SÉRIE SEMINÁRIOS N° 29/96

DIRETORIA DE PESQUISA

SEMINÁRIOS SOBRE ESTUDOS DO TRABALHO

The Economics of Compliance with Labor Legislation - a theoretical assessment with application to Brazilian data-

João Carlos Scandiuzzi

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Tiragem: 40 exemplares

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THE ECONOMICS OF COMPLIANCE WITH LABOR LEGISLATION

-a theoretical assessment with application to Brazilian data-

João Carlos Scandiuzzi

Introduction

The economics of noncompliance with labor legislation has received little theoretical attention. The literature, always applied to the issue of compliance with minimum wage laws, is relatively small, recent, and controversial.

One possible reason for the little attention this question has received in the American academia is the fact that the phenomenon of noncompliance with minimum wages seems to be rare in the United States. Ashenfelter and Smith (1979), the first paper to address the issue, estimated that among teenagers aged 17-19 and covered by the minimum wage law, a group particularly affected by minimum wage laws, only 3.3% received sub-minimum wages in May 1973. This figure is 37.2% for uncovered teenagers, suggesting that if sub-minimum wages were an important phenomenon at all in the United States, it was basically due to lack of coverage rather than to noncompliance.

The picture is completely different in Brazil, where noncompliance with labor legislation is much more widespread. During the 1980's, nearly one fourth of the wage earners worked for non-complying firms. In the 1990's this ratio has increased to approximately one third. It seems important, then, to understand the factors that determine noncompliance at the firm level and how the various labor market policies and institutions, as well as changes in the economic environment, might have an impact on the level of informality.

The perspective adopted in this paper is different from the two classical approaches to the analysis of informality in labor relations in developing countries. One group of authors (e.g., Lewis-1954 and Fizbein-1988) addresses the issue using a model where the distinction between formal and

informal sector is *ad hoc*, very similar to the distinction between covered and uncovered sectors in the literature devoted to the analysis of minimum wages in developed countries. The formal sector in these models represents the modern (capitalist) branch of the economy, while the informal sector is depicted as the traditional, subsistence sector. In these models all workers are homogeneous and the unemployment rate is the key variable in the equilibrium, playing the role of a cost to entry in the formal sector, and thus equating the expected utilities of a worker in the formal and informal sectors. Although this characterization may be useful, it is inadequate to describe the Brazilian case, since it is by no means possible to identify the informal sector with a subsistence, noncapitalist sector.

The second common approach to informality is based on a labor supply model of the Roy type (Roy-1951). Unlike the first approach, workers are heterogeneous both in their productive characteristics and tastes. Since skills are bundled, in equilibrium the formal and informal sectors may reward differently each of these productive characteristics. Each worker chooses to join the sector that gives her/him the highest income corrected for differences in tastes (i.e., there is self-selection). The hypothesis of segmentation of the labor market is tested by estimating the existence of costs of joining the formal sector (see Magnac-1991).

Contrary to the approaches described above, this paper analyses the issue of informality from the perspective of the firm. We do not assume assume the existence of an informal sector which is structurally different from the formal sector. On the contrary, we attempt to understand the basic factors that affect the decision of compliance by a profit-maximizing firm.The next section is devoted to the theoretical analyses of this issue. We then discuss briefly the aspects of the Brazilian labor legislation that might create incentives to noncompliance and present some empirical evidence. In the last section we summarize the conclusions of the paper.

The Model

The American literature on compliance is concerned specifically with minimum wage laws. Given the complexity of the Brazilian legislation that regulates labor relations, we will discuss the issue in more general grounds. In the discussion that follows, we decided to use the term regulated

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wage instead of minimum wage.

As mentioned above, the previous papers reached quite different results. In the following paragraphs we try to summarize the approaches and results in this literature. Ashenfelter and Smith (1979) were the first to analyze the decision of compliance at the firm level. A firm does not comply with the labor legislation if its profits doing so - considering the probability with being caught and the penalty if that happens - are higher than the profits attainable under compliance with the law. They propose that a firm does not comply if:

$$(1-\mu)[\pi(w,r,p)-\pi(M,r,p)]-\mu D>0 \qquad (1)$$

where π is the profit function, w is the market (noncompliance) wage, M is the regulated wage, μ is the probability of being caught and D is the lump-sum fee faced by the firm when caught. Taking a second order Taylor expansion around M=w, they obtain:

$$L(w)[M-w]+[L/w][0.5[M-w]^2|e|>[\mu/(1-\mu)]D \qquad (2)$$

where L(w) is the labor demand at wage rate w and e is the labor demand elasticity. From equation (2) the authors conclude that the incentives to noncompliance are higher: (a) the lower are the "odds" of being caught, (b) the higher the (lump-sum) penalty incurred if caught, (c) the lower is the market wage compared to the regulated wage, and (d) the larger is the elasticity of demand for labor (in absolute value).

There are two main drawbacks to this analysis. The first is the fact that the penalty for being caught in noncompliance does not depend on the employment level or on the difference between the market and the regulated wages. The second is the fact that the authors apparently made a mistake in deriving equation (2), so that the sign of the second term on the left-hand side is reversed. Their conclusion stating that the incentives for noncompliance are higher the higher is the absolute value of the labor demand elasticity is not valid.

Grenier (1982) attempted to reproduce the exercise made by Ashenfelter and Smith with a different assumption regarding the penalty for being caught noncomplying. In his formulation, a firm caught simply has to pay its employees the difference between their wages and the regulated wage. His equivalent to equation (1) is:

$$\pi(w,r,p)-\pi(M,r,p)-\mu L(w)[M-w]>0 \qquad (3)$$

Grenier concluded, after taking a Taylor expansion of (3) around M=w, that "the incentive to comply is lower: (a) the closer is the minimum (*regulated*) wage to the market wage, and (b) the smaller is the elasticity of demand for labor."

The deficiency in Grenier's approach is that the employment decision under noncompliance is assumed not to depend on the probability of being caught. This was corrected by Chang and Ehrlich (1985). Apart from a fixed cost "c" associated with being caught, which is not in their paper, the expected profit of a risk neutral firm that decides for noncompliance is:

$$\pi(E(w),r,p)=Max_{L,K} f(L,K)-wL-rK-\mu\kappa L[M-w]-c=Max_{L,K} f(L,K)-[w[1-\mu\kappa]+\mu\kappa M]L-rK-c \qquad (4)$$

where κ is a factor that represents the number of dollars the firm has to pay back to each employee, in case of being caught, for each dollar difference between regulated and market wages. $E(w) = (1-\mu\kappa)w + \mu\kappa M$ is the expected wage for a noncomplying firm.

The firm decides against compliance if:

$$v(E(w),M,r,p)=\pi(E(w),r,p)-\pi(M,r,p)-\mu c>0 \qquad (5)$$

As Chang and Ehrlich, let us initially consider the case where "c" is zero. First note that $\mu\kappa$ is smaller than one implies E(w) smaller than M. Since the profit function is decreasing on the wage rate, a firm decides for (against) compliance whenever $\mu\kappa$ is greater (smaller) than one[1]. The effect of an increase in the market wage, given the regulated wage, may be examined by differentiating (5) with respect to w:

$$\frac{\partial v(E(w),w,r,p)}{\partial w} = -L(E(w))[1-\mu\kappa] \qquad (6)$$

[1] When "c" is greater than zero, $\mu\kappa < 1$ is still a necessary condition for non-compliance , but is no longer a sufficient condition.

A decrease in the market wage, given the regulated wage, increases the incentives for noncompliance, provided that $\mu\,\kappa$ is smaller than one. Surprisingly, though, an increase in the regulated wage, given the market wage, has an ambiguous effect on the incentive for noncompliance[2]:

$$\frac{\partial v(E(w),w,r,p)}{\partial M} = L(M) - \mu\kappa L(E(w)) \qquad (7)$$

This finding is somewhat puzzling. Chang and Ehrlich do not devote more than a footnote to it. In the remaining of this section we further explore the issue.

Turning back to (5), now consider the case where "c" is greater than zero. This fixed cost might represent, for example, judicial costs. Suppose further that the labor demand elasticity is constant. The condition for noncompliance may be approximated by:

$$[1-\mu\kappa)L(w)[M-w] - 0.5|e_w|[1-\mu\kappa^2][M-w]^2\frac{L(w)}{w} > \mu c \qquad (8)$$

Or alternatively:

$$\frac{M-w}{w} - 0.5|e_w|[\frac{M-w}{w}]^2[1+\mu\kappa] > \frac{\mu}{[1-\mu\kappa]}\frac{c}{L(w)w} \qquad (9)$$

Equation (9) implies that the incentive to not comply is higher when: (a) the probability of being caught μ is low, (b) the cost from being caught is low (both the proportional cost κ and the fixed cost "c"), (c) the wage bill is high, (d) the elasticity of the labor demand is low.

As before, an increase in the regulated wage has an ambiguous effect. When the regulated wage is not "too" high compared to the market wage, an increase in the regulated wage increases the incentives to noncompliance, otherwise the contrary occurs. There is a turning point in this relation,

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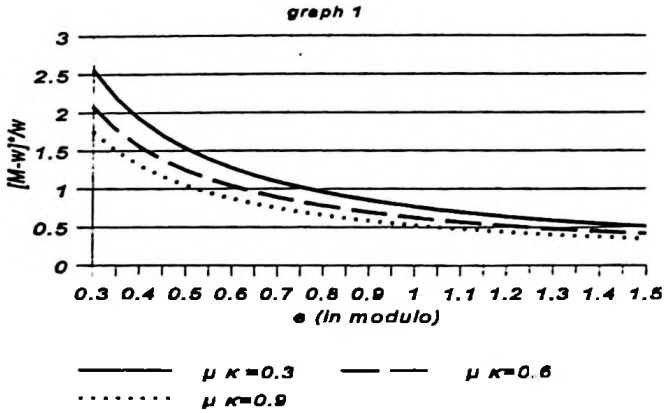
[2]Note that, no matter whether the incentive increases or decreases with an increase of the regulated wage, all non-complying firms will still not comply and all complying firms will still comply unless "c" is different from zero. The decision of compliance continues to depend solely on $\mu\,\kappa$ being bigger or smaller than one, and not on the value of the regulated wage.

and it is lower when the elasticity of labor demand is higher. To understand this, let us consider again the definition of the expected wage faced by a firm which decides not to comply: $E(w) = w + \mu \kappa (M- w)$. As pointed out by Hammermesh (1993, p.184): "the minimum (*regulated wage*) is a tax ceiling, with the tax rate on employment paying less than the ceiling being an increasing function of the discrepancy between W_M (*the regulated wage*) and the wage rate paid." As long as the tax rate $\mu \kappa$ is smaller than one, it pays to deviate from the regulated wage (assuming no fixed costs). Also note that the employment decision is made based on the expected (*ex-ante*) wage, but that *ex-post* this is not the optimal decision. The discrepancy between the *ex-ante* and *ex-post* optimal employment decisions is increasing in the labor demand elasticity. The cost of noncompliance, for a given "tax rate", is increasing in this difference between *ex-ante* and *ex-post* optimal employment decision, and so is increasing in the elasticity of labor demand.

The first term in the left-hand side of equation (8) might be regarded as the first-order gain from noncomplying and the second term as the second-order loss from noncomplying. This second term captures the effect just described. To illustrate the point, consider a situation where the elasticity of labor demand is zero, so that $L(M) = L(E(w)) = L$ and there is no discrepancy between *ex-ante* and *ex-post* optimal employment decisions. Then, an increase in the regulated wage unambiguously increases the incentive not to comply, and the firm decides against compliance if the (first order) gain exceeds the expected fixed cost μ c.

It is worth noting that, although the incentive to noncompliance may decrease as a result of an increase in the value of the regulated wage, in this simple model the employment will, "ceteris paribus", decrease in both in complying and in noncomplying firms. A higher regulated wage implies a higher wage not only to the formal sector but also a higher expected wage in the informal sector.

How important, from an empirical point of view, is the theoretical possibility that an increase in the regulated wage causes a decrease in the incentive for noncompliance? For given values of labor demand elasticity "e" and $\mu \kappa$, we can use equation (9) to calculate the percentage difference between the regulated and the market wage which maximizes the incentive for noncompliance. Let us denote this quantity as $[(M-w)/w]^*$. Figure 1 plots $[(M-w)/w]^*$ as a function of "e" for three levels of effective penalty for noncomplying ($\mu \kappa$):



This graph shows that, even in the case where the expected penalty rate (μ κ) for noncomplying is as high as 0.9 and the labor demand elasticity is also set at the high level of 1.5, the incentive for noncompliance would be increasing in [M-w]/w up to the point where the regulated wage is approximately 35% higher than the market wage. For lower values of the labor demand elasticity (in absolute value) this figure is above 100%. It is not possible then to discard beforehand the possibility that an increase in the regulated wage decreases the incentive to noncompliance. It will depend a lot on the range of the labor demand elasticity considered to be plausible.

Noncompliance in Brazil: Institutional Aspects and Empirical Evidence

In addition to the existence of a minimum wage, there are four aspects of the Brazilian labor market institutions that potentially make noncompliance with labor legislation attractive: (a) the official wage policy, (b) the existence of wage floors for diverse occupations, (c) non-wage labor costs that are imposed by law, and (d) costs of dismissal. We briefly discuss these aspects in the following paragraphs.

The official wage policy was created in 1965 to give the government some power over the wage formation process. Each month of the year, known as the "base-date" (data-base), a certain fraction of workers in the formal sector in Brazil bargains over wages with their employers. The assignment of workers to "base-dates" is made according to occupation and municipality. The official wage policy establishes a minimum rate of adjustment for wages of workers with "base-date"

in a given month[3]. This policy might generate incentives to noncompliance when this minimum rate of adjustment results in a wage that is higher than the market wage. It is important to note, though, that the wage policy only applies to workers continuously employed by the same firm. The firm can avoid the official wage policy and still comply with the labor legislation by dismissing and then recontracting its workers at the market wage, but this strategy involves the payment of the costs of dismissal imposed by legislation.

The existence of wage floors is the institutional aspect of the Brazilian labor market that more closely resembles the minimum wage policy, creating obvious incentives to noncompliance. These floors are defined at the occupational level and are negotiated between firms and unions. They constitute a minimum wage for the occupation, and unlike the official wage policy they are binding for all workers in the formal sector, including newly hired workers. Curiously, these floors are often fixed as multiples of the minimum wage. That means that increases in the minimum wage have an impact on the incentives to noncompliance for all the occupations which have their wage floors tied to the minimum. There is no evidence, so far, on how important this effect is in Brazil. It is likely that the indexation of wage floors to the minimum wage is a short-run phenomenon, i.e., the indexation factor would change every time the wage floor is negotiated between firms and unions, responding to market conditions. Maia and Saldanha (1989), for example, present evidence showing that as the minimum lagged behind other wages in the first half of the 1980's, fewer and fewer occupational wage floors tended to fall in the bracket that goes from 1.1 to 2 times the minimum wage. It would be interesting to find out whether this responsiveness of the wage floors to market conditions would be observed in the same degree in a period when the minimum is steadily growing compared to the market wage.

Non-wage labor costs create a wedge between the take-home wage of a worker and his or her cost to the firm. Following closely Amadeo and Camargo (1995), we can divide the labour cost in Brazil in the following components: (a) the contractual wage, (b) the annual one month bonus (13th wage), (c) payed one month vacations (with an additional bonus of 1/3 of the monthly wage), (d) transport subsidy, pregnancy leaves and other costs that vary with the sex of the worker, economic

[3]For a detailed description of the official wage policy in Brazil see Gonzaga and Scandiuzzi (1996).

sector and type of work, (e) the contribution to the worker capitalization fund (FGTS), (f) the contribution to finance the workers'assistance services (SESI, SESC), (g) contributions to finance official worker training systems (SENAI and SENAC) and an official institution which assists small enterprises (SEBRAE), (h) an on-the-job accident fee (proportional to the payroll), (i) the contribution to fund educational services, (j) the contribution to fund social security. Items (a) to (e) are individually appropriated by each worker, and thus must be considered take-home wage. Items (f) and (g) are in principle benefitial to workers, but for various reasons they might not be used at all by some workers. Finally, workers should benefit from the social security system, accident insurance and education (items (h) to (j)). But the low quality of these services and the possibility of free riding make it doubtfull that workers face these costs as wages (see Amadeo and Camargo-1995).

The complexity of the labor costs described above suggests the possibility that a firm complies with some aspects of the legislation, but not with others. In terms of incentives to noncompliance one extreme case would be that of a firm which has to decide between fully complying and paying only the contractual wage (item (a)). In this case, labor costs per worker are approximately 86% higher under compliance than under noncompliance. A much less extreme case would be that of a firm considering noncomplying with items (e) to (j). This would imply a cost difference of approximately 42% per worker. In any case, the figures suggest that these aspects of the Brazilian labor legislation are potentially important to explain noncompliance.

Finally, a complying firm faces two types of costs of dismissal (unless properly justified, as established by law). First, the firm has to pay a fine to the worker (40% of the FGTS contribution), which is increasing in the total time the worker has worked for the firm. Second, the firm is required to notify the worker about the dismissal one month in advance. During this month, the worker is entlited to take two hours a day to look for a new job. A noncomplying firm, unless taken to the Labor Court by a dismissed worker, does not face these costs.

The institutional aspects just mentioned might create incentives to noncompliance over the entire wage distribution, and not only among workers potentially affected by the minimum wage policy. Evidence of this is found in table 1, where we present, along with some other figures, the percentage of wage earners in the formal and informal sectors, i.e., workers with and without a

working card, that earn up to 1, 1.5, 2 and 3 times the minimum wage[4]. We present separate figures by metropolitan area, education, gender, age and industry.

[4]Unlike other papers on informality, self-employed workers are excluded from the concept of informal sector here for two basic reasons. On the one hand, this group is much more heterogeneous than the group of workers without a working card; including from physicians with independent practice to street vendors. On the other hand, and more importantly, because the aim of the paper is to study non-complying behavior by profit maximizing firms, a question that makes no sense for self-employed people.

Table 1		Av. Wage	Sector	% Emp. In Sector	W≤1M	W≤1.5M	W≤2 M.	W≤3 M
SMSA	Rio de Janeiro	237.8	informal	25.00	16.89	46.11	65.88	83.28
			formal	75.00	1.4	13.87	27.29	48.42
	Sao Paulo	341.7	informal	17.57	9.38	23.21	38.84	61.16
			formal	82.43	0.7	4.65	12.23	30.91
	Porto Alegre	269.8	informal	15.28	14.68	33.45	48.46	64.16
			formal	84.72	1.51	11.43	26.35	47.87
	Belo	205.9	informal	24.01	31.09	54.15	67.10	83.68
			formal	75.99	2.72	23.72	40.25	58.13
	Salvador	154.4	informal	30.86	46.80	64.65	75.08	87.21
			formal	69.14	3.72	25.67	45.57	64.96
	Recife	235.4	informal	22.24	38.92	59.46	75.14	83.78
			formal	77.76	1.30	16.78	30.04	49.67
Education	Illiterate	112.7	informal	30.00	35.53	57.90	77.85	90.14
			formal	70.00	3.74	28.41	50.08	76.48
	1 to 3 years	135.8	informal	29.97	27.55	54.19	71.49	58.18
			formal	70.03	2.58	17.80	35.95	62.64
	4 to 8	174.1	informal	23.92	21.46	44.98	63.64	83.62
			formal	76.08	1.62	13.61	27.85	51.94
	8 and more	421.7	informal	14.69	6.42	21.21	33.71	53.22
			formal	85.31	0.49	5.05	11.77	25.76
Gender	Female	195.7	informal	25.82	28.98	53.66	67.52	83.25
			formal	74.18	2.48	17.05	31.36	53.47
	Male	330.0	informal	18.04	10.01	27.64	45.99	66.38
			formal	81.96	0.67	7.35	17.11	35.18
Age	18 to 24	143.5	informal	27.47	25.30	52.86	70.25	88.16
			formal	72.53	1.94	16.88	33.11	60.01
	25 to 34	287.5	informal	16.04	15.97	33.84	50.76	68.59
			formal	83.96	0.87	9.19	19.28	36.78
	35 to 44	365.5	informal	14.55	15.51	28.65	44.99	65.29
			formal	85.45	1.25	6.45	15.03	32.44
	45 and More	364.7	informal	19.64	12.01	32.26	45.94	63.69
			formal	80.36	1.15	11.09	22.18	38.44
Industry	Manufacturin	341.0	informal	11.04	10.48	30.09	47.07	68.38
			formal	88.96	0.70	6.84	16.23	35.10
	Construction	196.9	informal	32.25	13.10	37.33	62.96	87.91
			formal	67.75	0.47	7.15	20.86	50.75
	Commerce	197.0	informal	21.06	8.86	25.06	46.81	64.98
			formal	78.94	1.10	14.06	31.43	57.76
	Services	277.3	informal	26.41	23.83	44.99	58.21	74.51
			formal	73.59	1.99	13.26	23.92	40.15
Total		283.35	informal	20.74	18.39	39.14	55.50	73.84
			formal	79.26	1.26	10.52	21.76	41.15

Notes: 1 Data from a sub-sample of the PME, August, 1988.

2 The average hourly was constructed using the formula (W/30)*(7/H), where W is the wage effectively earned in the month that precedes the interview and H is the number of hours worked in the week that precedes the interview. The values are in Cruzados from July, 1988.

3 The formal and informal sectors represent wage earners with and without a working card, respectively.

4 The hourly minimum wage was constructed using the formula (M/30)*(7/48), where M is the minimum wage of June 1988 (CZ$10,368.00).

Table 1 is based on a sub-sample of the PME (which in Portuguese stands for Monthly Employment Survey) from August 1988. Before we proceed in the analysis of the data, it is important to note that the methodology adopted by PME generates a concept of earnings that is very imprecise from the perspective taken in this paper. The question asked is: "how much did "X" effectively earn in the month of ... in this job?". Effective earnings (for a wage earner) include not only the ordinary wage, but also any other extra remuneration received in that month, such as the 13th wage and vacation bonus. These costs are taken in account by an employer when deciding whether to hire a worker, and thus it is legitimate to argue that they should in fact be included in the earnings concept. On the other hand, by measuring these costs in the month they are paid, we have a distorted picture of the total wage cost of a worker in a given month. The ideal way of dealing with this problem would be to dilute these costs proportionally over the months of the contract. It is not possible to do so, though, since the PME is not genuinely a longitudinal survey, and thus workers are not followed over the entire duration of their contracts. This distortion is probably not very serious in the figures presented in table 1 because the month considered is August and the 13th wage and vacation bonus are usually received in the months of November, December and January.

Another problem related to the earnings measurement has to do with the fact that the month considered is the one that precedes the interview. It is not uncommon in Brazil to receive part of the wage that corresponds to the work done in one month within that same month, and part in the beginning of the following month. The earnings reported, then, are in many cases a weighted average of earnings pertaining to two consecutive months, with the weights varying from case to case. And some workers receive their entire wage in the same month the work was performed. The earnings reported in an interview that takes place in August might correspond to the wage of June , to the wage of July, or to a weighted average of the two. This problem might be quite acute in a high inflation context, when nominal wages experience large variations from month to month. There is no obvious way of dealing with this shortcoming. In this paper we decided to work with the assumption that the wage corresponding to the work done in June is effectively paid in July. Accordingly, the minimum wage value considered was Cz$10,368.00, the value of June 1988. For the reasons discussed in this paragraph, the figures reported in columns 7 to 10 are likely to represent lower boundaries for the true figures. When convenient, we also report the upper boundaries,

obtained under the hypothesis that the wages are paid in the same month the work is performed. These figures were obtained by using the minimum wage of July 1988 (Cz$12,444.00) and may be found in the appendix.

Columns 7 to 10 in table 1 contain the percentage of workers in the informal and formal sectors that earn up to 1, 1.5, 2 and 3 times the minimum wage. These figures illustrate well the fact that the minimum wage is not the only incentive to non-compliance in Brazil. In fact, within the universe surveyed by PME, only 18.39% of the workers in the informal sector earn one minimum or less. When the minimum wage of July 1988 is used in the calculations this figure is still relatively small: 26.35%. On the other hand, a comparably large group of workers in the informal sector (between 20.73% and 26.16%) earn more than 3 times the minimum wage, suggesting that non-wage labor costs, the official wage policy, the wage floors, and costs of dismissal effectively induce noncompliance.

Although the informality is not restricted to workers directly affected by the minimum wage policy, it is clear from Table 1 that it is certainly concentrated among low wage workers. A much larger fraction of the workers in the informal sector receive wages up to 1, 1.5, 2 and 3 times the minimum wage than in the formal sector. This is true for males and females, as well as for all Metropolitan Areas, levels of education, age brackets and industries considered in this paper.

A simple earnings regression, reported in the appendix, generates a similar outcome. After controlling for education, experience, experience squared, gender, metropolitan area, and industry attachment, we get that a worker in the formal sector earns on average around 35% more than a worker in the informal sector. The result is consistent with the model presented in the previous section: it is this difference between the regulated wage (be it constrained by a minimum wage law, official wage policy or wage floor) and the market wage that creates incentives to noncompliance. There are other possible reasons for the difference between the wages in the formal and informal sectors. The first one is selectivity. Workers with similar observable demographic and productive characteristics might have very different ability levels. An employer, facing a minimum wage constraint, will probably decide to establish a formal contract with the workers with high ability, which would have earned at the least the minimum wage anyway, dismissing or establishing an

informal contract with the others. Under this hypothesis the dummy representing attachment to formal sector would in fact be capturing an ability difference.

The second possible reason for the wage gap between formal and informal sectors has to do with an agency problem. Certain occupations involve singularities that make them harder to monitor than others. Suppose that workers get any satisfaction from the fact of having a formal labor contract in opposition to having an informal one. The firm may use higher wages as well as a formal contract to keep the satisfaction among workers whose occupations are hard to monitor, and opt for lower wages and an informal contract in the relation with workers in occupations which are easy to monitor. This obviously generates a positive correlation between wages and formality. Furthermore, if agency problems are less common among occupations that require less experience and education, then there is an additional factor leading to the observed concentration of informality among low wage workers.

Assessing the relative importance of each of the factors mentioned in explaining the wage differentials between the formal and the informal sectors is a task that may not be tackled with the type of data and sample sizes we have. It would require an analyses of wage gains and losses experienced by workers who make transitions from one sector to the other, as well as detailed information on informality rates by occupation.

A related result that table 1 reveals is the negative correlation between average wage level and informality. Every factor that is associated with higher earnings in a typical earnings regression is also associated with lower informality incidence. Informality rates are decreasing in the educational achievement, are higher among females than males and are higher among non-manufacturing workers than among manufacturing workers. Informality rates decrease with experience up to a certain point, reaches a minimum among those aged 35 to 44, to increase again among those workers older than 45 years. All these patterns are confirmed by a logistic regression, reported in table 2, of the dummy representing the fact that an individual is in the informal sector, given that he/she is a wage earner, on various demographic characteristics (including dummies for metropolitan areas) and a dummy for employment in the manufacturing industry.

Table 2

LOGISTIC REGRESSION:

Estimates of the Parameters Associated with not Having a Working Card.

	Estimate	Standard Error
Constant	0.9342*	0.00506
Education	-0.1623*	0.000257
Experience	-0.0978*	5.132E-6
Experience Squared	0.00141*	0.000263
Manufacturing	-1.0134*	0.00208
Female	0.4540*	0.00174
Rio de Janeiro	0.2626*	0.00393
São Paulo	-0.2299*	0.00387
Porto Alegre	-0.2950*	0.00504
Belo Horizonte	-0.0088	0.00455
Salvador	0.4224*	0.00501

Notes: 1Total number of observations=12,218

2 The data was weighted by metropolitan area. The weights were obtained by dividing the expanded values of ocupation by the sample values, by metropolitan area.

3 * indicates that coefficient is significant at the 5% level.

It is important to note that we regard the logistic regression above as a descriptive tool; we do not claim a structural or causal relation between these variables. In this aspect, the perspective is completely different from the one taken by Sedlaceck (1989), where the worker is assumed to choose the sector (formal or informal) that maximizes her or his utility. Despite the differences in interpretation, the equation estimated is very similar, and so are the results.

Apart from the dummy for the metropolitan area of Belo Horizonte, all the regressors in this regression have opposite signs compared to those of the earnings regression reported in the appendix. The institutional factors that cause informality are specially important on the labor market for low income workers. Enforcement activity should focus on metropolitan areas and industries that employ primarily this type of workers.

Conclusions

In this paper we analyzed the theoretical literature on the incentives to non-compliance. We concluded that the incentive to noncompliance is high when: (a) the market wage is low compared to the regulated wage; (b) the wage bill is high; (c) the probability of being caught is low; (d) the penalty for being caught is low. An increase in the regulated wage has an ambiguous effect on the incentive to noncompliance. The importance of this effect is ultimately an empirical question.

Unlike the American case, in Brazil the incentives to non-compliance are not restricted to workers directly affected by minimum wage policies. Other institutional aspects, such as the official wage policy, the existence of wage floors by occupation, the existence of legally imposed dismissal costs and non-wage labor costs create incentives to non-compliance over the entire distribution of wages. The analysis of data from the PME showed that in fact a considerable portion of workers in the informal sector earn more than 2 and even 3 times the minimum wage. Nevertheless, informality is more concentrated among low wage workers. The proportion of informal workers earning up to 1, 1.5, 2 and 3 minimum wages is higher than the proportion of formal workers for all the different categories considered in this paper. Factors that are associated with higher earnings in an earnings regression tend to decrease the informality rate. Informality rates are thus lower among men than among women, and lower among more educated than among less educated workers. It decreases with experience up to a certain point, increasing afterwards.

The analysis of the data also showed that informal sector workers earn less than their peers in the formal sector, even after controlling for the usual demographic characteristics. This might be an evidence of sorting based on unobserved characteristics. It is also compatible with an agency problem type of explanation. Further analysis of these possibilities should be considered in future research.

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Appendix

Table 3		Av. Wage	Sector	% emp. in Sector	W≤1M	W≤1.5M	W≤2 M.	W≤3 M
SMSA	Rio de Janeiro	237.8	informal	25.00	28.04	65.54	76.95	87.16
			formal	75.00	3.56	26.99	38.90	57.29
	Sao Paulo	341.7	informal	17.57	14.73	37.50	51.73	62.90
			formal	82.43	1.52	11.76	19.00	40.09
	Porto Alegre	269.8	informal	15.28	21.84	47.78	58.21	71.33
			formal	84.72	3.31	25.67	35.85	56.50
3.	Belo Horizonte	205.9	informal	24.01	38.08	66.58	76.27	87.05
			formal	75.99	5.06	39.53	50.37	66.43
	Salvador	154.4	informal	30.86	56.90	75.08	84.19	89.23
			formal	69.14	8.09	44.67	56.38	71.89
	Recife	235.4	informal	22.24	45.95	75.14	80.87	85.95
			formal	77.76	3.25	29.65	39.22	57.61
Education	Illiterate	112.7	informal	30.00	44.74	77.85	87.83	86.71
			formal	70.00	8.69	49.85	63.74	74.05
	1 to 3 years	135.8	informal	29.97	36.84	71.49	82.65	91.15
			formal	70.03	5.16	35.55	48.39	73.71
	4 to 8	174.1	informal	23.92	30.97	62.36	74.95	86.83
			formal	76.08	3.77	27.04	38.99	61.32
	8 and more	421.7	informal	14.69	11.79	33.07	44.82	61.47
			formal	85.31	1.06	11.23	17.76	33.93
Gender	Female	195.7	informal	25.82	39.46	67.19	77.00	87.87
			formal	74.18	5.00	30.64	42.90	62.85
	Male	330.0	informal	18.04	15.96	44.95	58.29	72.46
			formal	81.96	1.75	16.56	24.43	43.74
Age	18 to 24	143.5	informal	27.47	35.51	68.45	82.72	92.13
			formal	72.53	4.06	31.87	47.16	67.36
	25 to 34	287.5	informal	16.04	23.22	50.60	61.12	74.49
			formal	83.96	2.27	18.74	26.92	46.58
	35 to 44	365.5	informal	14.55	21.60	44.70	53.90	70.88
			formal	85.45	2.41	14.79	21.97	40.73
	45 and More	364.7	informal	19.64	18.76	45.94	58.47	71.03
			formal	80.36	2.85	21.76	28.77	45.45
Industry	Manufacturing	341.0	informal	11.04	16.88	46.35	56.75	76.80
			formal	88.96	1.26	15.94	23.89	43.55
	Construction	196.9	informal	32.25	22.76	61.70	79.64	88.89
			formal	67.75	1.18	20.46	35.52	62.00
	Commerce	197.0	informal	21.06	14.52	45.61	59.11	70.46
			formal	78.94	2.77	30.10	43.68	65.94
	Services	277.3	informal	26.41	32.33	57.64	68.86	79.90
			formal	73.59	4.53	23.21	31.67	49.28
Total		283.35	informal	20.74	26.35	54.78	66.69	79.27
			formal	79.26	2.81	21.16	30.40	49.99

Note:

1 The hourly minimum wage was constructed using the formula (M/30)*(7/48), where M is the minimum wage of July 1988 (CZ$12,444.00).

Earnings Regression:

Variable	Estimate	Standard Deviation
Constant	-4.1115	0.03250183
Education	0.1568	0.00144815
Experience	0.068461	0.00161960
Experience Squared	-0.000877	0.00003317
Female (dummy)	-0.395109	0.01115940
Formal Sector (dummy)	0.335759	0.01379832
Manufacturing (dummy)	0.141766	0.01136218
Rio de Janeiro (dummy)	-0.001718	0.02556616
Sao Paulo (dummy)	0.396747	0.02478183
Porto Alegre (dummy)	0.094730	0.03058000
Belo Horizonte (dummy)	-0.052823	0.02944579
Salvador (dummy)	-0.230238	0.03398973

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