Producing Higher Quality Jobs: Exploring Enforcement of Benefits Across Brazilian Cities[1]

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PRELIMINARY AND INCOMPLETE.

There is an open debate on how governments can foster the creation of higher quality jobs. We explore administrative panel data on a policy tool that directly improves job quality: the enforcement of mandated job benefits at the city level. We measure job quality with several mandated and voluntary job attributes going much beyond wages and formality of the work contract. Our findings show that, between 1996 and 2007, a stricter enforcement of labor code at the city level was associated with a higher provision of mandated benefits as well as with higher average wages. However, we also find a strong trade-off between the provision of non-wage mandated benefits and the set of voluntary job benefits. We argue that enforcement policies can be welfare improving depending on how workers value the mandated and voluntary benefits.

JEL Codes: H00; H26; J20; J30; K31; O17; O41

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1. Introduction

Over the last decade economic growth in Brazil has translated into rising real wages and strong job creation, particularly among those workers with a *carteira de trabalho*.[2] However, it remains an open question whether job quality in the country has risen significantly. One of the instruments that policymakers can use to directly foster job quality is the enforcement of mandated benefits in the labor code. This paper analyzes whether the enforcement of the labor code, through the compliance with the set of mandated job benefits, translates into higher job quality at the city level. We explore a unique administrative panel data on the enforcement of labor market regulations and detailed job quality proxies at city level between 1996 and 2007. We find that stricter enforcement at the city level increases compliance with the labor code at the local level, increasing the provision of jobs offering mandated benefits and increasing mean wages in the economy. We also show that there is a strong trade-off between the provision of mandated benefits and the wage level, on the one hand, and the provision of optional job benefits on the other hand. We argue that enforcement policy can be welfare improving depending on how wages, mandated and voluntary benefits are valuable to workers.

We are particularly interested in understanding how governments can foster job quality in Brazil. Therefore, we proposed to measure job quality at the city level with a thorough vector of job characteristics which includes level of wages, the set of mandated but also the a set of voluntary benefits. In Brazil, the set of mandated job benefits established by law is wide ranging and imposes high labor costs on firms. For example, since 2001, the firm's costs with social security contributions and severance pay reach 28.5 percent of gross wage (35 percent including all other payroll taxes). However, in addition to the mandated benefits firms might also provide voluntary benefits (e.g., private health insurance, education/child care subsidy or food subsidy).

There is a strong correlation between worker's skills and the level of wages, and incidence of both mandated and voluntary benefits. However, this correlation is also present for each skill or educational group.[3] In particular, jobs providing the set of mandated benefits also pay relatively higher wages,

2 Over the decade, mean wages increased 8% for the workers with *carteira* and 9% for the workers without *carteira de trabalho*. (author's calculations using PNAD 2001, 2007). One important reason is economic growth, which has occurred mainly after 2004. Another remarkable fact which is perhaps consequence of growth is the creation of more than 10 million formal vacancies (or a 37% increase) from 2001 to 2007 [RAIS, Ministry of Labor].

3 PNAD data from 1997 shows that the correlation between having social security coverage and (i) having employer provided health care is 0.25; (ii) having food benefits is 0.26 and (iii) having education/child care benefit is 0.07. Similar correlations hold within education groups (not reported but available on request). The correlation between social security coverage and wage level is also positive 0.20 for all employees. It is a bit higher for very low educated employees (0.37) and much lower for

especially for the low educated workers. Therefore, the workers skills are not the single determinant of how firms combine wage levels and the provision of mandated and voluntary benefits.

An alternative factor determining directly the provision of mandated and voluntary benefits relates to the degree of enforcement of the labor laws. This toll is particularly important because it can be easily adjusted to affect the main labor market variables. Stricter enforcement of labor law increases job quality through a direct effect in the compliance with the mandatory labor market regulations. However, when faced with increased enforcement of mandated job benefits, and thus with higher costs of labor, firms may choose to either decrease the demand for labor, decrease hourly wages, reduce hours of work or adjust provision voluntary benefits. In the presence of strict enforcement, the set of voluntary job benefits could be easier to adjust than other channels simply because they are not mandated by the law. Almeida and Carneiro (2009a) find that stricter enforcement is associated with more formal contracts (i.e., contracts with *carteira de trabalho*) and with lower wages in the formal sector but it is unclear what happens on all the other dimensions, especially mandated and voluntary benefits. The extent to which firms adjust through these other channels is important and will likely affect individual's welfare.

We define mandated benefits as those benefits that are mandatory for all firms according to the labor code, regardless of the sector of activity. According to the Brazilian regulations, these include having social security coverage, a formal worker registration with the Ministry of Labor (or the commonly known *carteira de trabalho*), a wage in accordance with the minimum wage and receiving transportation benefits[4]. The social security coverage provides workers retirement benefits, disability and death benefits, unemployment insurance and maternity leave. The formal worker registration grants workers annual paid leave, and the compliance with the legal maximum weekly working hours (44 hours/week). We define the set of voluntary benefits as the set of all those job attributes beyond wages and hours that are not defined in the labor code. Firm might choose to offer these to employees, depending on their preferences and outside options. These benefits include, for example, the provision of a private health insurance, education and child care benefits to dependents, food and housing benefits.

highly educated employees (0.15).

4 Non compliance with the mandated benefits could be partial. For example, some workers could have a *carteira de trabalho* but may not receive transportation benefits. Section 2.1 will discuss the conditions under which workers are entitled to different mandated benefits (like social security coverage, formal registration with the Ministry of Labor and the compliance with minimum wages).

Discussing the evidence for Brazil is also very relevant for other developing countries in Latin America. First, In Brazil, as in many other Latin American countries, the set of mandated job benefits established by law is wide ranging and imposes high labor costs on firms.[5] Second, as several other large countries in the region, Brazil has a strict labor code set at the country level which is regionally enforced through labor inspections. There is a large debate on the effect of this strict labor regulation on the labor market outcomes like employment or wages. There is some evidence that stricter regulation is associated with more formality of labor and with lower wages for formal sector workers (e.g., Almeida and Carneiro, 2009a). However, little is known on the effects of stricter labor regulations on alternative job quality measures. This is an important contribution of this paper.

This paper analyzes whether the enforcement of the labor code, through the compliance with the set of mandated job benefits, translates into higher overall job quality at the city level. In addition we also look at the effects of enforcement on wages and employment. We explore a unique administrative panel data on the enforcement of labor market regulations and detailed job quality proxies at city level, between 1996 and 2007. Our identification strategy links variation in the enforcement of labor market regulations across cities (or *municipios*) and over time with city level outcome variables like wages, employment and alternative mandatory and voluntary job attributes. An increase in the enforcement of labor market regulations through more labor inspections, is expected to directly impact on the compliance with mandated benefits. Cardoso e Lage (2007) show that enforcement is primarily linked to stricter enforcement of mandated health and safety regulations, and to the worker's formal registration. When faced with higher costs of labor, firms may choose to adjust the demand for labor (disproportionally formal), decrease hourly wages in formal sector, reduce hours of work or adjust provision voluntary benefits. In the presence of strict enforcement, and with sticky wages in the short run, the set of voluntary job benefits could be easier to adjust than the other dimensions. In the medium run, as wages adjust downwards, there could be even an increase in the voluntary benefits. The later will depend on how worker value these benefits relatively to wages.

Our empirical findings show that stricter enforcement at the local level increases compliance with the labor code and the provision of jobs with the mandated benefits (including social security coverage, worker formal registration and compliance with minimum wage). The findings also show that a stricter enforcement of labor code at the city level is associated with higher average city wages.

5 Brazilian firms face the fifth toughest regulatory costs related to hiring, firing and working time in Latin America (Botero, 2004)

The latter is mostly driven by the higher share of workers whose contracts comply with mandated benefits (including formality of wage contracts and for whom average wages are higher) and the higher wages for workers without mandated benefits in cities where enforcement is stricter. Moreover, there is also evidence of a strong trade-off between the provision of mandated benefits and the set of voluntary job benefits. The implication is that while governments can use the enforcement of labor code to improve compliance with set of mandated benefits, this could decrease the provision of voluntary benefits which can be equally (possibly even more) valued by workers. Therefore, the welfare gains of stricter enforcement depend on whether the higher wages at the city level (and at the top of the formal wage distribution) and the smaller compliance with mandated benefits compensates sufficiently for loss of voluntary benefits.

The main empirical challenge we face is that variation in the enforcement across cities is likely not randomly distributed across cities and this is likely correlated with level of wages, employment and job quality measures. On one hand, enforcement may be stronger in cities with more infractions of labor laws. On the other hand, a city with better institutions could have stricter enforcement of the labor law. We find strong evidence that the level of enforcement (captured by the number of inspections in the city) is higher among the more developed cities. Figures 1(a) and 1(b) show that enforcement per 1,000 people in a city, is higher among the richer states of the South, Southeast and Center of Brazil. To minimize this problem, we explore panel data on enforcement and control for the heterogeneity at the city level by exploring *changes* in the enforcement of the labor law in a given city with changes in labor market variables of interest. However, one could still question the exogeneity of changes in enforcement at the city level over time. Actually, Figures 2(a) and 2(b) show that enforcement has become stricter over time in some developed cities like the southern Brazilian states of Minas Gerais and Rio Grande do Sul, which were already among the more developed states back in 1996. To the extent that these changes correlate with improvement in labor market outcomes, we will be over estimating the effects of enforcement in improving job quality. To mitigate this concern in our reduced form we will condition on a number of time varying city characteristics like total population, average age of the population at the city level, average education of the population at the city level, share of urban population in the city, the sector composition of the economic activity in the city and the city's per capita income in each year. Because labor market, education and anti-criminal state level policies are also likely to affect enforcement and labor market outcomes, we will also test the robustness of our main findings to the control for state specific year trends. Reassuringly, our main

findings do not significantly change with the set of city or state level controls. We interpret this as evidence that the potential endogeneity of the variation of enforcement in a first difference specification is probably not a serious concern.

Our paper relates with different literatures. First we relate to the literature analyzing the link between employment protection regulations and labor market outcomes (e.g., Kugler (1999, 2001, 2004), Kugler and Kugler (2003), Eslava et al (2005), Ahsan and Pages (2007), Petrin and Sivadasan (2006) and several other studies cited in Heckman and Pages (2004). Particularly related to our paper is Besley and Burguess (2004) and Autor, Kerr and Kugler (2007) who explore changes in the *de facto* regulations to identify the effects of employment protection laws on labor market outcomes. Our identification strategy builds on Almeida and Carneiro (2009a, 2009b) who explore within country variation in the enforcement of labor market regulation. However, unlike them we explore time series data on the enforcement of regulation at the city level, and study the effects of regulation on a detailed breakdown of mandated and voluntary job attributes. Therefore, our paper makes two important contributions to this literature. First, we analyze the effects of labor market regulations on other job attributes besides the formality of the work contract. In most studies, job quality is captured simply by formality of the work contract (e.g., ILO, 2003, Madrigal and Pages, 2008; Boeri et al, 2008). However, this is just one dimension of job quality.[6] We show that, in Brazil, there is a strong correlation between being formal (measured by having *carteira de trabalho*) and receiving other mandated and optional benefits. However, this correlation is far from perfect and there is significant within country and time series variation in the provision of these attributes. Second, we explore time series variation in the enforcement of labor market regulations to mitigate the potential problem of unobserved city level characteristics potentially correlated with labor market outcomes and with enforcement of the law.[7]

Second, we relate to the literature linking the employer provided benefits and individual job satisfaction. For developed countries, this literature shows that the provision of fringe benefits correlates positively with individual job satisfaction (e.g., many articles cited in Artz (2008): Bender, Donohue and Heywood (2005), Heywood and Wei (2006), Bender and Heywood (2006), Donohue and

6 According to the ILO definition, the informal sector is composed of unprotected workers (who are not covered by social security), self-employed, unpaid workers and workers or owners of smaller enterprises (firms with fewer than 10 workers).

7 This is a different approach than the one used in Almeida and Carneiro (2009). They explore only the cross sectional variation in the cost of providing enforcement in each city, which is proxied by the commuting time between each city and the enforcement office, interacted with number of inspectors in the state. Reassuringly their main findings on the effects of enforcement on wages, employment and formality are quite similar to the ones we obtain in our paper.

Heywood (2004), Uppal (2004), Benz (2005) and Artz (2008)). [8] The evidence for developing countries is scarcer. Madrigal and Pages (2008) link job protection and firm size with job satisfaction for three Latin American countries. They find that job satisfaction correlates with firm size for wage earners. The effect is heterogeneous across workers with the low skilled valuing relatively more self employment and less salaried jobs with benefits than the high skilled workers. Boo, Madrigal and Pages (2009) investigate the relationship between part-time work and job satisfaction for Honduras. They find that both women and men tend to prefer a full-time job, unlike evidence found for developed countries where the effect of hours worked on job satisfaction is negative. In Honduras, working part-time is a luxury good whose most disadvantaged families or families with children cannot afford.

Third, we relate to the literature investigating the extent to which higher mandated benefits translate to lower wages (or the commonly know rate of pass through). Among the papers cited in Boeri, Helppie and Macis (2008), the most closely related to our work are Kugler and Kugler (2002) and Gruber (1997). Kugler and Kugler (2002) study the effects of payroll taxes using a panel dataset of manufacturing plants in Colombia. The authors find 2.4% drop in wages as a result of a 10% increase in payroll taxes. Gruber (1997) explores the social security reform of Chile in 1981, which represented a large decrease in payroll taxes, and find no employment effects after a complete adjustment of the wages up. Wages also seem to respond inversely to the adoption or increase in other mandated benefits. For example, Gruber (1994) uses US state-level data to show that wages went down considerably when maternity benefits increased with a reform in the 1970s.

We explore two main sources of data. First, we explore information on the enforcement of labor regulations by exploring an administrative panel data set on the labor inspections in each Brazilian city between 1996 and 2006. This data, collected by the Brazilian Ministry of Labor, provides information on the number of labor inspections in each city. Inspectors check the compliance of firms with different mandated attributes related with the compliance with minimum wages, severance pay, formal worker registration with Ministry of Labor, transportation benefits and the maximum legal working period.

8 Fringe benefits usually include flexible working hour arrangements, vacation days, parental leave, health insurance, child care, employer provided pensions or profit sharing. These are usually less taxed than wages and thus employers have a monetary incentive to provide them as long as they are valuable to the worker. Artz (2008b) shows that the provision of flexible working hours, pensions, dental insurance, parental leave and child care benefits raises individual job satisfaction in the US, even after controlling for individual heterogeneity and the endogeneity of benefits.

Second, we explore information in the *Pesquisa Nacional por Amostra de Domicilios* (PNAD) surveys to compute alternative measures of job quality at the city level between 1997 and 2007. Based in this data we compute three alternative sets of measures of job quality. First, we capture job quality at the city level with the non-wage benefits mandated by the Brazilian labor law. In particular, we compute the share of the city population covered by the minimum wage, share of workers with transportation benefits, share of workers with contributions to the social security, share of workers with formal registration with the Ministry of Labor (through ownership of *carteira de trabalho*) and share of workers complying with the maximum weekly working period. Second, we capture job quality at the city level with the set of voluntary job benefits. In particular, we compute the share of the city population with housing benefits, food benefits, private health insurance and education and child care subsidies.[9] Third, we compute more indirect proxies of job quality which relate to whether jobs are offered in large firms, the share of workers with full time contracts and the share of workers in the construction sector. Proxying job quality with firm size follows Madrigal and Pages (2008) and several other papers relating firm size with higher investment in human capital or in innovation (e.g., Almeida and Aterido, 2008, Almeida and Fernandes, 2007, McKenzie et al, 2009). Proxying job quality with the share of the population in the construction sector follows Firpo and Carvalho (2009).[10] The assumption is that in some sectors, like construction, there is a higher risk of being laid off due to cyclical variations in the demand. If anticipated, workers could demand a wage premium or higher fringe benefits.

The paper proceeds as follows. In the next section, we discuss the labor market regulations in Brazil and the recent evolution in the enforcement of the labor laws conducted by the Brazilian Ministry of Labor. In section 3, we discuss the data and in section 4 we propose a simple theoretical model to analyze the main findings. Section 5 discusses the empirical strategy and section 6 the main findings. Section 7 concludes and highlights the main policy implications.

9 Unfortunately, we cannot disentangle education and child care benefits. While the former is mandatory (part of the social security package), the latter is voluntary. Education benefits (or *Salario Familia)* is part of the social security benefits and is given to low income working parents with school age children. We thus prefer to include these benefits in the voluntary group.

10 Firpo and Carvalho (2009) link risk on the job with lack of employability. They explore data for Brazil to construct a ranking of occupations based on their risk on the job and their wage return. The prior is that there should be a trade-off between risk and return. They assume that the risk on the job for each individual is a function of their education, experience, geographical location (metropolitan area, Brazilian state), internet use, the estimated probability of being employed, duration of employment and migration. Using hedonic wage regressions, they thus predict the risk component of wages. The latter is given by the direct effect of being in an occupation plus the wage effect related to individual and jobs quality attributes. The authors find that services, less capital-intensive manufacturing and construction and arts and sciences professionals are ranked worse while military, managers (public or private) are at the top of the ranking.

2. Labor Market Regulations and Enforcement in Brazil

2.1 Labor Market Regulations

The current Brazilian labor code dates back to 1943 with the *Consolidacao das Leis do Trabalho* (CLT). Since then two major revisions took place (Barros, Corseuil and Gonzaga, 1999). In 1964, revisions reduced power of labor unions and prohibited strikes, reflecting the repressive military regime (Amadeo and Camargo, 1996). In 1988, the new Brazilian Federal Constitution (FC), reflected the re-democratization process, and increased back the benefits to workers. These latter changes represented a large increase in the labor costs to firms. First, it reduced the maximum weekly working period (from 48 to 44 hours). Second, it increased the overtime wage premium from 20% to 50% of regular wage. Third, the maximum number of hours for a continuous work shift dropped from 8 to 6 hours. Fourth, maternity leave increased from 3 to 4 months. Fifth, it increased the one month vacation time pay from 1 to 4/3 of a monthly pay. Following 1988 the changes is the labor code included additional increases in the cost of labor to the employers. First, the employer's payroll contribution increased from 18.2% to 20% (and to 22.5% for workers in the the financial sector). Second, from 1988, the penalty on the firm for dismissing the worker without cause increased from 10% to 40% of the total contributions to the severance fund, FGTS. Third, from 2001, the monthly contribution towards FGTS increased from 8% to 8.5% and the penalty on the firm increased further from 40% to 50%, where 40% goes to the employee and the extra 10% goes to the government.[11]

As result, in Brazil employers face very high costs of hiring and firing formally workers. For example, in 2007, for a net wage of 100 Reais, the firm needs to disburse approximately 165.70 Reais (Cardoso and Lage, 2007). [12] In addition, if the worker is dismissed for unjustified reasons, with the exception of workers on probationary period, the firm is fined and has to pay the worker additional 40% of the FGTS balance and, since 2001, the firm also has to pay the government 10% of the worker's FGTS

11 The FGTS (Fundo de Garantia por Tempo de Servico) is 8% (8.5% since 2001) of the employee's monthly wage which goes into an individual account managed by a federal bank, where deposits get adjusted by inflation plus a 3-6% annual interest rate, depending on tenure in the current job. Workers have access to their accounts only if they get fired for no reasons, upon retirement or other reasons which mostly include the worker to buy its first own house.

12 That mainly include: the firm's costs with social security contributions and severance pay (28% of gross wage or 28.5% since 2001). In addition, firms must pay 2% of the worker's gross wage as insurance to cover for accidents in work. Also, all private-owned firms pay 2.5% for *Salario-Educacao* which is a contribution towards a fund of the Ministry of Education to support financing public primary education. Finally, there is also a sector contribution (known by the acronyms of SEBRAE, SESI, SESC, SENAI, INCRA) which may reach up to 1.5% of gross wages for the manufacturing sector. Data on the mandated benefits provided by the law are available at the Brazilian Ministry of Social Pensions (http://www.previdenciasocial.gov.br) and Ministry of Labor (http://www.mte.gov.br).

balance.[13] Unlike in most of the countries, in Brazil severance payments received by the worker are not subject to income taxation. This means that the workers value one Real of FGTS more than one Real in gross wages.[14] Moreover, firms pay taxes on profits, which represent about 23% (15% IRPJ and 8% CSLL). As a result, the cost of FGTS to the firm is much smaller than the value of FGTS to the worker. Moreover, not differently than in other Latin American countries, employers in Brazil must also give an advance notice to workers. During this interim period, workers are granted up to two hours per day (25% of a regular working day) to search for a new job or the firms voluntarily choose to grant them the full monthly wage without requiring them to work. Barros and Corseuil (2001) find that there are large productivity losses during this period.

In the empirical work, we will analyze five different mandated benefits, which we observe at the individual level in PNAD: social security coverage, worker's registration with Ministry of Labor (*carteira de trabalho*), wage complying with the minimum wage, transportation benefits and a maximum weekly working hours. We describe briefly next the benefits provided by each of these categories. The entitlement to a *carteira de trabalho* implies that the worker is protected by the Employment Laws, laid out by the CLT and revised subsequently in the 1988 FC. In particular, since 1988 owning a *carteira de trabalho* entitles workers to paid annual leave (CLT art. 129), maternity leave (CF art.7, XVII), severance pay conditional on being fired (Law 8036 of 1990), maximum weekly working period of 44 hours (CF, art. 7, XIII), unemployment insurance (Law 7998 of 1990) and other associated benefits such as social security and transportation benefits (Law 7418 of 1985 and Decree 95247). Social security coverage entitles workers to retirement pensions, disability benefits, death insurance and to *Salario Familia*.[15] The social security law, Law *Elói Chaves* and Decree 4682, dates from 1923 and was implemented gradually. In 1960, the *Lei Organica de Previdencia Social* extended social security coverage to most urban workers and three years later coverage was extended also to rural workers.

We observe in the data the direct entitlement to minimum wages, transportation benefits and with the maximum weekly working period. A monthly and federal minimum wage was implemented in the

13 Therefore, dismissal costs increase significantly with tenure and may generate the adverse effects of increase firings and workers to force being fired. The high turnover rates among the workers in Brazil is therefore not surprising

14 Nonetheless, the rate of return on the FGTS fund is lower than the market rates. (Gonzaga, 2004) In that case, workers could prefer having the monthly contribution towards severance in terms of salary rather than in terms of compulsory savings.

15 *Salario Familia* entitles low wage workers with dependant children (until 14 years of age) to a monetary benefit per dependent. *Salario Familia* currently ranges between Reais 19 and Reais 27 per month and child, depending on the individual wage. Households where both parents work and are eligible for this benefit, receive this contribution twice.

mid 30's (Law 1985, 1936 and Decree 399, 1938)[16]. In 1996, the minimum wage was Reais 112 and by 2007 it had risen 3.3 times to Reais 380. In real terms the minimum wage also rose, although less, from Reais 248 in 1996 at 2008 prices (or US$ 250) to Reais 406 (or US$ 200) in 2007. After 2002, more than one minimum wage became effective as the state of *Rio de Janeiro* adopted a different wage threshold, and allowing it also to vary by occupation and sector. From 2007 onwards a total of four states (including now *Sao Paulo, Parana* and *Rio Grande do Sul)* also adopted a different minimum wage by occupation and sector. The transportation benefits may be provided in kind or through a monetary transfer. The amount or the cost of this benefit for the firm varies from city to city in Brazil. It also depends on the journey and on the type of transport needed/available in the city (mainly bus, metro or car).

Safety in workplace is another benefit which is mandated by law. The labor code is quite ample in this attribute as specified by the CF (art.6 and 7, XXII, XXIII, XXVIII e XXXIII), CLT (V, 1977) and by law 5.889 of 1973 for the rural workers. Cardoso e Lage (2007) argues that enforcement is highly linked to inspecting safety regulations. Unfortunately, we do not observe safety in workplace benefits in PNAD and thus are unable to analyze this. However, most fines issues on the lack of compliance with safety regulations are strongly correlated with fines issued due to the lack of worker's registration with Ministry of Labor. Therefore, most likely compliance and evasion in these two components are strongly correlated.

Finally, we also observe a number of voluntary benefits in our data. These include employer provided private health insurance, education or child care benefits, food and housing benefits. The incidence of these benefits in PNAD shows that private health insurance and food benefits are the most important source of voluntary benefits.[17] Arbache and Ferreira (2001) provide estimates on the costs of providing these two benefits. They estimate a cost of food benefits of US$35 per month and worker as of 1992 (or 57% of the minimum wage) and a cost of US$13.8 per month and worker (or 22% of the minimum wage) as of 1991 for the private health care provided by the firm.[18] Arbache (1994a,1994b)

16 In particular, since then the state of *Rio de Janeiro* adopted a minimum varying also by occupation. Since 2007, three other states in the country – *Sao Paulo, Parana and Rio Grande do Sul* – also adopted a state specific minimum. In the empirical work we explore time series variation between 1996 and 2007 and thus should account for these differences. States with higher minimum wage, could have more difficulties in complying with the law and thus could have more evasion (and consequently more/less enforcement). Our empirical work will explore time series variation at the *municipio* level and thus should not be affected by these differences.

17 Using individual data from PNAD 1997 to 2007, we see that 33% of employees have food benefits, 18% have employer provided health insurance, while only 8% receive housing and 2.4% get education or child care benefits.

18Unfortunately, we do not have estimates for the magnitude of the average costs for the firm to provide housing, education or child care benefits.

and Arbache and Ferreira (2001) have analyzed the implications of the employer provision of voluntary benefits for the income tax collection and contributions to social insurance in Brazil. Since voluntary benefits are free of taxes (as each dollar spent does not make any contribution towards social security) and are unequally spread across workers (benefiting mostly high wage and registered employees), they find that their provision is likely to reduce tax revenues to finance the social security system and increase inequality.

2.2. Enforcement of labor regulation in Brazil

Firms weight the costs and benefits of complying with this strict labor regulation. They decide whether to comply with all mandated benefits or to evade compliance with some specific features of the labor code (e.g., avoid the provision of specific mandated benefits like the provision of health and security conditions, or avoid payments to social security). The expected cost of evading the law is a function of the probability of being caught and of the monetary value of the penalties (fines and loss of reputation). In turn, the probability of being caught depends on the firm's characteristics (such as size and legal status) and on the degree of enforcement of regulation in the city where the firm is located.

The Brazilian Ministry of Labor is in charge of enforcing compliance with labor regulation. Given the size of the country, enforcement is first decentralized at the state level with the main labor offices (*delegacias*) being located at most state capitals. Enforcement is further decentralized at a more local level within each state. For example, the state of Sao Paulo has 21 labor offices (*subdelegacias*) while other smaller states, like Acre or Amapa, only have one office, usually coinciding with the delegacia of the state capital. The descentralization of the enforcement at the level of the *subdelegacia* is a key feature of our empirical work, which explores city level data. In particular, we will explore variation in the yearly number of labor inspections at the city level between 1996 and 2007. A comprehensive description of the enforcement of labor regulation in Brazil is given in Cardoso and Lage (2007) and in Almeida and Carneiro (2009a, 2009b).

Labor inspections became stricter and more relevant after mid 90s. The large public deficit at that time led the Brazilian government to search for alternative ways to collect revenue. The size of informal economy (57% of the workforce in the country did not pay payroll taxes in 1996) and in particular the significant evasion of severance pay by firms seemed to be a profitable target for labor officers whose main role was to act as tax collectors.

Most of the inspections (and fines) are to ensure compliance of firms with the worker's formal registration in the Ministry of Labor, contributions to the severance pay fund (FGTS), compliance with minimum wage, with the maximum working period and work shifts.[19] The monetary amount of the fines is economically significant and maybe issued per worker or it may be indexed to firm size. For example, in 2009 values, a firm is fined by Reais 403 for each worker without a *carteira de trabalho* and by Reais 170 per violation of the terms of payment. Depending on its size and profitability fines related with FGTS range from Reais 11 and Reais 106 per worker. Fines related to evasions of the working schedule (daily, weekly or extra hours) vary from Reais 40 to Reais 4,025 per worker. When firms are caught evading more than once, all fines are doubled. At 2009 prices, the federal minimum wage was Reais 415 so not complying with worker registration may imply a penalty of approximately one monthly wage.

An inspection can be triggered either by a random firm audit, or by a report (often anonymous) of non-compliance with the law. Workers, unions, the public prosecutor's office, or even the police can make reports. In practice, almost all of the targeted firms are formal firms because it is difficult to visit a firm that is not registered, since there are no records of its activity. Also, inspectors face a performance based pay scheme which often leads them to look for big cases where the penalty is likely to be large.[20]

3. Data

We explore two main sources of data. First, we use administrative city level data on the enforcement of labor regulations collected by the Brazilian Ministry of Labor. Data for the number of labor inspections and fines in each city is available for the following years: 1996, 1998, 2000, 2002, 2004 and 2006. Second, we explore the household level survey PNAD, collected by the *Instituto Brasileiro de Geografia e Estatistica* (IBGE). Data is available annually for the years 1996 through 2007 (except for 2000, when PNAD is not available). For the year 2000, we interpolate with values obtained from the simple average of the variables between year 1999 and 2001.[21] PNAD collects detailed labor market variables at the individual level. In each year, the sample covers approximately

19 Evasion of one of these dimensions accounts for approximately 62% of all fines issued in 2007.

20 In particular, up to 45% of their wage is tied to the efficiency of the overall enforcement system (1/3 is tied to the inspectors own performance while 2/3 is tied to the system's global performance). Their base salary is also competitive. In 2004, their monthly wage was between USD 2,490 (starting position) and USD 3,289 (top management) [Almeida and Carneiro, 2009]

21 We tested the robustness of the results to when excluding year 2001 to compute the explained variable from the sample (and year 2000 for the explanatory variables. It is reassuring to see that our main results do not significantly change.

300,000 individuals in a sample of cities across all Brazilian states. In particular, PNAD selects all metropolitan and large cities and extracts a random sample of the smaller cities. [22] We use PNAD to construct several city level measures of employment, wages and proxies for the quality of jobs at the city level. To compute the mean labor market variables at the city level we only consider individuals aged 23 through 65 years old.[23] Tables A2 through A5 in the appendix report the descriptive statistics of the main variables in the paper.

Table A1.1 in the appendix reports the number of cities with labor inspections, the number of cities with labor fines issued, the total number of inspections, the total number of fines and the proportion of fines per type of evasion for Brazil. Table A1.2 reports similar data only for the cities covered by PNAD. Tables show that the incidence of enforcement is high and increasing during this period. In table A1.1, the proportion of cities with labor inspections rose from 46% in 1996 to 67% in 2006. Figures 2(a) and 2(b) report a large within country variation in the intensity of enforcement and their trends (captured by the share of cities with labor inspections) within Brazil. Figure 2(a) refers to the Northern states and Figures 2(b) refers to the Southern states. Furthermore, Figures 1(a) and 1(b) also report a large variation in the levels and trends in the extensive margin of enforcement (captured by the total number of inspections per 1,000 individuals in the city). For example, while the total number of inspections decreases from 3 inspections per 1,000 inhabitants in 1996 to 2.5 in 1998 and from 2.9 in 2000 to 2.4 inspections per 1,000 inhabitants in 2006, the city level patterns differ markedly both in the levels and in the trends. Figures 1(a) and 1(b) also show that enforcement per 1,000 people in a city, is higher among the richer states which are in the South, Southeast and Center of Brazil. Figures 3(a) and 3(b) report similar statistics only to the cities covered by PNAD at each point in time, where it can be seen similar pattern of such measure to the one observed in figures 1(a) and 1(b) for all cities in the country.

In the empirical work we will relate the degree of enforcement of labor market regulation with several labor market variables at the city level, after conditioning on a set of city time varying characteristics. Our main measure of enforcement is the logarithm of the number of labor inspections at the city level divided by 10,000 (plus one), i.e., log(labor inspections/10,000+1).[24] This variable

22 At the beginning of each decade, PNAD selects the cities that will be included in the survey. The sampling includes all metropolitan and large cities and selects a random sample of the remaining cities (*municipios*). For example, for the state of *Sao Paulo* PNAD include 112 cities, where 56 are metropolitan or large. Albieri and Bianchini (1999) describe the sampling in detail.

23 Domestic employees comprises about 5% of all workforce aged 23-65 according to PNAD 1996-2007.

24 This is an arbitrary measure that suits the range of the inspections variable in our data. It is reassuring to see that our main findings would be qualitatively similar if we were to change the enforcement variable to the total number of inspections at the

captures the total number of visits by labor inspectors to each city. We explore PNAD to compute several city and time varying characteristics, including labor market outcomes. The city level characteristics include total city population, average years of schooling of population aged 23-65, average age of the population in the city, the share of urban population in city, average per capita household income and the share of workers in agriculture, mining, trade, services, manufacturing, transport and telecommunications and in construction.

We also explore PNAD to compute several labor market variables, which include total city employment, employment composition, moments of the wage distribution and alternative measures of job quality. All the variables proxying job quality discussed below are computed as the number of wage earners in each city with a specific job attribute as a percentage of the total city population aged 23-65 years old. Because labor inspections target mostly the wage earners in firms, we always exclude from the numerator domestic employees, unpaid workers or self-employed workers.

We consider three alternative types of job benefits. First, we compute variables to proxy for city level coverage with mandated benefits, which include social security coverage, formal worker registration with the Ministry of Labor (*carteira de trabalho*), compliance with minimum wage and transportation benefits. These are measured with the number of wage earners with social security coverage as share of city population between 23 and 65 years old. We compute similar statistics for the workers with *carteira de trabalho,* with monthly labor earnings above the federal minimum wage per month, with transportation benefits and working a maximum of 44 hours per week.

Second, we compute variables to proxy for city level coverage with a set of voluntary benefits, which include housing benefits, private health insurance, education or child care benefits and food benefits. Again these are measured with the number of wage earners with housing benefits as share of total city population aged 23 and 65 years old. We compute similar statistics for the workers with (private) health insurance, with education or child care benefits and with food benefits.

Third, we consider in addition a set of job characteristics that are more indirectly related with job quality at the city level. In particular, we compute the share of wage earners in firms with more than 11 employees as share of total population, the share of wage earners in construction and the share of wage earners that work more than 30 hours per week (i.e., are considered full time).[25] The rational is that

city level.

25 We follow the ILO definition of part time work as workers with less than 30 or 35 hours per week. Most of the full time workers in Brazil work 44 hours/per week, which is the maximum allowed in the law. Therefore, the effect of enforcement in

job quality correlates with firm size and with satisfaction on the job. Madrigal and Pages (2008) report that job satisfaction is higher among larger firms. This is likely to be occur because in large firms there is more job training, better working conditions, more networking, more specific human capital (as large firms invest more in technology). Firpo and Carvalho (2009) also argue that construction jobs are worse because wages do not fully compensate for the more risk involved. They consider as part of the risk the probability of becoming unemployed, the duration of employment, geographic location, ease of searching for a new job and individual's characteristics such as education and experience. Finally, we also expect that stricter enforcement is associated with different use of part-time labor (eventually also positively correlated with job quality)[26] First, the required compliance with a monthly minimum wages, even for part time workers makes full-time workers more costly on hourly basis. Moreover, although some mandated benefits (like contributions to the severance fund) are proportional to monthly wages, there are also fixed costs of hiring a worker. Therefore, with stricter labor regulations, it is most likely cheaper to hire a full-time worker than a part-time worker. Thus, cities with stricter enforcement should have a higher share of full time workers.

Finally, we also compute additional labor market indicators at the city level. First, we compute the median, percentile 10^{th} and 90^{th} of the labor earnings for all wage earners in each city. Similarly, we also construct these moments for workers with and without the specific mandated or voluntary attributes discussed above. Second, we compute city level measures of the composition of employment in each city: as the share of wage earners (registered or unregistered with Ministry of Labor), the share of the self-employed, the share of the unpaid workers, the share of domestic employees and the share of the non-employed, always as a proportion of the total city population between 23 and 65 years old.

4. Theoretical Model

We motivate our estimations with a simplified version of a theoretical model of compensating differentials studied in Rosen (1974, 1986) and summarized in Fernandes (2002). These models relax the assumption that wages are the only choice variable when firms and workers decide on the optimal

the full time/part time breakdown is more informative than in the number of working hours. We follow the ILO definition of part time work as workers with less than 30 or 35 hours per week.

26 According to evidence for other Latin American countries this may not be true since working part-time is a luxury consumption, which the most disadvantaged families or families with children cannot afford (see e.g., Boo, Madrigal and Pages, 2009).

allocation of labor. In addition to wages, workers value also job attributes. Some jobs offer worse working conditions than others, and thus firms must pay a compensating differential to account for the worker's lower utility.

As discussed in the previous section, we observe whether Brazilian workers receive a set of mandated and voluntary benefits. If individuals value these benefits, they should be willing to receive lower wages in exchange for having these job attributes. The greater is the worker's valuation of each benefit, the larger is the wage reduction he/she would be willing to accept. All else constant, providing these benefits is costly to firms and thus, they are willing to offer jobs that trade off these benefits in exchange of lower wages.

Assume that the workers utility function is U=U(w,B), where w is wage and B is an indicator as to whether the worker is in a job which provides benefits. Let B=1 if benefits are received and 0 otherwise, with U(w,1)> U(w,0) for all w. Let w0 be the equilibrium wage in a market without benefits and w1 the wage in the market with benefits. The reservation wage of the worker who is indifferent between working in the job without benefits and taking up a job with benefits is thus the wage which equates U(w*,0)=U(w1,1). In that case, the compensation needed for the worker to be indifferent is equal to w*-w0. Given that w1-w0 is the market wage differential, the decision rule for the worker would be B=0 if w1-w0>w*-w0, i.e if the individual's required wage compensation to work without benefits is lower than the one provided in the market and B=1 if w1-w0< w*-w0. If w1-w0= w*-w0, then workers would be indifferent between the two types of job, with and without benefits.

Suppose now that the economy is populated by a continuum of workers (normalized to 1), which are identical in their productive characteristics. However, assume they differ in their preferences for benefits so that they may decide on different values for B. Some will optimally prefer to be in a job with benefits and some will not. This implies that in the population there are different levels of reservation wages (w*). Assuming that X=w*-w0 follows a continuous distribution function, g(X), the aggregated labor supply of workers without benefits is given by $G(w1-w0)=\int_0^{w1-w0} g(X)dX$ and the aggregated labor supply of workers with benefits $1-G(w1-w0)$.

Now, consider the demand for labor and that the number of vacancies is also normalized to 1. The firms will have to decide on offering jobs of type B=0 or of type B=1. This decision will depend on the costs they incur to offer such benefits. Let the cost of providing benefits per worker be C. A firm

chooses B=0 if C>w1-w0 or B=1 if C<w1-w0. The firm will be indifferent between offering of not benefits if C=w1-w0. As cost of provision varies across firms, firms will take different decisions as to whether they will provide or not benefits. Assuming C is continuous with probability distribution function, f(C), the aggregate demand for workers with benefits is given by $F(w1-w0) = \int_0^{w1-w0} f(C)dC$, and the aggregate demand for workers without benefits is $1-F(w1-w0)$. In equilibrium the market wage differential, w1-w0, is such that the demand and supply equate for the two types of jobs, i.e. by making $G(w1-w0) = 1-F(w1-w0)$ which is solved with knowledge on the density functions g(X) and f(C). [27]

The main intuition underlying this model is that workers with high preference for benefits will be allocated to jobs offering benefits but paying lower wages. These jobs would be offered by firms facing lower costs to provide such benefits. On the contrary, workers with low preference for benefits will be offered jobs with no benefits in firms paying higher wages and facing higher costs of providing benefits. This prediction, however, does not ignore that in the data there are workers which earn high wages and work in jobs with benefits. The decreasing association between wages and job benefits is only expected for workers with similar characteristics, and thus the same reservation wage.

Since the real world is much more complex than the model, there could be different reasons why in the data there could be no negative correlation between level of wages and set of job benefits. First, individuals are likely to be very heterogeneous regarding their preferences for certain job attributes and thus in their reservation wage, across cities. Brazil is a very large country with several economic and cultural differences in its population across cities. Workers have significant different observable characteristics (e.g., education, age, gender and wealth) and unobservable characteristics (e.g., tastes) across cities. Second, worker preferences for given job attributes are likely to be time varying and themselves affected by the expectations of the future value of the benefits. For example, if there is an increasing belief that the social security system will not pay retirement pensions in the future, workers will value less this coverage. Third, firms in Brazil are also likely to be quite heterogeneous, with varying costs to provide job benefits across cities and over time. In particular, cities differ in the tax structure, factor prices and technology available. Therefore, firms located in different cities will have

27 It is possible to generalize this result for a J-dimensional vector of job quality attributes. In equilibrium, there are J different wages in the market relative to the wage of the workers without the J attribute (Wj*-W0) and allocations Nj, which are determined by the relative preference of workers for job attributes and by the relative cost of providing these benefits.

different cost of providing the same job attribute. In sum, in the real world significant differences across individuals and firms in their preferences and costs of providing certain job benefits could prevent us from finding the empirical contradiction of the model that wages and benefits correlate negatively. Nevertheless, we are confident that exploring within country and time series variation at the city level and conditioning for several city characteristics as well as year trends, we account for the large heterogeneity.

In the next section we relate the degree of enforcement of labor market regulations at the city level, which is a proxy for the cost of providing mandated job benefits, with the provision of job benefits. Our empirical strategy will explore variation in the cost of providing mandated benefits across cities and over time. We assume that the cost of evading the law and not providing mandated benefits is higher in cities with stricter enforcement of labor market regulations (proxied with labor inspections). Thus, stricter enforcement should directly affect the provision of mandated benefits. The most important mandated benefits are observed in our data and include social security coverage, the worker formal registration with MoL, compliance with federal minimum wage, provision of transportation benefits and compliance with maximum working period.

As discussed in section 2, when labor inspectors visit the firms they check the compliance with a wide set of mandated benefits established in the labor code and which include all the dimensions reported above (e.g., Cardoso and Lage, 2007). Even though the Brazilian labor law is set at the federal level, – and thus the cost of compliance with mandated benefits should not vary at the city level- it might change over time as tax rates, tax allowances or the minimum wages change.

All else constant, firms located in cities with stricter enforcement will face higher labor costs. They will have a lower demand for labor and thus may reduce employment, wages (of those covered or uncovered) or the provision of voluntary job benefits. Since wages and employment are likely to be more rigid in the short-run, firms may more easily adjust the supply of voluntary job benefits (like the provision of private health insurance, food or housing benefits). As wages and employment become easier to adjust downwards in the medium/long term, the effect of stricter enforcement on voluntary benefits should become smaller. However, in the long run, the effect stricter enforcement might not necessarily be associated with lower wages or with less employment. If stricter enforcement disproportionally affects the cost of employing the low skilled workers (e.g., because the minimum wage is a binding policy for firms paying wages at the minimum or just above), it is possible that in

the long run the share high educated workers in total workforce increases. This change in the composition of employment could lead to higher mean wages in the economy for those who remain employed. Nevertheless, we still find it more plausible to expect that the first order enforcement effect dominates this composition effect and that, in the long run, stricter enforcement at the city level is associated with lower mean city wages.

In sum, in a wage compensation framework, stricter labor regulation may not always be desirable. Enforcement policies could increase the compliance with some benefits but could employers may reduce wages and the provision of voluntary benefits, which are also valuable to workers. However, labor informality is often associated with low investment and low productivity jobs (Acemoglu, 2001), in which case stronger enforcement may promote more efficient markets and higher utility.

5. Empirical model

Section 4 discussed how, in theory, stricter enforcement at the city level could affect the provison of mandated and voluntary benefits, mean wages, employment and employment composition at the city level. In this section we present the simple empirical model that we estimate. Consider that in each city *i* and year *t*, the provision of job attribute *k* at the city level relates with enforcement at the city level in the following linear equation:

$$Y_{it}^{k} = \alpha^{k} + \beta^{k} E_{it-1} + X_{it-1}\delta^{k} + \eta_{i}^{k} + \mu_{t}^{k} + u_{it}^{k} \qquad (1)$$

where, Y_{it}^{k} is a proxy of the job attribute *k* in city *i* at time *t*, E_{it-1} is the measure of enforcement of labor market regulation in the city *i* and time *t-1*, X_{it-1} is a set of city and time-varying characteristics. η_i are the city time invariant effects, μ_t are the year dummies and u_{it} is the (unobserved) time varying city level characteristics. We assume u_{it} is unrelated to the explanatory variables given city and year fixed effects, i.e., $E(u_{it} | \eta_i, \mu_t, X_{t-1}, E_{t-1}) = 0$.

In Y_{it}^{k} we consider several outcomes of interest such as mean city level log wages, employment and employment composition (wage earners, self employment, domestic and unpaid workers), as well as

alternative proxies for mandated and voluntary job benefits, which includes the shares of city population with social security benefits, with worker's formal registration with Ministry of Labor, with earnings complying with the minimum wage, with working period below the maximum, with housing benefits, with food benefits, with transport benefits, with health benefits, with education/child care benefits. For all those job benefits, we also look the share of population without the job benefits. Other job quality indicators include the share of population which works part-time, the share of population in the construction sector and share of population in large firms.

We measure enforcement of labor market regulation in E_{it-1} with the (log) number of labor inspections in each city in year *t-1* (divided by 10,000). In X_{it-1} we include several lagged time varying city characteristics that are likely to be simultaneously correlated with job attributes and with the degree of enforcement of labor regulation in each city. These include the (log) city population, the average years of schooling of adults, the average age of the population, the share of urban population, the average per capita household income and the share of workers in agriculture, mining, trade, services, manufacturing, transport and telecommunications and in the construction sectors. Controlling for the share of urban population and for the composition of employment at the sector level is important because, over the last three decades, there has been a significant and increasing trend in the share of urban population and the services sector along the rising formality. Controlling for the average per capita city household income captures for cross city and time differences in city development.[28] [29] Finally, the year dummies μ_t capture the effect of macroeconomic shocks or any other federal policies that could be simultaneously correlated with stricter enforcement of labor market regulations at the city level and with the different job benefits considered. For example, these could capture fiscal policy related with income tax rates, corporate tax rates, social security contributions or other federal level policies that could be correlated with the degree of enforcement of the labor law and also with labor market outcomes at the city level.

The main parameter of interest is β^k, which captures the effect of stricter enforcement on the labor market outcomes, Y_{it}^k. The main challenge in this estimation is that the level of enforcement of labor market regulation is likely not to be exogenous. First, enforcement may be stricter in cities where

28 Unfortunately, Brazil does not produced for all the time period covered in our sample estimates of the city level GDP.
29 In the regressions of the share of construction workers, we had to exclude from the set of controls the shares of workers per industry.

violation of labor laws is more frequent. Second, enforcement of the labor law may be stricter in cities where institutions are more developed. Moreover, both violation of labor laws and better institutions are probably correlated with labor market outcomes. Actually, the descriptive statistics reported in Figures 1(a) and 1(b) (and 3(a) and 3(b) for PNAD cities) showed that the level of enforcement (captured by the number of inspections per 1,000 people in the city) was higher, between 1996 and 2007, among the more developed cities in the country. In particular, enforcement as proportion of population in a city was higher in the South, Southeast and Center states of Brazil which are relatively richer in the country. Moreover, Figures 2(a) and 2(b) also show that enforcement gradually became stricter among the southern Brazilian states of Minas Gerais and Rio Grande do Sul, who were already more developed back in 1996. Since we explore changes in the enforcement of labor regulation within each city, we already accounting for the systematic correlation between the level of enforcement of labor regulation at the city level and the level of development of cities. However, differences across cities in the trends of enforcement that correlate with city trends in labor market outcomes are more problematic. In particular, many labor market variables, linked with job quality, may have a similar pattern overtime as that of the enforcement variable.

To minimize the concerns with endogeneity of inspections we first take advantage of the panel structure of the city level data and estimate equation (1) with city level time invariant effects, captured by η_i.[30] Controlling for unobservable city heterogeneity, mitigates the endogeneity problem in levels as it assumes that cities can systematically differ in the degree of enforcement and across several unobservable determinants of the city outcomes. Our identification comes simply from the time variation in the enforcement of labor market regulations across cities. Thus, it assumes that the current trends in the labor market variables are common across all cities, independently of the degree of enforcement. To mitigate the endogeneity concerns of current changes in enforcement, we explore lags of enforcement and we also condition on a rich set of city controls. Controlling for lagged city level characteristics will also minimize the endogeneity concerns because it makes the assumption $E(u_{it} | \eta_i, \mu_t, X_{t-1}, E_{t-1}) = 0$ more plausible.

30 Constructing a panel with averages of variables by city and year and using fixed effects in both dimensions follows closely the approach given by Meghir and Whitehouse (1996). Rather than using individual data, they use grouped data by cohort and year to study the behavior of wages (returns and differentials by occupation) of males living in UK. By doing so, they argue that they can control for the effects of self-selection into occupations by exploiting the changing occupational choices over time since grouping 'averages out' the idiosyncratic unobserved productivity components which may be correlated with occupations.

Exploring the lagged variation in the enforcement of regulation will reduce the likelihood that β^k is capturing the contemporaneous variation in other city level characteristics which are also correlated with labor market outcomes. The point estimates are also suggestive of the long term effects of regulation. In the absence of labor market rigidities, the levels of wages and employment would adjust within one period, and the effect of lagged enforcement could be interpreted as the long-term effects on the economy. Alternatively, if wages and employment take a more than one period to adjust, the point estimates for β^k would sign the short rather than a long-term impacts. Moreover, our data on enforcement shows that only about 3% of formal firms are on average inspected per city.[31] Even though one could expect enforcement of labor market regulations to affect at most these 3% of firms straight away, since this is a rather small number of firms, there will hardly be a short term effect in the city outcomes of interest.

6. Empirical Findings

6.1 Main Findings

Table 1 through 5.4 report the weighted least square estimates of equation (1) after clustering the standard errors at the city level and using as weights the inverse of the number of individuals in each city. For each regression we only report the coefficient of interest β^k. Our set of control variables (X_{it-1}) in Panel A regressions include mean education, mean age and the log of population. In Panel B, X_{it-1} includes the share of workers per industry, the share of urban population and the log of per capita family income. In general, the results are quite similar across these two specifications and we will focus our comments on Panel B with a richer set of controls.

Table 1 reports the estimates of equation (1) when the dependent variable is the share of wage earners in total city population (registered and unregistered at MoL), share of self employed workers, share of non-employed (inactive and the unemployed), share of unpaid workers, share of domestic workers and the share of other workers (which include employers and workers for own consumption). The findings show that, increasing enforcement by 10% increases the share of wage earners by 0.19 percentage points (pp). This is expected as increasing enforcement will increase the employer's

31 We divide the total number of inspections by the total number of formal firms in each city and year. Total number of formal firms is collected by IBGE (National Statistics Bureau).

compliance with the law, especially for wage employees. This increased enforcement increases the attractiveness of formal sector jobs, leading to a contraction in the share of self-employed by 0.16pp. Similarly, the share of unpaid workers increases by 0.18pp. We do not find strong evidence in a fall of non-employment, domestic employees and for other workers. The increase in the share of unpaid workers could support the idea that employers are able to substitute away from wage earners to support the costs of compliance.[32]

Table 2 reports the effects of stricter enforcement on the set of mandated benefits provided by employers at the city level. Findings show that an increase in labor inspections by 10% is associated with more formality, although the effects of increasing inspections by 10% are quantitatively very small: 0.28pp for share of workers with social security benefits and 0.35 pp for those registered workers with Ministry of Labor.[33] Interestingly, increasing the enforcement of labor market regulations does not affect the share of workers without transport benefits or the share of workers with the maximum legal working period. This is expected because enforcement is likely not primarily used to monitor the firm's compliance with transport benefits (which are a small monetary value) and evasion of the maximum legal working period is already quite high across most cities (as shown in table A1).

Table 3 reports the estimates of the effects of increasing enforcement on the set of voluntary benefits provided by the employer. The findings show that stricter enforcement of the labor regulations is associated with a larger share of the wage earners without voluntary benefits (including housing benefits, food benefits, education/child care benefits or without health insurance). In particular, cities with 10% higher labor inspections have a higher share of workers without food subsidies and without health benefits in 0.53 and 0.49 pp, respectively. These findings suggest that stricter enforcement of labor regulations leads firms to substitute away from voluntary benefits to mandated benefits, at least in the short run, when it is more difficult to adjust employment or wages (nominal rigidity). The adjustment in the workforce is particularly costly for the older employees where the cost of firing is particularly high.[34]

32 This is probably focused on the low skilled agricultural workers. In current work we investigate whether this is focused on a certain set of workers.

33 Because the total number of workers that must be registered with MoL (wage earners and self employed) increases by less than the share of registered workers thus the share of unregistered workers decreases significantly.

34 If the worker is newly hired, the contributions (8.5% of monthly wage) of the firm made towards the worker's severance fund were small enough such that the penalty (50% of contributions made by firm) the firm would face is negligible.

Table 4 reports the effects of enforcement on additional proxies for job quality including share of workers working full time, share of workers in the construction sector and the share of workers in firms with more than 11 employees (non-micro firms). We find that stricter enforcement increases the cost of providing mandated benefits, especially in the construction sector, so that the share of workers in other sectors rises. We do not find robust evidence of compliance affecting significantly the share of individuals in micro firms and working part time.

Table 7 and 5.1 through 5.4 report the effects of stricter enforcement on the wage levels at the city level. We have seen that stricter enforcement at the city level is associated with higher levels of compliance with social security contributions, registration with MoL and with coverage of the minimum wages. However, the provision of food and health insurance falls. There is also not much evidence that total employment falls significantly at the city level (as non-employment is not affected). However, composition effects could lead to changes in the level of wages. First, share of wage earners increases and to the extent wages are higher for this group, mean wages could increase. Moreover, the substitution way from "uncovered" workers to "covered" workers, possibly with higher skills could also lead to higher city wages. Table 7 and tables 5.1 through 5.4 report that mean wages increase by 0.9% when enforcement increases in 10%.

Tables 5.1 through 5.4 report the estimates of the effects of enforcement on the 10^{th}, the 50^{th} and on the 90^{th} percentile of log monthly wages for different groups of workers. We find that increasing enforcement at the city level is associated with a decrease in wages at the top of the distribution for workers with social security coverage and for those that are formally registered with the Ministry of Labor. We also find that wages fall for the wage earners that do not have social security or that are unregistered. The adjustment only at the top of the wage distribution is probably related with downward rigidities linked to the enforcement of the minimum wages. Finally, tables 5.3 and 5.4 report that there are likely some changes in the composition of the workforce for those with and without transportation benefits and complying with the maximum working period.

6.2 Robustness of Results

One of the major concerns with the results reported above relates with the possible role of time varying omitted variables that are also correlated with changes in enforcement. In particular, we worry with state level reforms in the quality of some institutions that are simultaneously correlated with greater compliance with the labor code, as well as with better labor marker outcomes. In particular, we

worry that this improvement in the quality of institutions explains most of the changes in employment composition relatively to the compliance with mandated benefits (although there are not much reasons to believe this would explain a reduction in voluntary benefits too).

Tables 6.1 through 6.5 report the same sequence as above for the specification reported in Panel B and after controlling for state year trends (or state dummies interacted with time trend). Tables 6.1 through 6.4 refer to the employment composition and Tables 6.5 refer to wages. It is reassuring to see that most of our findings carry through with stricter enforcement correlating with higher share of registered workers and with lower voluntary benefits (especially food and health benefits). The main difference relates to the lack of effect of enforcement on the share of wage earners and on the self employed, which now are not statistically significant and with an increased lack of compliance with minimum wages. The former suggests that findings in table 5.1 were biased upward.[35]

Finally, the results reported in Tables 6.5.1 through 6.5.4, still conform that wages tend to fall at the top of the wage distribution for workers with mandated benefits. The main difference from the previous section relates to the statistically significant increase in the wages of workers at the lower part of the wage distribution (10^{th} percentile). We curremtly investigate whether these results can be explained by a change in the composition of workers at this part of the wage distribution. This would happen if the incoming workers into the formal sector have lower skill levels than the exiting workers.

7. Conclusion and Policy Implications

Growth in Brazil over the last years has translated into job creation, in particular across the formal sector. This has been followed by rising real wages (both in the formal and informal sectors), which could be interpreted as an improvement in job quality in the country. The debate whether good and bad jobs are rising has often been confused with the identifying the trend in formal sector jobs, which in Brazil are usually proxied with having a *carteira de trabalho*.

This paper explores unique panel data on one important policy toll that directly affects the provision of high quality jobs: the enforcement of labor market regulations at the city level between 1996 and 2007. Our prior is that in cities with stricter enforcement it is more costly to evade the labor law and there will be a greater compliance with the set of mandated benefits. Thus stricter enforcement should directly impact job quality through a higher compliance with the set of mandated benefits (including social security coverage and registration with MoL). However, exploring city level

35 Interestingly, the share of unpaid now increases even more (by 0.21pp) and remains statistically significant.

variation in the enforcement of the law will allows us to identify how increasing the cost of compliance with the labor code will affect the compliance with other dimensions of job quality, including level of wages and several employer provided voluntary benefits (e.g., food benefits, education/child care benefits, private health insurance). Our main empirical challenge is the exogeneity of the variation in enforcement, which we capture by city level labor inspections. We argue that the panel dimension of the city level data (between 1996 and 2007), together with the possibility of exploring *lagged* changes in enforcement and controlling for several time varying city characteristics, goes a long way in mitigating this problem and controlling for city heterogeneity.

Our findings show several interesting results. First, stricter enforcement at the city level increases compliance with mandated benefits and is correlated with higher city level wages. The latter is driven both by an increase in the share of workers with mandated benefits (and thus more skilled) and also by an increase in the wages of the uncovered workers. Second, there is a significant trade-off between the provision of mandated and voluntary benefits. As a policy implication, while government can use enforcement policy to improve some dimensions of jobs, this may decrease provision of some voluntary benefits (like private health insurance or food benefits) which may be equally or more valued by workers. Whether stricter enforcement leads to welfare gains in the society depends on whether the higher city level wages and higher compliance with mandated benefits off set the welfare losses related with the smaller provision of some voluntary benefits, namely the food subsidies and the private health insurance. The fall at the top of the wage distribution for covered workers suggests that an increase in enforcement could be welfare reducing particularly for the groups that are better off.

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Table 1. Effects of Enforcement on City Employment Composition

Dependent Variable:	Wage Earner	Self-Employed	Non-employed	Unpaid	Domestic	Other
	(1)	(2)	(3)	(4)	(5)	(6)
			Panel A: FE with basic controls			
Log # Inspections	0.023	-0.019	-0.005	0.012	-0.006	-0.005
	(0.010)**	(0.008)**	(0.017)	(0.007)*	(0.007)	(0.005)
Obs.	4834	4834	4834	4834	4834	4834
			Panel B: FE with all controls			
Log # Inspections	0.019	-0.016	-0.005	0.018	-0.009	-0.008
	(0.010)*	(0.009)*	(0.018)	(0.007)**	(0.007)	(0.005)
Obs.	4834	4834	4834	4834	4834	4834

Standard errors in parentheses are clustered by city, * significant at 10%; ** significant at 5%; *** significant at 1%.
The table reports the least squares estimates of equation (1) in the text when the dependent variable is the share of the population aged 23-65 whose employment status is: wage earner, self-employed, non-employed, unpaid worker, domestic employee and other worker (employer or working for own consumption). In all specifications, we use city and year fixed effects. Panel A regressions include basic controls which are mean education, log of population and mean age at the city and year. Panel B includes controls in Panel A regressions plus the share of urban population, the share of workers per industry (i.e. shares in manufacturing, agriculture, trade, services, telecommunications and others), and finally the log of per capita income in the city and year. All independent variables are lagged. We use the inverse of the number of observations per cell as weights.

Table 2. Effect of Enforcement Labor Regulations on Mandated Job Benefits

Dependent	Social Security		Registration MoL		Compliance Minimum Wage		Transportation Benefits		Compliance Max.	
Variable:	with	without	with	without	with	without	with	without	legal	above
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
					Panel A: FE with basic controls					
Log # Inspections	0.033	-0.011	0.041	-0.018	0.044	0.012	-0.002	0.025	0.01	0.011
	(0.010)	(0.007	(0.012)**	(0.009)*	(0.016)**	(0.005)**	(0.014	(0.011)**	(0.0	(0.011)
Obs.	4834	4834	4834	4834	4834	4834	4834	4834	4834	4834
					Panel B: FE with all controls					
Log # Inspections	0.028	-0.008	0.035	-0.016	0.038	0.014	0.000	0.019	0.01	0.008
	(0.010)	(0.007	(0.010)**	(0.009)*	(0.019)**	(0.005)***	(0.013	(0.013)	(0.0	(0.012)
Obs.	4834	4834	4834	4834	4834	4834	4834	4834	4834	4834

Note: Standard errors in parentheses are clustered by city, * significant at 10%; ** significant at 5%; *** significant at 1%. The table reports the least squares estimates of equation (1) in the text when the dependent variable is the share of population aged 23-65 with(out) social security coverage, formal registration with the Ministry of Labor (MoL), minimum wage, transportation benefit and work - ing by 44 hours/week). In all specifications, we use city and year fixed effects. Panel A regressions include basic controls which are mean education, log of population and mean age at the city and year. Panel B includes controls in Panel A regressions plus the share of urban population, the share of workers per industry (i.e. shares in manufacturing, agriculture, trade, services, telecommunica - tions and others), and finally the log of per capita income in the city and year. All independent variables are lagged. We use the inverse of the number of observations per cell as weights.

Table 3. Effects of Enforcement on Optional Benefits

Dependent Variable:	Housing		Food		Education/Child Care		Health	
	with	without	with	without	with	without	with	without
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Panel A: FE with basic controls				
Log # Inspections	-0.005	0.028	-0.034	0.056	0.003	0.020	-0.027	0.050
	(0.005)	(0.010)***	(0.014)**	(0.016)***	(0.002)	(0.010)**	(0.014)**	(0.015)***
Obs.	4834	4834	4834	4834	4834	4834	4834	4834
				Panel B: FE with all controls				
Log # Inspections	-0.006	0.026	-0.033	0.053	0.002	0.017	-0.030	0.049
	(0.005)	(0.010)***	(0.015)**	(0.018)***	(0.002)	(0.010)*	(0.013)**	(0.016)***
Obs.	4834	4834	4834	4834	4834	4834	4834	4834

Standard errors in parentheses are clustered by city, * significant at 10%; ** significant at 5%; *** significant at 1%.
The table reports the least squares estimates of equation (1) in the text when the dependent variable is the shares of population aged 23-65 with or without the benefit of: housing, food, education/child care and employer provided health insurance. In all specifications, we use city and year fixed effects. Panel A regressions include basic controls which are mean education, log of population and mean age at the city and year. Panel B includes controls in Panel A regressions plus the share of urban population, the share of workers per industry (i.e. shares in manufacturing, agriculture, trade, services, telecommunications and others), and finally the log of per capita income in the city and year. All independent variables are lagged. We use the inverse of the number of observations per cell as weights.

Table 4. Effects of Enforcement on Other Job Benefits

Dependent Variable:	Hours		Industry (Riskier occupation):		Firm size	
	Part-time	Full-time	Construction	Other industries	Large	Small
	(1)	(2)	(3)	(4)	(5)	(6)
			Panel A: FE with basic controls			
Log # Inspections	0.007	0.015	-0.005	0.027	-0.018	0.005
	(0.007)	(0.008)*	(0.005)	(0.009)***	(0.016)	(0.007)
Obs.	4834	4834	4834	4834	4834	4834
			Panel B: FE with all controls			
Log # Inspections	0.008	0.011	-0.005	0.024	-0.022	0.002
	(0.006)	(0.008)	(0.005)	(0.010)**	(0.015)	(0.007)
Obs.	4834	4834	4834	4834	4834	4834

Standard errors in parentheses are clustered by city, * significant at 10%; ** significant at 5%; *** significant at 1%.
The table reports the least squares estimates of equation (1) in the text when the dependent variable is the shares of population aged 23-65 with or without the benefit of: working part-time, not working in the construction sector (*proxy* for lower risk), working in larger firms (11 or more workers). In all specifications, we use city and year fixed effects. Panel A regressions include basic controls which are mean education, log of population and mean age at the city and year. Panel B includes controls in Panel A regressions plus the share of urban population, the share of workers per industry (i.e. shares in manufacturing, agriculture, trade, services, telecommunications and others), and finally the log of per capita income in the city and year. In the regressions of the share of construction workers, we had to exclude from the set of controls the shares of workers per industry. All independent variables are lagged. We use the inverse of the number of observations per cell as weights.

Effects of Enforcement on Wages, by Job Benefit

Table 5.1. Social Security Coverage

	With Social Security			Without Social Security		
Dependent Variable:	P10	Median	P90	P10	Median	P90
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: FE with basic controls					
Log # Inspections	0.025	0.009	-0.351	-0.087	0.281	0.321
	(0.113)	(0.098)	(0.097)***	(0.210)	(0.198)	(0.152)**
Obs.	4826	4826	4826	4791	4791	4791
	Panel B: FE with all controls					
Log # Inspections	0.005	-0.011	-0.359	-0.111	0.207	0.243
	(0.099)	(0.080)	(0.085)***	(0.189)	(0.168)	(0.139)*
Obs.	4826	4826	4826	4791	4791	4791

Standard errors in parentheses are clustered by city, * significant at 10%; ** significant at 5%; *** significant at 1%.
The table reports the least squares estimates of equation (1) in the text when the dependent variable is the 10th, the median or the 90th percentile of log-monthly wages. We run separate regressions for the wage percentiles of employees with and without the mandated benefit, which is indicated on the first line of table. In all specifications, we use city and year fixed effects. Panel A regressions include basic controls which are mean education, log of population and mean age at the city and year. Panel B includes controls in Panel A regressions plus the share of urban population, the share of workers per industry (i.e. shares in manufacturing, agriculture, trade, services, telecommunications and others), and finally the log of per capita income in the city and year. All independent variables are lagged. We use the inverse of the number of observations per cell as weights.

Table 5.2. Registration with the Ministry of Labor

	Registered			Unregistered		
Dependent Variable:	P10	Median	P90	P10	Median	P90
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: FE with basic controls					
Log # Inspections	0.034	0.030	-0.362	0.088	0.186	0.284
	(0.117)	(0.102)	(0.095)***	(0.242)	(0.164)	(0.100)***
Obs.	4820	4820	4820	4806	4806	4806
	Panel B: FE with all controls					
Log # Inspections	0.015	0.012	-0.367	0.060	0.109	0.178
	(0.105)	(0.083)	(0.080)***	(0.216)	(0.126)	(0.087)**
Obs.	4820	4820	4820	4806	4806	4806

Standard errors in parentheses are clustered by city, * significant at 10%; ** significant at 5%; *** significant at 1%.
The table reports the least squares estimates of equation (1) in the text when the dependent variable is the 10th, the median or the 90th percentile of log-monthly wages. We run separate regressions for the wage percentiles of employees with and without the mandated benefit, which is indicated on the first line of table. In all specifications, we use city and year fixed effects. Panel A regressions include basic controls which are mean education, log of population and mean age at the city and year. Panel B includes controls in Panel A regressions plus the share of urban population, the share of workers per industry (i.e. shares in manufacturing, agriculture, trade, services, telecommunications and others), and finally the log of per capita income in the city and year. All independent variables are lagged. We use the inverse of the number of observations per cell as weights.

Table 5.3. Transportation benefits

	With Benefit			Without Benefit		
Dependent Variable:	P10	Median	P90	P10	Median	P90
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: FE with basic controls					
Log # Inspections	-0.050	-0.031	-0.238	0.208	0.431	-0.157
	(0.110)	(0.081)	(0.128)*	(0.206)	(0.180)**	(0.087)*
Obs.	4417	4417	4417	4832	4832	4832
	Panel B: FE with all controls					
Log # Inspections	-0.049	-0.036	-0.231	0.149	0.366	-0.206
	(0.095)	(0.073)	(0.103)**	(0.175)	(0.147)**	(0.092)**
Obs.	4417	4417	4417	4832	4832	4832

Standard errors in parentheses are clustered by city, * significant at 10%; ** significant at 5%; *** significant at 1%.
The table reports the least squares estimates of equation (1) in the text when the dependent variable is the 10th, the median or the 90th percentile of log-monthly wages. We run separate regressions for the wage percentiles of employees with and without the mandated benefit, which is indicated on the first line of table. In all specifications, we use city and year fixed effects. Panel A regressions include basic controls which are mean education, log of population and mean age at the city and year. Panel B includes controls in Panel A regressions plus the share of urban population, the share of workers per industry (i.e. shares in manufacturing, agriculture, trade, services, telecommunications and others), and finally the log of per capita income in the city and year. All independent variables are lagged. We use the inverse of the number of observations per cell as weights.

Table 5.4. Maximum Legal Working Period

	Legal Working Hours			Above Legal Working Hours		
Dependent Variable:	P10	Median	P90	P10	Median	P90
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: FE with basic controls					
Log # Inspections	-0.063	0.096	-0.079	-0.065	0.229	-0.068
	(0.134)	(0.123)	(0.188)	(0.106)	(0.094)**	(0.101)
Obs.	4825	4825	4825	4798	4798	4798
	Panel B: FE with all controls					
Log # Inspections	-0.093	0.065	-0.103	-0.111	0.184	-0.100
	(0.117)	(0.103)	(0.159)	(0.090)	(0.080)**	(0.123)
Obs.	4825	4825	4825	4798	4798	4798

Standard errors in parentheses are clustered by city, * significant at 10%; ** significant at 5%; *** significant at 1%.
The table reports the least squares estimates of equation (1) in the text when the dependent variable is the 10th, the median or the 90th percentile of log-hourly wages. We run separate regressions for the wage percentiles of employees with and without the mandated benefit, which is indicated on the first line of table. The maximum legal working period in Brazil is 44 weekly hours. In all specifications, we use city and year fixed effects. Panel A regressions include basic controls which are mean education, log of population and mean age at the city and year. Panel B includes controls in Panel A regressions plus the share of urban population, the share of workers per industry (i.e. shares in manufacturing, agriculture, trade, services, telecommunications and others), and finally the log of per capita income in the city and year. All independent variables are lagged. We use the inverse of the number of observations per cell as weights.

Table 7. Effect of Enforcement on Labor Earnings of All Workers

	P10	Median	P90
	(1)	(2)	(3)
	Panel A: FE with all controls		
Log # Inspections	-0.054	0.098	-0.113
	(0.182)	(0.079)	(0.072)
Obs.	4834	4834	4834
	Panel B: FE with all controls + State-specific year trends		
Log # Inspections	0.105	0.140	-0.048
	(0.122)	(0.079)*	(0.079)
Obs.	4834	4834	4834

Standard errors in parentheses are clustered by city, * significant at 10%; ** significant at 5%; *** significant at 1%. The table reports the least squares estimates of equation (1) in the text when the dependent variable is the 10th, the median or the 90th percentile of log-monthly labor earnings of all workers in the city. In panel A, we use city and year fixed effects plus a set of control variables which include mean education, log of population, mean age, share of urban population, shares of workers per industry and the log income per capita in the city and year. In panel B, besides all variables included in A, we also include the interactions between each state dummy (minus one) and a year trend. All independent variables are lagged. We use the inverse of the number of observations per cell as weights in all regressions.

Robustness: Effects of Enforcement using State-specific Year Trends

Table 6.1. Effect of Enforcement on Employment Composition

Dependent Variable:	Wage Earners	Self-Employed	Non-employed	Unpaid	Domestic	Other
	(1)	(2)	(3)	(4)	(5)	(6)
Log # Inspections	0.008	-0.011	-0.000	0.021	-0.012	-0.005
	(0.012)	(0.012)	(0.012)	(0.006)***	(0.008)	(0.008)
Obs.	4834	4834	4834	4834	4834	4834

Standard errors in parentheses are clustered by city, * significant at 10%; ** significant at 5%; *** significant at 1%.
The table reports the least squares estimates of equation (1) in the text when the dependent variable is the share of the population aged 23-65 whose employment status is: wage earner, self-employed, nonemployed, unpaid worker, domestic employee and other worker (employer or working for own consumption). In this specification, we use city and year fixed effects, all the control variables used in the most complete specification in table 1: mean education, log of population, mean age, share of urban population, shares of workers per industry (i.e. shares in manufacturing, agriculture, trade, services, telecommunications and others) and the log income per cap - ita in the city and by year. In addition, we also include the interactions between each state dummy (minus one) and a year trend. All independent variables are lagged. We use the inverse of the number of observations per cell as weights in all regressions.

Table 6.2. Effect of Enforcement Labor Regulations on Mandated Job Benefits

Dependent	Social Security		Registration MoL		Compliance Minimum		Transportation		Compliance Max.	
Variable:	with	witho	with	without	with	without	with	witho	Legal	above
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Log # Inspections	0.013	-	0.023	-0.015	0.017	0.014	-0.005	0.013	0.000	0.007
	(0.012)	(0.00	(0.014)*	(0.010)	(0.013)	(0.005)**	(0.016)	(0.01	(0.01	(0.012)
Obs.	4834	4834	4834	4834	4834	4834	4834	4834	4834	4834

Standard errors in parentheses are clustered by city, * significant at 10%; ** significant at 5%; *** significant at 1%.
The table reports the least squares estimates of equation (1) in the text when the dependent variable is the share of population aged 23-65 with social security coverage, formal registration with the Ministry of Labor (MoL), minimum wage, transportation benefit and working by 44 hours/week). In this specification, we use city and year fixed effects, all the control variables used in the most complete specification in table 2: mean education, log of population, mean age, share of urban population, shares of workers per industry (i.e. shares in manufacturing, agriculture, trade, services, telecommunications and others) and the log income per capita in the city and by year. In addition, we also include the interactions between each state dummy (minus one) and a year trend. All independent variables are lagged. We use the inverse of the number of observations per cell as weights in all regressions.

Table 6.3. Effect of Enforcement on Optional Benefits

Dependent Variable:	Housing		Food		Education/Child Care		Health	
	with	without	with	without	with	without	with	without
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log # Inspections	-0.002	0.011	-0.033	0.041	0.002	0.006	-0.029	0.037
	(0.005)	(0.012)	(0.018)*	(0.020)**	(0.002)	(0.011)	(0.015)**	(0.019)**
Obs.	4834	4834	4834	4834	4834	4834	4834	4834

Standard errors in parentheses are clustered by city, * significant at 10%; ** significant at 5%; *** significant at 1%.
The table reports the least squares estimates of equation (1) in the text when the dependent variable is the shares of population aged 23-65 with or without the benefit of: housing, food, education/child care and employer provided health insurance. In this specification, we use city and year fixed effects, all the control variables used in the most complete specification in table 3: mean education, log of population, mean age, share of urban population, shares of workers per industry (i.e. shares in manufacturing, agriculture, trade, services, telecommunications and others) and the log income per capita in the city and by year. In addition, we also include the interactions between each state dummy (minus one) and a year trend. All independent variables are lagged. We use the inverse of the number of observations per cell as weights in all regressions.

Table 6.4. Effect of Enforcement on Other Job Benefits

Dependent Variable:	Hours		Industry (Riskier		Firm size	
	Part-	Full-	Construction	Other	Large	Small
	(1)	(2)	(3)	(4)	(5)	(6)
Log # Inspections	0.004	0.004	-0.004	0.014	-0.032	0.000
	(0.006)	(0.009)	(0.004)	(0.013)	(0.015)**	(0.007)
Obs.	4834	4834	4834	4834	4834	4834

Standard errors in parentheses are clustered by city, * significant at 10%; ** significant at 5%; *** significant at 1%.
The table reports the least squares estimates of equation (1) in the text when the dependent variable is the shares of population aged 23-65 with or without the benefit of: working part-time, not working in the construction sector (*proxy* for lower risk), working in larger firms (11 or more workers). In this specification, we use city and year fixed effects, all the control variables used in the most complete specification in table 4: mean education, log of population, mean age, share of urban population, shares of workers per industry (i.e. shares in manufacturing, agriculture, trade, services, telecommunications and others) and the log income per capita in the city and by year. In addition, we also include the interactions between each state dummy (minus one) and a year trend. In the regressions of the share of construction workers, we had to exclude from the set of controls the shares of workers per industry. All independent variables are lagged. We use the inverse of the number of observations per cell as weights in all regressions.

Effect of Enforcement on Wages, by Job Benefit

Table 6.5.1. Social Security Coverage

	With Social Security			Without Social Security		
Dependent Variable:	P10	Median	P90	P10	Median	P90
	(1)	(2)	(3)	(4)	(5)	(6)
Log # Inspections	0.129	0.064	-0.257	0.000	0.167	0.225
	(0.045)***	(0.063)	(0.078)***	(0.123)	(0.139)	(0.142)
Obs.	4826	4826	4826	4791	4791	4791

Standard errors in parentheses are clustered by city, * significant at 10%; ** significant at 5%; *** significant at 1%.
The table reports the least squares estimates of equation (1) in the text when the dependent variable is the 10th, the median or the 90th percentile of log-monthly wages. We run separate regressions for the wage percentiles of employees with and without the mandated benefit, which is indicated on the first line of table. In this specification, we use city and year fixed effects, all the control variables used in the most complete specification in table 1: mean education, log of population, mean age, share of urban population, shares of workers per industry (i.e. shares in manufacturing, agriculture, trade, services, telecommunications and others) and the log income per capita in the city and by year. In addition, we also include the interactions between each state dummy (minus one) and a year trend. All independent variables are lagged. We use the inverse of the number of observations per cell as weights in all regressions.

Table 6.5.2. Registration with the Ministry of Labor

	Registered			Unregistered		
Dependent Variable:	P10	Median	P90	P10	Median	P90
	(1)	(2)	(3)	(4)	(5)	(6)
Log # Inspections	0.141	0.090	-0.260	0.153	0.124	0.209
	(0.046)***	(0.067)	(0.066)***	(0.183)	(0.095)	(0.097)**
Obs.	4820	4820	4820	4806	4806	4806

Standard errors in parentheses are clustered by city, * significant at 10%; ** significant at 5%; *** significant at 1%.
The table reports the least squares estimates of equation (1) in the text when the dependent variable is the 10th, the median or the 90th percentile of log-monthly wages. We run separate regressions for the wage percentiles of employees with and without the mandated benefit, which is indicated on the first line of table. In this specification, we use city and year fixed effects, all the control variables used in the most complete specification in table 1: mean education, log of population, mean age, share of urban population, shares of workers per industry (i.e. shares in manufacturing, agriculture, trade, services, telecommunications and others) and the log income per capita in the city and by year. In addition, we also include the interactions between each state dummy (minus one) and a year trend. All independent variables are lagged. We use the inverse of the number of observations per cell as weights in all regressions.

Table 6.5.3. Transportation Benefits

	With Transport Benefit			Without Transport Benefit		
Dependent Variable:	P10	Median	P90	P10	Median	P90
	(1)	(2)	(3)	(4)	(5)	(6)
Log # Inspections	0.086	0.044	-0.136	0.222	0.394	-0.147
	(0.066)	(0.061)	(0.091)	(0.148)	(0.140)***	(0.126)
Obs.	4417	4417	4417	4832	4832	4832

Standard errors in parentheses are clustered by city, * significant at 10%; ** significant at 5%; *** significant at 1%.
The table reports the least squares estimates of equation (1) in the text when the dependent variable is the 10th, the median or the 90th percentile of log-monthly wages. We run separate regressions for the wage percentiles of employees with and without the mandated benefit, which is indicated on the first line of table. In this specification, we use city and year fixed effects, all the control variables used in the most complete specification in table 1: mean education, log of population, mean age, share of urban population, shares of workers per industry (i.e. shares in manufacturing, agriculture, trade, services, telecommunications and others) and the log income per capita in the city and by year. In addition, we also include the interactions between each state dummy (minus one) and a year trend. All independent variables are lagged. We use the inverse of the number of observations per cell as weights in all regressions.

Table 6.5.4. Maximum Legal Working Period

	Working Legal Hours			Working Above Legal Hours		
Dependent Variable:	P10	Median	P90	P10	Median	P90
	(1)	(2)	(3)	(4)	(5)	(6)
Log # Inspections	-0.002	0.118	-0.005	-0.067	0.221	-0.091
	(0.086)	(0.089)	(0.121)	(0.075)	(0.052)***	(0.150)
Obs.	4825	4825	4825	4798	4798	4798

Standard errors in parentheses are clustered by city, * significant at 10%; ** significant at 5%; *** significant at 1%.
The table reports the least squares estimates of equation (1) in the text when the dependent variable is the 10th, the median or the 90th percentile of log-hourly wages. We run separate regressions for the wage percentiles of employees with and without the mandated benefit, which is indicated on the first line of table. The maximum legal working period in Brazil is 44 weekly hours. In this specification, we use city and year fixed effects, all the control variables used in the most complete specification in table 1: mean education, log of population, mean age, share of urban population, shares of workers per industry (i.e. shares in manufacturing, agriculture, trade, services, telecommunications and others) and the log income per capita in the city and by year. In addition, we also include the interactions between each state dummy (minus one) and a year trend. All independent variables are lagged. We use the inverse of the number of observations per cell as weights in all regressions.

Figure 1(a)
Intensity of labor inspections in Brazil and in the Northern and Northeast States – *Total firm visits per 1,000 inhabitants*

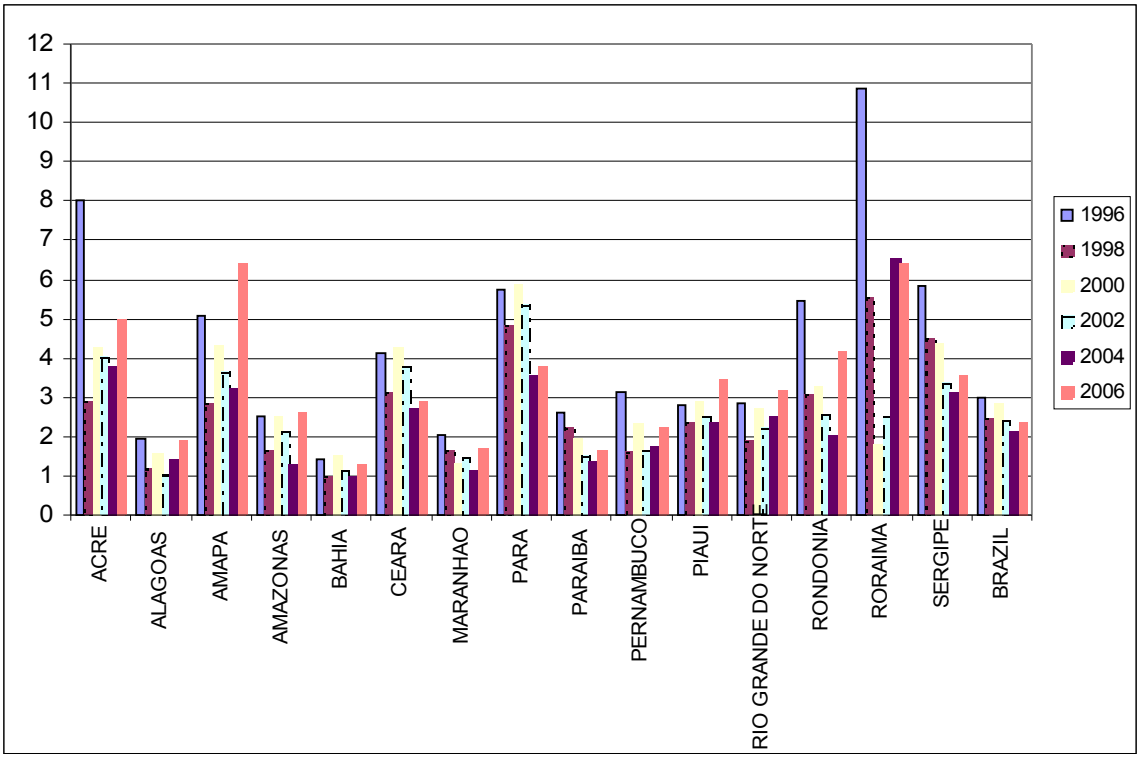

Figure 1(b)
Intensity of labor inspections in Brazil and in the Center, Southeast and South States – *Total firm visits per 1,000 inhabitants*

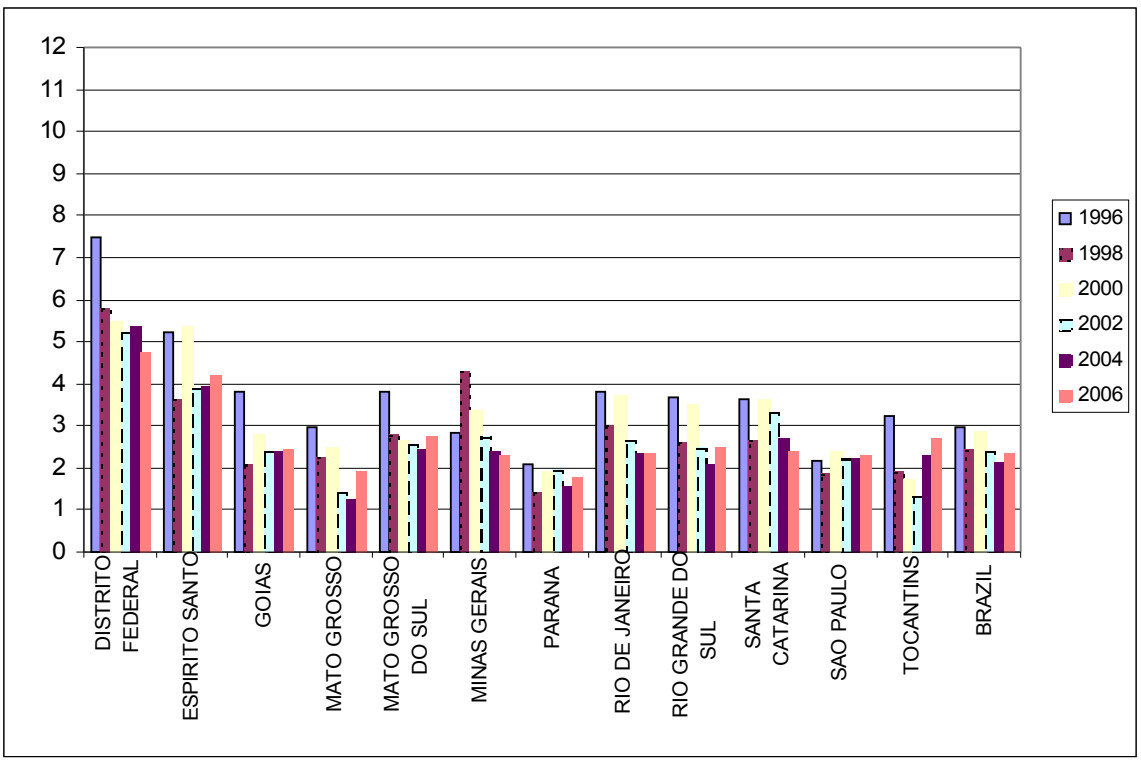

Figure 2(a)
Percentage of cities with labor inspections between 1996-2006, in Brazil and across Northern and Northeast States

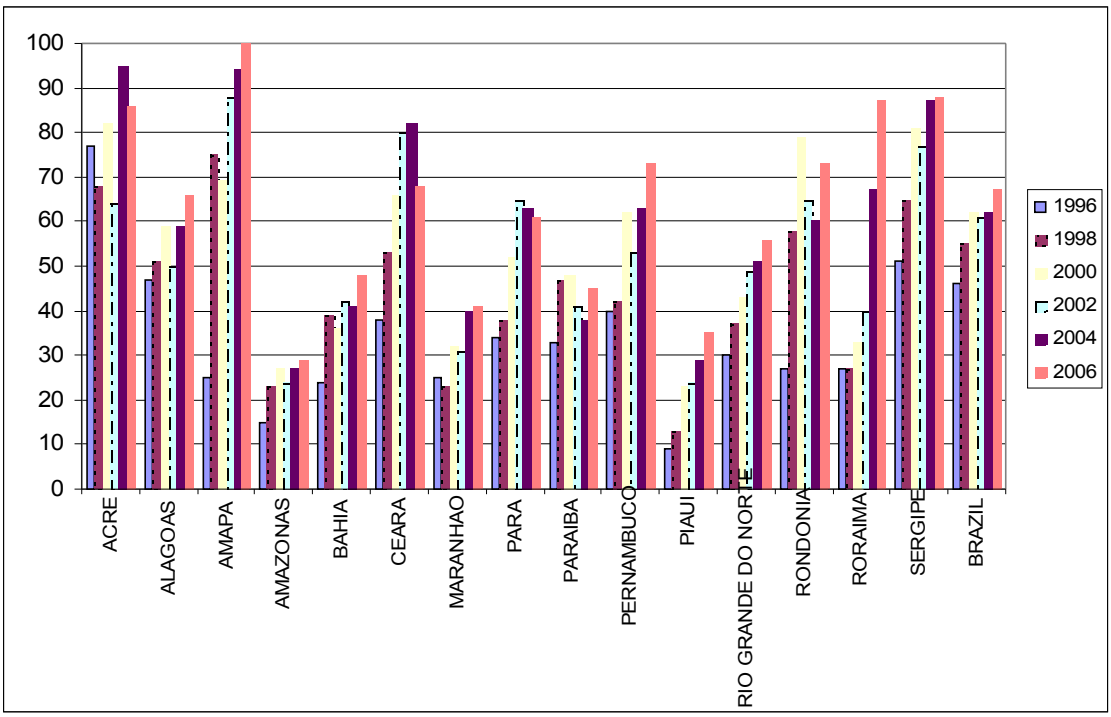

Figure 2(b)
Percentage of cities with labor inspections between 1996-2006, in Brazil and across Center, Southeast and South States

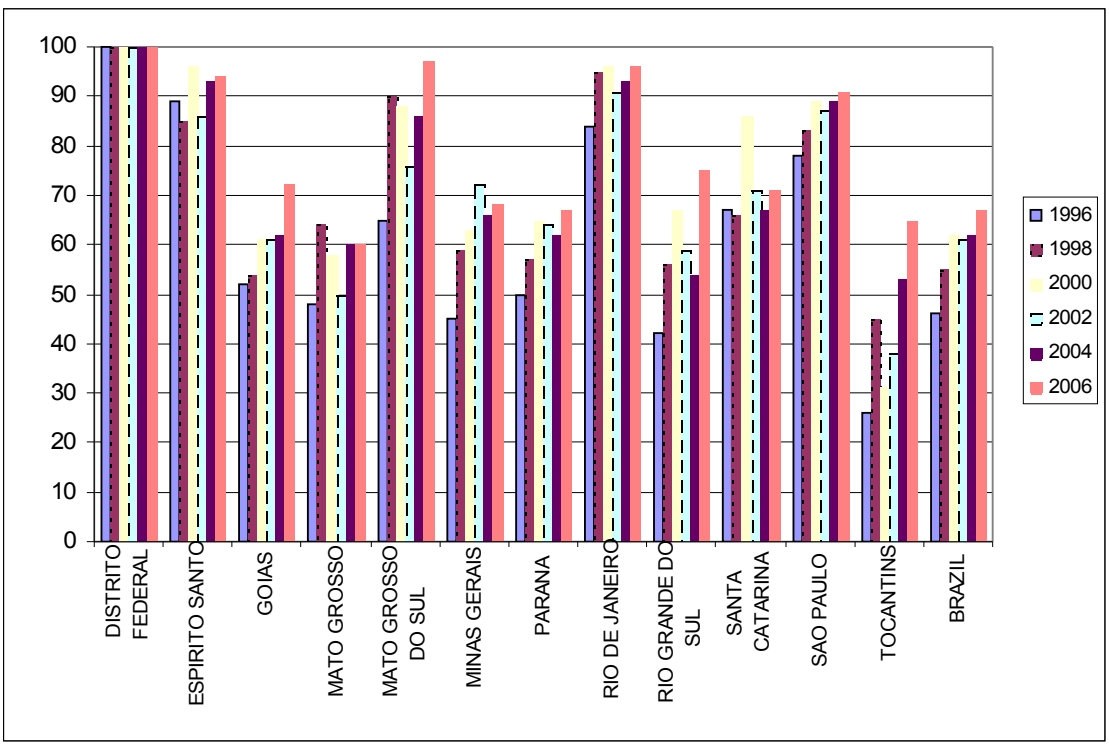

Figure 3(a) – only PNAD cities
Intensity of labor inspections in Brazil and in the Northern and Northeast States –
Total firm visits per 1,000 inhabitants

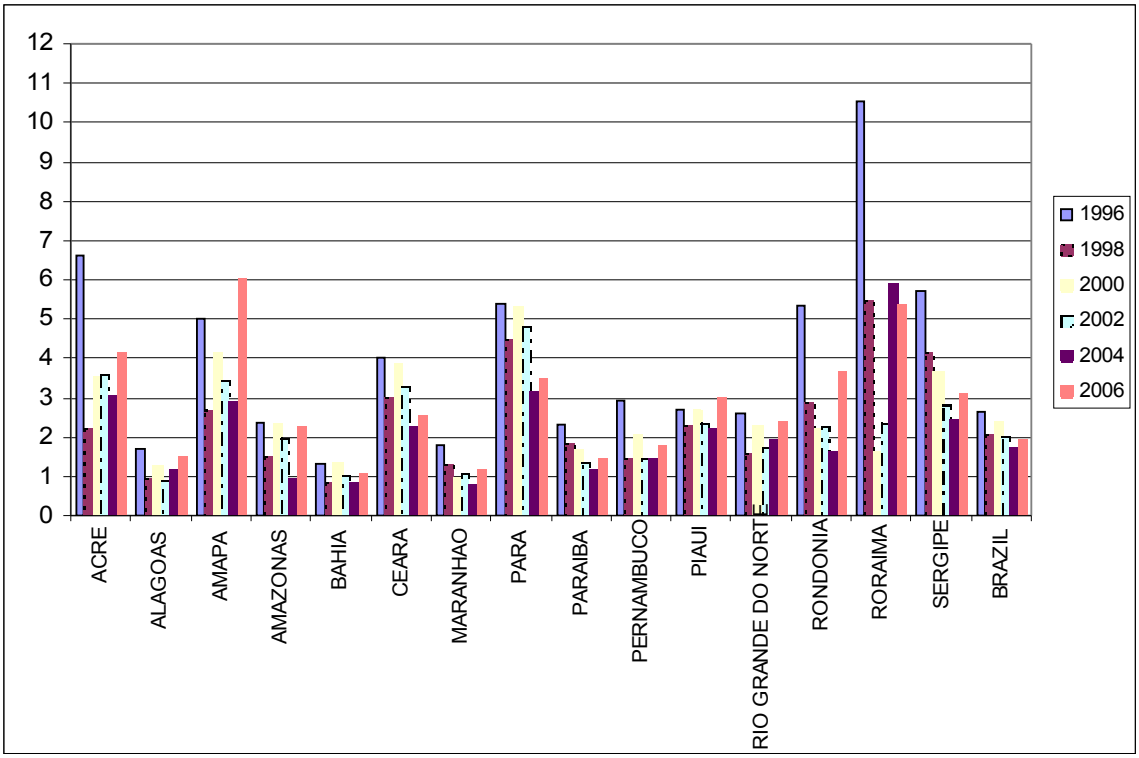

Figure 3(b) – only PNAD cities
Intensity of labor inspections in Brazil and in the Center, Southeast and South States –
Total firm visits per 1,000 inhabitants

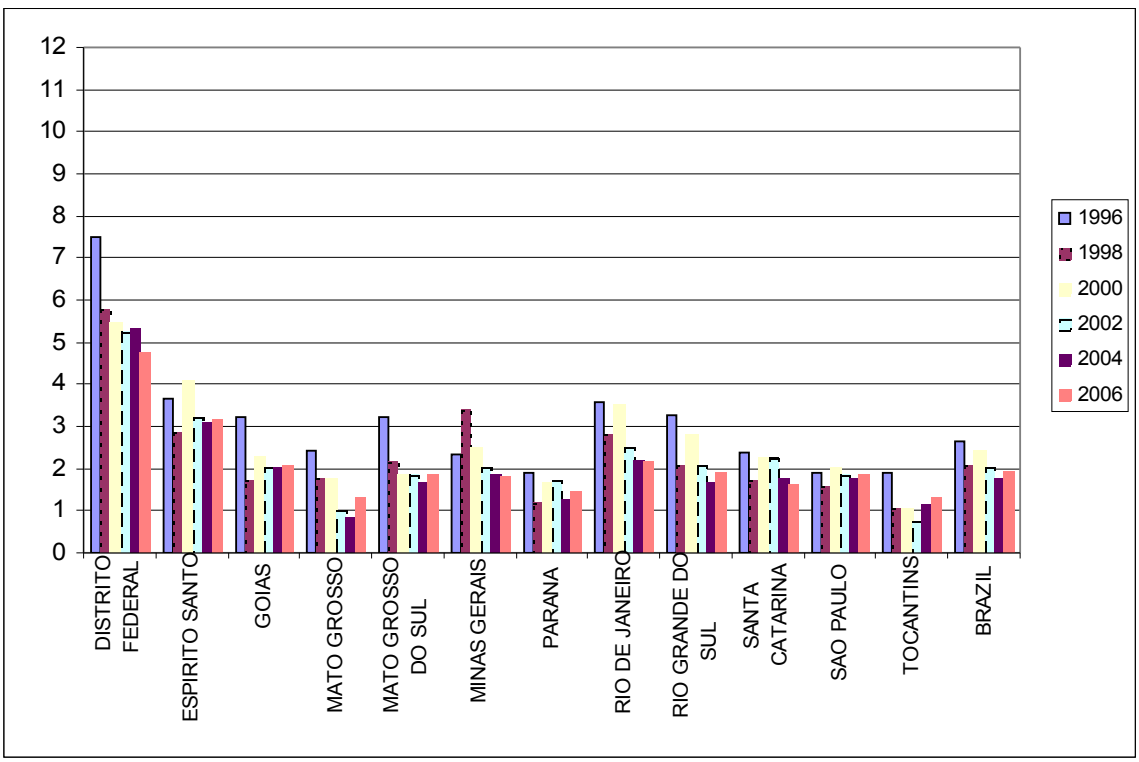

Table A1.1. Enforcement of Labor Regulations in Brazil: 1996-2006

	1996	1998	2000	2002	2004	2006
Number of Cities with Labor Inspections	2,560	3,079	3,456	3,429	3,473	3,773
Number of Cities with Labor Fines	2,554	2,642	2,639	2,622	2,627	2,628
Total Number of Labor Inspections	459,368	383,246	456,068	388,255	359,171	406,093
Total Number of Labor Fines	110,475	144,982	121,954	116,143	117,454	140,429
Proportion of Fines, by type:						
Worker's formal registration MoL	0.21	0.18	0.18	0.19	0.19	0.19
Contributions FGTS	0.18	0.16	0.16	0.16	0.15	0.16
Contractual Wages	0.17	0.15	0.15	0.15	0.15	0.15
Mandatory Working Period	0.10	0.13	0.13	0.12	0.12	0.12
Mandatory Rest Period	0.09	0.11	0.11	0.11	0.11	0.11
Transportation Benefits	0.04	0.05	0.04	0.03	0.04	0.03
Unemployment Insurance	0.03	0.04	0.03	0.02	0.03	0.02
Other (incl.safety, health and in-work benefits)	0.19	0.20	0.21	0.21	0.22	0.22
Correlation(Fines Worker's formal registration, Other Fines)	0.98	0.99	0.98	0.97	0.96	0.97
Correlation(Contributions FGTS, Other Fines)	0.95	0.97	0.95	0.94	0.95	0.95

Source: Brazilian Ministry of Labor. In 2009 there was a total of 5,596 cities in Brazil.

Note: Table reports aggregate statistics for the enforcement of labor market regulations in Brazil between 1996 and 2006. Last two lines report the correlation, at the city level, between the incidence of fines related with formal worker registration at the Ministry of Labor (*carteira de trabalho*) and other fines.

Table A1.2. Enforcement of Labor Regulations in Brazil: 1996-2006, only in PNAD cities

	1996	1998	2000	2002	2004	2006
Number of Cities with Inspection	619	655	683	696	693	702
Number of Cities with Fines	442	474	487	494	480	504
Number of Inspections	405,959	327,091	383,748	326,410	294,873	332,674
Number of Fines	84,198	112,392	90,520	84,370	82,149	96,138
Proportion of Fines, by cause:						
Worker's formal registration MoL	0.20	0.17	0.17	0.18	0.18	0.18
FGTS Contributions	0.18	0.16	0.16	0.16	0.15	0.16
Contractual Wages	0.17	0.15	0.15	0.15	0.14	0.15
Mandatory Working Period	0.09	0.13	0.13	0.12	0.12	0.12
Mandatory Rest Period	0.09	0.11	0.11	0.11	0.11	0.11
Transportation Benefits	0.04	0.05	0.05	0.04	0.04	0.04
Unemployment Insurance	0.03	0.04	0.04	0.03	0.03	0.02
Other (incl.safety, health and in-work benefits)	0.19	0.20	0.20	0.21	0.22	0.22
Correlation(Fines Worker's formal registration, Other Fines)	0.98	0.99	0.98	0.98	0.98	0.98
Correlation(FGTS Contributions, Other Fines)	0.97	0.98	0.98	0.98	0.98	0.98

Source: Brazilian Ministry of Labor. The total number of cities sampled for PNAD in 1996 is 808.

Note: Table reports aggregate statistics for the enforcement of labor market regulations in Brazil between 1996 and 2006. Last two lines report the correlation, at the city level, between the incidence of fines related with formal worker registration at the Ministry of Labor (*carteira de trabalho*) and other fines and the incidence of fines related with FGTS contributions (severance) and other fines.

Table A2. Descriptive Statistics for the Enforcement and Other City Level Characteristics

				Means by year					
	Obs.	Mean	St.Dev.	1996	1998	2000	2002	2004	2006
Log (Labor Inspections/10,000+1)	4848	0.033	0.112	0.037	0.032	0.036	0.032	0.030	0.033
Log of Population	4834	11.81	0.75	11.78	11.80	11.80	11.79	11.82	11.85
Average Years of Schooling	4834	5.83	1.89	4.90	5.10	5.57	6.11	6.47	6.83
Average Age Population	4834	39.83	1.59	39.57	39.76	39.72	39.78	39.96	40.18
Proportion of Urban Population	4834	0.78	0.24	0.73	0.73	0.77	0.81	0.82	0.82
Average Log of per capita Family Income	4834	5.77	0.57	5.66	5.69	5.72	5.79	5.80	5.96
Share of workers in:									
Agriculture	4834	0.25	0.23	0.31	0.29	0.26	0.22	0.22	0.21
Mining	4834	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
Manufacturing	4834	0.12	0.09	0.11	0.11	0.11	0.14	0.14	0.14
Trade	4834	0.13	0.06	0.11	0.11	0.12	0.14	0.14	0.14
Transport & Telecom.	4834	0.04	0.03	0.04	0.04	0.04	0.05	0.05	0.05
Construction	4834	0.07	0.04	0.07	0.08	0.07	0.08	0.07	0.07
Services	4834	0.17	0.08	0.17	0.17	0.18	0.17	0.18	0.18
Other Industries	4834	0.20	0.09	0.18	0.19	0.19	0.20	0.20	0.21

Source: Author's calculations (PNAD, Ministry of Labor, 1996 through 2006).

Note: Table reports the statistics of the enforcement measure and the control variables we use in our regressions which are the log of population in the city, average years of schooling of adult population (above 23), average age, the share of urban population, the average of log of per capita family income and the share of workers in agriculture, mining, manufacturing, trade, transport and telecommunications, construction, services and other industries.

Table A3. Descriptive Statistics of the Main Job Quality Measures at the City Level

					Means by year					
Job Benefit		Total Obs.	Mean	St.Dev.	1997	1999	2001	2003	2005	2007
Social Security Coverage	with	4834	0.265	0.108	0.228	0.234	0.262	0.271	0.289	0.308
	without	4834	0.105	0.058	0.116	0.111	0.106	0.102	0.100	0.095
Registration MoL	with	4834	0.252	0.108	0.224	0.222	0.246	0.257	0.271	0.290
	without	4834	0.119	0.060	0.120	0.122	0.122	0.116	0.118	0.113
Transportation Benefits	with	4834	0.113	0.094	0.087	0.086	0.117	0.119	0.132	0.140
	without	4834	0.257	0.088	0.257	0.258	0.251	0.254	0.257	0.263
Minimun Wage Coverage	eq/above	4834	0.329	0.112	0.309	0.303	0.327	0.329	0.347	0.358
	below	4834	0.039	0.048	0.033	0.040	0.039	0.042	0.040	0.042
Legal Working Hours	legal	4834	0.228	0.083	0.203	0.206	0.219	0.226	0.245	0.268
	above legal	4834	0.142	0.069	0.141	0.139	0.149	0.147	0.144	0.135
Housing Benefits	with	4834	0.029	0.043	0.037	0.035	0.029	0.026	0.026	0.024
	without	4834	0.341	0.096	0.307	0.310	0.339	0.347	0.363	0.379
Food Benefits	with	4834	0.123	0.082	0.106	0.101	0.120	0.120	0.143	0.147
	without	4834	0.247	0.079	0.238	0.244	0.248	0.253	0.246	0.256
Education/Child Care Benefits	with	4834	0.009	0.012	0.009	0.007	0.009	0.008	0.009	0.011
	without	4834	0.362	0.088	0.335	0.338	0.359	0.366	0.381	0.392
Health Insurance	with	4834	0.066	0.066	0.059	0.056	0.066	0.060	0.076	0.080
	without	4834	0.304	0.079	0.285	0.289	0.302	0.314	0.313	0.323
Full Time Work	full-time	4834	0.320	0.095	0.299	0.295	0.319	0.325	0.337	0.348
	part-time	4834	0.050	0.032	0.045	0.049	0.048	0.048	0.052	0.055
Construction Sector Job	construction	4834	0.024	0.021	0.023	0.025	0.025	0.022	0.023	0.025
	others	4834	0.347	0.090	0.321	0.319	0.343	0.351	0.366	0.378
Large Firms	large	4834	0.143	0.096	0.116	0.115	0.143	0.150	0.165	0.171
	small	4834	0.080	0.040	0.068	0.068	0.084	0.084	0.086	0.090

Source: Author's calculations (PNAD, Ministry of Labor, 1997 through 2007).

Note: Table reports the statistics of the job quality measures we use as dependent variables in our regressions. These are the share of population aged 23-65 with(out) the benefit of social security coverage, formal registration with the Ministry of Labor (MoL), minimum wage, transportation benefit, working by 44 hours/week), housing, food, education/child care, employer provided health insurance, working part-time, not working in the construction sector (*proxy* for lower risk) and working in larger firms (11 or more workers).

Table A4. Summary of the 50th Percentile of Log of Wages, by Job Benefit and for All workers

					Means by year					
Job Benefit		Obs.	Mean	St.Dev.	1997	1999	2001	2003	2005	2007
Social Security Coverage	with	4826	6.326	0.385	6.287	6.288	6.343	6.273	6.336	6.432
	without	4791	5.867	0.462	5.857	5.786	5.866	5.818	5.881	5.992
Registration MoL	with	4820	6.338	0.383	6.291	6.306	6.360	6.283	6.349	6.441
	without	4831	5.940	0.510	5.937	5.886	5.942	5.875	5.934	6.065
Transportation Benefits	with	4417	6.367	0.430	6.360	6.330	6.371	6.302	6.354	6.480
	without	4832	6.162	0.467	6.106	6.092	6.171	6.120	6.190	6.296
Legal Working Hours	legal	4825	1.228	0.448	1.162	1.171	1.258	1.178	1.249	1.353
	above legal	4798	0.849	0.436	0.802	0.773	0.842	0.799	0.895	0.984
All workers		4834	6.101	0.481	6.058	6.035	6.113	6.047	6.115	6.240

Source: Author's calculations (PNAD, Ministry of Labor, 1997 through 2007.

Note: The table reports statistics of the 50th Percentile of log wages. We use the sample of employees aged 23-65 to obtain the wages by job benefit considered in table A3 and we use the sample of all workers aged 23-65 to obtain the wages (labor earnings) for all workers in the city. All wages are per month, except wages by the benefit "legal working hours" which is per hour.

Table A5. Summary of Workers by Employment Status

				Means by year					
Employment Status	Obs.	Mean	St.Dev.	1997	1999	2001	2003	2005	2007
Wage Earners	4834	0.370	0.091	0.344	0.345	0.368	0.373	0.389	0.403
Self Employed	4834	0.187	0.078	0.203	0.204	0.183	0.183	0.176	0.172
Nonemployed	4834	0.281	0.083	0.280	0.279	0.295	0.285	0.272	0.275
Unpaid Workers	4834	0.076	0.083	0.092	0.092	0.067	0.071	0.069	0.062
Domestic	4834	0.052	0.035	0.047	0.047	0.053	0.053	0.057	0.056
Other	4834	0.034	0.027	0.033	0.033	0.033	0.035	0.037	0.032

Source: Author's calculations (PNAD, Ministry of Labor, 1997 through 2007.

Note: Table reports the share of the population aged 23-65 whose employment status is: wage earner, self-employed, nonemployed, unpaid worker, domestic employee and other worker (employer or working for own consumption)