprises since there are less likely to be increased efficiency losses to offset gains in equity from greater compliance.



V. ANALYZING LABOR MARKET REGULATIONS: A CHECKLIST

Based on the preceding analysis, the following checklist provides a means for heuristically evaluating the likely distortionary impact of minimum wage regulations. Where the

efficiency losses.

preliminary evaluation suggests significant distortionary costs, further research and analysis would be called for.

i) **Check whether the legislated minimum is potentially binding.** As empirical studies demonstrate, minimum wages are not likely to have significant employment or other effects if they do not "bite." One helpful exercise would be to consider the relationship of the minimum wage to the wage distribution. Wage histograms which spike at or near the minimum wage rather than significantly to the right would indicate situations where such minima have more bite. Such histograms for Morocco differentiated by firm size, indicate, for example, that minimum wages are considerably less binding for larger than smaller firms. Similarly, the fact that only 6 percent and 24 percent of firms had average wages below 1.5 and 2 times the minimum respectively in Mexico, while 27 percent and 71 percent did so in Colombia indicates that minimum wages potentially had more bite in the latter.²⁴ While this will give a preliminary indication, in practice there may be several complications. For example, there may be several legislated minima corresponding to different sectors or classes of firms. Furthermore, since the total return to labor includes both wage and non-wage elements, simple comparisons of average to legislated minimum wages may not capture the true extent to which such minima are binding.

ii) **If the legislated minimum is potentially effective, check the extent of noncompliance.** To arrive at a quick assessment of the extent of compliance, it would be useful to interview the relevant staff in the country's Department of Labor. Their assessment of the situation could be supplemented with data on the size of the enforcement budget, the number of inspectors and prosecutions, and the severity of fines. It would also be useful to check the

Data are for 1989 in Mexico and 1987 in Colombia from Bell (1994).

relevant legislation to establish the scope for easy and legal avoidance through such means as use of temporary workers, apprentices, or subcontracting. As a crosscheck, a small survey of selected enterprises in different segments (private/public, formal/informal) would be desirable. In addition to government administrative capacity, strong labor unions and judicial systems may also play an important role in determining the effectiveness of enforcement. In Ecuador and Morocco, for example, unions reportedly act as important channels for the transmission of complaints regarding violations of labor regulations. In the United States, many cases of violations are taken directly by plaintiffs to court without the involvement of the Department of Labor.

iii) If the legislated minimum is binding and enforced, check the relative sizes of the public and private sectors. If the private sector predominates, then the evidence already compiled provides a basis for concluding that distortionary costs are potentially significant and that further analysis is required. If, on the other hand, the public sector predominates, one more test is required because in this case the efficiency impact depends on the net strength of the employment objective and the fiscal constraint λ . One indication of this is the extent of net financial flows from government to public enterprises. High figures could indicate a looser fiscal constraint. For example, as a proportion of GDP, these figures were 2.5 percent for Argentina, but -12.1 percent for Chile; and 16.6 percent for Algeria, but -6 percent for Egypt.²⁵ In the event that PEs appear to operate like profit-maximizing private firms, then, as with private firms, the evidence would point to potentially significant efficiency losses and would call for further investigation.

Data are for 1978-91 and from Galal (1994).

To conclude, we return to the opening quote from Freeman. In our checklist we have set out three conditions that would have to be fulfilled before we would expect to see significant distortions associated with legislated wage minima. It is our presumption that in many developing countries these conditions are unlikely to be fulfilled. If this is true, then Freeman's surprise at the lack of evidence regarding the distortionary costs of minimum wages is explained, at least as far as broad, cross-country comparisons are concerned. Such costs could, however, still be significant in some countries at some times.

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