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Enforcement of labor market regulations: Heterogeneous compliance and adjustment across gender

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Enforcement of Labor Market Regulations:

Heterogeneous Compliance and Adjustment across Gender

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When compliance with labor market regulations is low, the enforcement of the labor law becomes a concept that is closer to the regulatory environment that firms and workers face. Firms are expected to react to variations in the enforcement level, and the response may differ for male and female workers. This paper explores microdata from Argentine household surveys to analyze: (i) how changes in the enforcement of labor regulations affect the level of compliance with the labor law among men and women, and (ii) how changes in the enforcement of the labor law generate adjustments of other labor outcomes, for men and women separately. Using information of the highly decentralized labor inspection system in Argentina, I construct an enforcement measure with variation at the province, sector, and time level (share of inspected firms). To deal with the potential endogeneity of this measure, I instrument using a measure of the arrival cost of labor inspectors to the firms. The main findings reveal different patterns of adjustment for men and women. When the degree of enforcement increases: the compliance with employment and social security regulations increases for men and decreases for women; the share of wage employees increases and the share of self-employed declines for men, with no changes for women; no changes are found in hourly wages and in the provision of non-mandated benefits. These results bring additional evidence about how the regulatory environment can impact on the decisions of firms and workers about participating in the informal sector. More importantly, they stress that both the written labor regulation and the degree of enforcement are essential parts in the provision of social and labor protection.

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1. Introduction

In Argentina, labor market regulations are extensive and the social security system has a *de jure* universal coverage. Most workers' rights are established in the National Constitution, while labor relationships are regulated through different laws. However, as in most developing countries, compliance with labor market regulations is low in Argentina. According to workers' report on their own working conditions, in 2015 around 31% of wage employees did not receive pension contributions, health insurance, the annual extra monthly pay, and were not entitled to paid vacation time (SEDLAC, 2016). These figures suggest that there is a large difference between the written regulations and its effective implementation in the country.

Strict labor market regulations jointly to an imperfect enforcement can generate incentives for the firms to not comply with the labor laws. That will depend on their evaluation of the costs and benefits of evading the regulations (the expected monetary fine versus reduced labor costs). In this context, where the compliance with labor market regulations is low, the enforcement of the rules becomes a concept that is closer to the regulatory environment that firms and workers face (Almeida and Carneiro, 2009). Therefore, firms are expected to react to variations in the enforcement level, even when the written law does not change.

In this paper I explore microdata from Argentine household surveys for the period 2005-2011 to analyze (i) how changes in the enforcement of labor market regulations affect different indicators of compliance among men and women, and (ii) how changes in the enforcement of the labor law generates adjustments of some labor market outcomes (different than the compliance level) for men and women separately. I take advantage of the highly decentralized labor inspection system in Argentina, which allows me to construct an enforcement measure (number of inspected firms per hundred formal firms) with variation at the province, productive sector, and time level. The econometric strategy links indicators of compliance with labor market regulations (obtained from workers' reports) and other labor market outcomes such as hourly wages, percentiles of the wage distribution, indicators of the provision of non-mandated benefits, and the structure of occupation by employment categories (wage employment versus self-employment), with the enforcement measure and with a rich set of individual socioeconomic and labor characteristics, and economic, institutional and development characteristics of the Argentine provinces.

The mechanisms analyzed in this paper are the following. When firms face stricter enforcement, the cost of not complying with labor market regulations increases for them, i.e. the probability of being detected evading the labor laws and of paying a fine increases. Firms are expected to react by complying with the rules they were evading which imply an increase in labor costs for them. The increased compliance may impact men and women differently for at least two reasons. First, labor regulations usually present some differences across gender, and that is the case in Argentina. For instance, the maternity leave is longer for women (90 days in the private sector) compared to men (only two days); the retirement age also differs between men and women (65 for men and 60 for women); the law bans the employment of women in

dangerous or unhealthy jobs, while it does not establish any restriction in the case of men. Second, differences in some labor characteristics may lead firms to avoid labor regulation among women more than men or the other way around. For instance, the contributions to the pension system and to the health insurance will be cheaper for women as these contributions are a percentage of monthly earnings and average wages are usually lower for women than men (for a given set of characteristics). On the other hand, firms may prefer to increase the level of compliance among men to avoid the longer maternity leave women are entitled to.

The increased labor costs resulting from the stricter enforcement can lead firms to make an adjustment that can take several forms. Firms can reduce the size of their labor force (extensive margin of adjustment) and with that, the level of production (Micco and Pages, 2006; Ahmad and Pages, 2007; Amin, 2008; Almeida and Carneiro, 2009). Firms can also adjust by affecting some job attributes (intensive margin of adjustment). They can reduce hourly wages, or they can decrease the level of non-mandated benefits, such as meals and housing. This adjustment may also impact men and women differently. For instance, regarding the extensive margin, firms may prefer to lay off women more than men because their severance pay will be lower due to their lower average tenure and average monthly earnings. A possible associated effect to the firm's size adjustment is that workers who lose their jobs may offer their hours of work in the informal sector. That effect is possible because labor inspections are focused on formal firms in Argentina. Thus, the linkages across markets can result in effects on the informal sector of the economy, even if enforcement is focused only on firms in the formal sector (Almeida and Carneiro, 2012). Regarding the intensive margin of adjustment, reductions in wages can affect women more than men because women can be considered "outsiders" with less bargaining power and less negotiating abilities (Montenegro and Pagés, 2004; Bertrand, 2011). However, the final effect on hourly wages will also depend on the reallocation of workers between the formal and the informal sector, where average hourly wages are usually lower (given workers' characteristics). Reductions in the provision of non-mandated benefits such as food and housing are also expected. This set of benefits should be easy to adjust for firms in the presence of wage rigidities and firing costs. However, it is difficult to predict a differential adjustment by gender.

The main challenge to the estimation of the relationships of interest is that the enforcement measure is probably endogenous. First, a low level of compliance with labor market regulations can result in a higher level of enforcement (reverse causality argument). Second, the enforcement level can be correlated with unobserved institutional and development time-varying characteristics at the province level, generating a spurious correlation with the compliance with labor regulations and other labor market outcomes (omitted variables argument). To deal with this problem, I implement and instrumental variable strategy. The proposed instrument is a measure of the arrival cost of labor inspectors to the firms. Labor inspectors travel by car from the local inspection agencies to the firms to be inspected. The extension of the road network in each province provides a measure of the arrival cost to the firms. With a wider network, a higher geographic dispersion of firms is expected, increasing the arrival cost in terms of money and time. The arrival cost is also affected by the traffic in the road network in each province. A larger

number of vehicles is expected to increase the cost as well. The arrival cost is defined as the logarithm of the number of per capita crossing vehicles per kilometer of provincial roads, multiplied by the share of each productive sector in the total gross production value in the year 2004. The reasoning is that labor inspections in Argentina are focused on expansionary activities, avoiding the penalization of subsistence sectors. Considering that a higher share of the gross production value is probably associated with a higher level of compliance and also with higher values for some labor outcome variables (violating the exclusion restriction of the instrument), I predetermined that share using data of the year 2004. The measure of arrival cost is a strong predictor of the level of enforcement in each province, sector and year in my data, and the relationship is unaffected by the inclusion of different sets of control variables.

Results reveal very different effects of an increase in the degree of enforcement on the compliance level and other labor market outcomes among men and women. Higher enforcement leads firms to increase the compliance with labor market regulation among men: the share of male employees covered by social security (pensions and health insurance) and employment regulations (annual extra monthly wage, paid vacation time, paid sickdays, wage equal or above the legal minimum and working hours equal or below the legal maximum) increases at the province and sector level. Hourly wages remain unchanged for men, and the same is true for the provision of non-mandated benefits (meals, housing and other products). Finally, the share of male wage employees increases, while the share of self-employment declines. Under an increase in the level of compliance with labor market regulations, I expect formal jobs to become more attractive for men. An increase in labor supply in the formal sector should reduce hourly wages. However, my findings indicate that hourly wages do not change for men. My interpretation is that the reduction is offset by the increase in hourly wages in the informal sector where labor supply fell, and probably by an increase in labor demand for formal workers too (due to a large reduction in wages). As a result of the higher attractiveness of wage employment with mandated benefits, the share of wage employees among men increases and the share of self-employment decreases.

For the sample of women, higher enforcement leads to a reduction in the provision of mandated benefits with no changes in hourly wages, in the share of female wage earners, in the share of self-employed, and in the provision of non-mandated benefits. Considering that is not reasonable for a firm to simultaneously increase the level of compliance among men and to reduce it among women (labor inspections and fines are not heterogeneous by gender), these results suggest a reallocation of women from firms where they were receiving mandated benefits to other firms where they work as unregistered workers (in the formal or in the informal sector).[1] Thus, the way firms compensate for the higher labor costs due to the increased compliance with labor market regulations among men is through the laying off of female employees, who manage

[1] According to the functioning of the labor inspection system in Argentina, a firm is considered formal (and it is a target of labor inspections) if it has declared *at least* one employee in the registration system, but it could be the case that the same firm has some not registered workers. Thus, the formal sector includes firms declaring every employee in the registration system and those declaring only some of them.

to get a job as wage earners without mandated benefits. All these findings are robust to the inclusion of several province characteristics of economic and institutional development, to controls related to the cost of access to main markets, and to different definitions of the instrument.

This paper contributes to different strands of literatures related to labor market regulations, enforcement of the labor law and their impact on the labor market, and to the literature on labor informality. First, this paper is related to studies analyzing the impacts of labor market regulations on labor market outcomes in a broad sense, i.e. level of compliance with the labor law and other labor market outcomes. The literature on this topic is very extensive. Earlier research based the identification of the impact of labor regulations on cross country and time series variation of the labor rules. The main conclusion of these studies is that stricter labor market regulations hinder economic efficiency (Blanchard and Wolfers, 2000; Blanchard and Portugal, 2001; Heckman and Pagés, 2004; Botero et al., 2004). These studies have some shortcomings related to the lack of variation in the relevant policy measures either over time, across workers or across geographic locations, the difficulty to control for unobserved country differences and for reverse causality issues, and differences in measurement across countries (Micco and Pagés, 2006). These limitations led to the rise of a large body of work analyzing within country variations in labor market regulations, i.e. changes in labor regulations across geographic locations or economic sectors of the same country. These studies have found that stricter labor market regulations are associated to reductions in output, employment, investment, and productivity in the formal sector, declines in job turnover, and output increases in the informal sector (Besley and Burgess, 2004; Mondino and Montoya, 2004; Kugler, 2004; Micco and Pagés, 2006; Ahmad and Pagés, 2007; Autor et al., 2007; Amin, 2008).

From the strand of literature analyzing the impacts of labor market regulations on labor market outcomes, this paper is closely related to studies looking at heterogeneous impacts for different population groups. The evidence, a combination of cross-country and within country studies, is not conclusive when it comes to gender differences. Betcherman (2013) provides a detailed survey on the effects of labor market regulations on labor market outcomes for men and women (among other population groups). The findings regarding the effects of stricter job security regulations show a reduction in the probability of employment of women relative to men, especially for those middle aged or older, and a movement out of wage employment and into self-employment (Montenegro and Pagés, 2004), a larger increase in unemployment for women compared to men (Botero et al., 2004), and lower reductions in earning for women than men (Mondino and Montoya, 2004). Despite these predictions of stricter job security regulations, it has been noticed that the flexibilization of the rules will not necessarily help the outsiders, i.e. women, because it will encourage the substitution of temporary workers for permanent workers (Kahn, 2007). For the maternity leave specifically, the findings indicate that there is a wage penalty for women depending on the length of the leave (Gindling and Crummett, 1997; Ruhm, 1998), and a widening of the gender wage gap because of longer non-employment period for women (Mandel and Semyonov, 2005). Regarding the minimum wage legislation, most studies

have found a negative employment effect among adult women (Feliciano, 1998; Arango and Pachon, 2004; Addison and Ozturk, 2010). An exception to this finding is the study of Montenegro and Pagés (2004), who found that women benefit from minimum wage policies, especially the young. Finally, unions and collective bargaining lead to a positive effect on wages which is larger for women than men (Aidt and Tzannatos, 2002), to larger increases in female unemployment than male unemployment (Bertola et al., 2002; Botero et al., 2004), and the opposite (more unemployment for men than women) when collective bargaining are more decentralized (Feldmann, 2009).

Second, this paper is related to the literature analyzing the relationship between enforcement of labor market regulations and labor market outcomes. The large gap between the written regulations and the level of compliance has led to the emergence of studies emphasizing the importance of enforcement of the labor law. These studies use the variation in the enforcement of labor market regulations rather than or in addition to changes in the regulation itself to identify effects on labor market outcomes. Cross-country and within country studies have been carried out. Findings of cross-country studies indicate that job security regulations reduce the speed of adjustment of employment in countries where regulations are more likely to be enforced in comparison to countries where enforcement is low (Caballero et al., 2004), stricter enforcement of labor regulations is strongly associated to higher investment by firms in the human capital of their employees although the effect is very small (Almeida and Aterido, 2011), firms are of smaller size in countries with stricter enforcement and more rigid regulations compared to firms in countries with looser enforcement and less rigid regulations (Almeida and Susanli, 2012). Within country studies have concluded that higher enforcement of the labor law reduces firms' size (measured by employment, output, sales or capital stock) and possibly productivity (Almeida and Carneiro, 2009), decrease job creation and increase job destruction (Almeida and Poole, 2013), increases the compliance with labor market regulations (Ronconi, 2010; Almeida et al., 2013) or doesn't generate any effect (Bhorat et al., 2012), increases formal employment and non-employment, reduces informal employment, leads to a fall in formal wages at the top of the wage distribution, while informal wages increases (Almeida and Carneiro, 2012), reduces wages of workers covered by mandated benefits at the top of the monthly wage distribution but increases wages at the bottom, and reduces de provision of non-mandated benefits (Almeida et al., 2013).

Third, this paper relates to the literature linking labor regulations and taxes to the size of the informal sector (for example, de Soto, 1989; de Paula and Scheinkman, 2006), directly or indirectly through the effect of enforcement (for example, Loayza, Oviedo and Serven, 2005). Inside the literature on labor informality, this paper is also close to studies conceptualizing the informal sector as a non-homogenous sector, where easy entry and low wage activities coexist with other activities that have barriers to entry and require high capital or skill level, and where the linkages of these two types of activities with the formal sector is very different (Fields, 1990; Fields, 2005).

Although the topic of gender differences in the analysis of labor market regulations is of clear importance for both developed and developing countries, I focus the empirical work on Argentina for three reasons. First, the availability of data allows me to construct a measure of enforcement of labor market regulations with variation across provinces, productive sectors, and over time for the period 2005-2011, when there is also microdata at the individual level on a wide set of mandated benefits for wage employees (pension contributions, health insurance, paid vacation time, annual extra monthly wage, paid sick days), some non-mandated benefits (housing, food, and products), hourly wages, and hours of work. With this data, I can test for men and women how the level of compliance with labor regulations reacts when the enforcement measure changes, and how other labor market outcomes respond, probably due to the firms' need of adjustment. Second, the fact that the labor rules being enforced by labor inspectors are common to all Argentine provinces generates an ideal framework to evaluate the effects of the enforcement measure on labor market outcomes using the province variation of the data. Third, equality of opportunities between men and women has been placed at the top of the policy agenda in recent years. In 2009, Argentina has passed a law directed to eliminate any type of violence against women, being a type of violent behavior the discrimination in the access to a job, promotion or job stability, and the payment of different remunerations for the same task.[2]

This paper contributes directly to the literature that analyzes heterogeneous labor market effects of labor regulations across gender, and to the literature that studies the effects of enforcement of the labor law (not the law by itself) on labor outcomes. To my knowledge, there is no evidence linking the enforcement of labor market regulations to labor market outcomes of men and women, and no evidence using simultaneously the variation of an enforcement measure across geographic locations, economic sectors and time. The results also bring evidence about how the regulatory environment can impact on the decisions that firms and workers make about participating in the informal sector, even when labor inspections are focused on formal firms.

The rest of the paper proceeds as follows. Section 2 describes the labor inspection system in Argentina and presents some statistics on the enforcement measure. Section 3 details the data used in this paper. Section 4 discusses the theoretical mechanisms at play in the estimation of the relationship between enforcement of labor market regulations and labor market outcomes for men and women. Section 5 presents the empirical strategy, while sections 6 and 7 discuss the results. Section 8 concludes.

2. Labor regulations and labor inspections in Argentina

2.1. Labor regulations and workers' rights

In Argentina, most workers' rights are established in the National Constitution which specifies: inalienable benefits of the social security, decent and equitable labor conditions, limited working

[2] Ley de protección integral para prevenir, sancionar y erradicar la violencia contra las mujeres en los ámbitos en que desarrollen sus relaciones interpersonales (Law 26485).

hours, paid vacation time, fair remuneration, minimum, living and adjustable wage, labor stability, free association to unions, equal pay for work of equal value, participation on business profits, protection against arbitrary dismissal, and right to strike. Labor relationships are regulated through different laws. The main legal instruments are the Ley de Contrato de Trabajo 20744 (Labor Contract Law), Ley de Empleo 24013 (Employment Law), Ley de Riesgos del Trabajo 24557 (Occupational Hazard Law), and Convenios Colectivos de Trabajo (Collective Labor Agreements) that are agreements about remuneration and labor conditions specific to each productive sector.

Wage employees who are registered in the Registro de Altas y Bajas en Materia de Seguridad Social –the formal register of labor relationships- are entitled to several benefits in the country.[3] They include: a monthly wage equal or above the minimum wage; an annual extra monthly wage; paid vacation time which depends on the tenure the worker has in his position; a maximum of 8 working hours a day and 48 hours a week; a paid maternity leave of 90 days and a paternity leave of two days; special paid leaves for marriage, death of a family member, and studying reasons; an extra payment for working on national holidays; occupational hazard insurance paid by the employer; advance notice and severance payment; family allowances; unemployment insurance; and retirement and health insurance benefits.

The level of compliance with labor market regulations is far from perfect in Argentina like in many other Latin American countries. During the 1990s and the beginning of the 2000s, the percentage of salaried workers who received legally mandated benefits fell systematically from around 70% to 55% (Figure 1). That was a period characterized by a gradual process of agreement between workers' unions and employers with the objective of increasing the flexibility in labor relationships. Since 2003 the percentage of workers receiving the mandated benefits showed a positive trend reaching around 69% of coverage in 2015. This pattern is probably related to the better performance of the economy and changes in the labor inspection system through the Ley de Ordenamiento Laboral 25877, passed on 2004 (MTEySS, 2013a).

2.2. Labor inspection system

The Ley de Ordenamiento Laboral set up the Sistema Integral de Inspección del Trabajo y de la Seguridad Social or SIDITYSS (Labor and Social Security Integral Inspection System) with the objective of monitoring the compliance with labor and social security regulations. This system intends to guarantee the labor rights established in the National Constitution and international labor agreements supported by Argentina. The law establishes a shared faculty to exert control and assess the compliance with labor laws between the Ministerio de Trabajo, Empleo y Seguridad Social (National Ministry of Labor, Employment and Social Security or MTEySS),

[3] Employers must register and inform about hiring and terminations of labor relationships in the Registro de Altas y Bajas en Materia de Seguridad Social (Social Security Hiring and Termination Registry). Employers must present a monthly affidavit indicating the information of their employees, monthly wages and contributions to the social security system (MTEySS, 2013b).

the 23 *provincias* (provinces), and the Ciudad Autónoma de Buenos Aires (CABA), which is the capital of the country and an autonomous district.[4] Labor inspections are decentralized in 39 *delegaciones regionales* (regional agencies of low rank) spread throughout the country, which are grouped in seven *direcciones regionals* (regional agencies of high rank). Each province has at least one *delegación regional* and the CABA has the Dirección de Inspección Federal (Federal Inspection Office) in its jurisdiction.[5] The labor inspection functions of the *delegaciones regionales* extend only to each province's territory.

Every quarter the *direcciones regionales* receive the recommendations from the MTEySS regarding the activities and areas where the inspections should be focused. Then, the *direcciones regionales* (agencies of high rank) organized jointly with the *delegaciones regionales* (agencies of low rank) the inspection activities according to the recommendations received, the availability of resources, and past experience. Since the implementation of the SIDITYSS, the *delegaciones regionales* have learnt about the regional economies operating in their jurisdictions, the amount of workers participating in these activities, and the seasons of more activity, allowing the adjustment of the inspection's plans. In fact, the detection of non-registered workers increased since 2005 as a result of the improvements in the focus of the inspections (see Figure 2, Panel c) (MTEySS, 2013a).

MTEySS, *direcciones regionales* and *delegaciones regionales* explore several sources of information to organize by productive sector and geographically the number and intensity of labor inspections. First, they consider the past number of inspected firms and workers, number of non-registered workers detected and their regularization, according to sector of activity and geographic area.[6] Second, they consider the percentage of wage earners without social security contributions across the country using the Encuesta Permanente de Hogares. The household survey, which is only representative of large urban areas in the country, gives an indication of the target population of inspections while the national census gives the geographic concentration of wage earners throughout the country. Third, the MTEySS, *direcciones regionales* and *delegaciones regionales* also consider databases of firms that need to be inspected for a second time (because they interfered with the inspectors' activity, and/or didn't regularize the situation of non-registered workers), and reports received by the MTEySS and then transmitted to the *delegación regional* with jurisdiction in the case.

Labor inspections are focused on formal firms in expansionary economic activities that have contributory capacity in order to avoid the penalties to go to weaker sectors (MTEySS, 2013a). Therefore, the subsistence sectors are left aside and the inspected firms are those that can hold

[4] Throughout the study I will consider CABA as a province.

[5] Buenos Aires province has 10 *delegaciones regionales*, Río Negro has three *delegaciones regionales*, Chubut, Entre Ríos, Mendoza, Santa Cruz, and Santa Fe have two *delegaciones regionales*, while Catamarca, Chaco, Córdoba, Corrientes, Formosa, Jujuy, La Pampa, La Rioja, Misiones, Neuquén, Salta, San Juan, San Luis, Santiago del Estero, Tierra del Fuego, and Tucumán have one *delegación regional*. CABA has the Direccion de Inspeccion Federal. The number of *delegaciones regionales* did not change during the period covered in this study.

[6] The regularization implies the registration of a worker in the Registro de Altas y Bajas en Materia de Seguridad Social –formal register of labor relationships- when that worker was not registered in a previous inspection.

the payment of mandated benefits over time. MTEySS (2013a) reported that some labor inspectors have found employers who did not register *any* employee, i.e. an informal employer or firm. This evidence indicates that informal firms can receive labor inspections too. However, according to the description of the target of labor inspections, formal firms are expected to be inspected to a greater extent compared to informal firms, being formal firms those with *at least* one employee declared in the registration system.

Inspectors receive from the *delegación regional* clear instructions about the number of firms and workers to assess and the number of non-registered workers to detect. That depends on the sector of activity where the inspections are going to be carried out, and on the geographic dispersion of the firms. These clear instructions intend to reduce inspectors' opportunities to select the firms in a discretionary manner. Inspectors travel from the *delegación regional* to the firms to be inspected by car. Since the creation of the SIDITYSS the *direcciones* and *delegaciones regionales* have received vehicles (cars and vans) easing the inspection activities throughout the country.

Labor inspectors target different types of violations. "Minor" violations include the delay in the payment of remunerations (when the delay does not exceed 4 days in a monthly basis), announcements related to changes in the distribution of hours of work that are not exposed in a visible place, and violations of work safety and health standards when they are related to formal or documentary requirements. "Serious" violations include the lack of essential data of labor contracts in the employees' register that firms keep, lack of delivery of certifications of services or certifications of the termination of a labor relationship to employees, violation of regulations regarding the amount, place and time of payment of remuneration, violation of regulations regarding the extension of working days, holidays and leaves, and violations of work safety and health standards. "Very serious" violations include any discriminatory behavior of the employer, those actions affecting the workers' dignity, the non-registration of workers in the social security system, the dismissal in violation of legal requirements, and violations of norms related to child labor (Topet, 2008). Although violations to any mandated benefit are penalized if discovered, the main type of violations targeted by labor inspectors are the non-declaration of workers in the registration system and the lack of payment of social security contributions (MTEySS, 2013a).

When a situation of non-compliance with the law is detected, a case file is opened and the employer has the opportunity to present evidence in its defense. With this information and the result of a second inspection, the Dirección de Resolución de la Fiscalización (Fiscalization Resolution Office) determines if the employer should be penalized. The penalties consist of economic fines, which amount depends on the severity of the irregularity detected, and the close down of the firm in case of reoccurrence of very serious violation. If the employer solves the irregularity by the moment of the deposition, the amount of the fine is reduced.

2.3. Enforcement of labor market regulations in Argentina

The measure of enforcement of labor market regulations is the number of inspected firms per hundred formal firms in each province, productive sector and year. Enforcement is expected to vary at the province and sector level since labor inspections are planned by the *delegaciones regionales* with jurisdiction in each province considering the productive structure of province economies, the amount of workers participating in the main activities, and their seasonality, among other factors.

Institutional and development factors can also play a role. For instance, in certain provinces labor inspectors could be more prone to participate in dishonest deals. There is evidence on reports against labor inspectors who ask for money in exchange for not inspecting certain firms. The evidence also point out different "patterns" of enforcement across provinces. For example, inspectors in Córdoba are highly dependent on labor unions, while in CABA they rely on non-union civil organizations for enforcement (Amengual, 2014).[7] The reason that explains the strong relationship between inspectors and labor unions in Córdoba is the low level of administrative resources of the Ministerio de la Producción y Trabajo (local Ministry of Production and Labor) and, then, of the *delegación regional* of that province. For example, inspectors had (by 2008 and 2009) limited access to transportation to reach firms limiting their ability to take action without using the transportation of unions. In CABA, the Subsecretaría de Trabajo (local Labor Secretariat) received political pressures from non-union civil organizations allowing them to gain access to the inspectors. Both Córdoba and CABA seem to be similar in the precarious situation of their inspectors. In Córdoba, they held other jobs in order to supplement their low salary, while in CABA nearly all of inspectors had a precarious contract that could be terminated in any time and many of them held other jobs. The evidence indicate that institutional and development characteristics of the provinces are a close determinant of the enforcement level, and probably of the level of compliance with labor market regulations too.

Figure 2 reports the time series of some variables related to the inspection system between 2005 and 2011. Panels (a) and (b) show, for the country as a whole, the number of inspected firms and the number of inspected firms per hundred formal firms respectively. Both variables present the same overall pattern, with a reduction over time, especially between 2006 and 2011. As mentioned in the previous section, since the Ley de Ordenamiento Laboral, inspections have been adjusted over time using information from past experiences in order to achieve the same number of non-registered workers through the inspection of fewer firms (MTEySS, 2013a). That can be seen in Panel (c), which shows the increase over time in the number of non-registered workers detected as a percentage of the total number of inspected workers. The only interruption to the upward trend took place between 2008 and 2009, when the number of inspected firms (and inspected workers) increased.

Figure 3 shows the variation in the measure of enforcement across provinces, sectors and over time. Panels (a) and (b) present the changes in the enforcement level between some selected consecutive years for each of the 24 provinces and each of the 10 productive sectors covered by

[7] The comparative analysis carried out by Amengual (2014) corresponds to 2008 and 2009.

the data respectively. Between 2005 and 2006, the level of enforcement increased for most provinces (Panel (a)). The average change in the enforcement measure was 6.5 percentage points, ranging from a minimum of -4.7 percentage points (La Pampa) to a maximum of 15.7 (San Juan). Changes tended to be larger for provinces with lower levels of enforcement in 2005, indicating a change in the structure of the enforcement degree across provinces (the average change in the enforcement measure for the 12 provinces with lower level of enforcement in 2005 was 7.3 percentage points, while the average change for the provinces above the median value of 2005 was 5.6 percentage points). Between 2007 and 2008, the enforcement decreased in most provinces. In this case, provinces with larger levels of enforcement in 2007 tended to exhibit the largest reductions (the average reduction in the enforcement measure for the provinces below the median value of 2007 was -3.4 percentage points, while the average reduction for the provinces above the median of 2007 was -5.2 percentage points). For the period 2009-2010, changes in the enforcement measure at the province level were smaller on average compared to previous periods (only 0.9 percentage points), but with great variation across provinces. Changes ranged between -8.1 percentage points (Corrientes) and 25.3 percentage points (Mendoza).

Changes in the enforcement measure across productive sectors tended to fall over time (in absolute terms) (Panel (b)). The average change was 5.7 percentage points between 2005 and 2006, -2.3 percentage points between 2007 and 2008, and 0.9 between 2010 and 2011. However, the variation across sectors was important, especially in the first two periods depicted in the figure. Between 2005 and 2006, the change in the enforcement measure ranged from -0.4 (construction) to 15.7 (transportation and storage, communication, and financial intermediation). Between 2007 and 2008, the lowest change in absolute value was 0.3 percentage points (education), while the largest was -7.6 (transportation and storage, communication, and financial intermediation). Finally, the range of the variation in the enforcement measure between 2009 and 2010 was of 4.5 percentage points only, with a minimum of -2.0 (mining and quarrying) and a maximum of 2.5 (wholesale and retail trade, and real estate activities).

3. Data description

3.1. Enforcement measure

I collect information by province and productive sector on the total number of inspected firms from 2005 to 2011 published by the MTEySS, and on the total number of registered firms. Data on the total number of firms (registered or formal firms plus unregistered or informal firms) is not available. However, I do not expect this to be a problem. Even though MTEySS (2013a) reports that some labor inspectors have found workers whose employers have not declared any employee on the registration system (i.e., informal employers or firms), labor inspections target "formal employers with contributory capacity to avoid penalties to go to weaker sectors" (MTEySS, 2013a). This means that even when informal firms can be inspected, the chances of receiving a labor inspection are much higher for formal firms. With this data, I can generate a measure of enforcement: the ratio of inspected firms divided by total number of formal firms. I

define it as the log of inspections per hundred formal firms in each province, sector and year. The data covers the 23 provinces of Argentina and the CABA. All of them have at least one *delegacion regional*, and their labor inspection functions extend only to their own territory. The productive sectors covered by the data are 22. I re-categorized them in ten sectors in order to match this data with the household surveys. These ten sectors are: agriculture, animal production, hunting, forestry, and fishing; mining and quarrying; manufacturing; electricity, gas and water supply; construction; wholesale and retail trade, and real estate activities; accommodation and food service activities; transportation and storage, communication, and financial intermediation; education; human health and social work activities, and personal services. Public sector is not included among inspected sectors, and domestic workers either.

Labor inspectors travel by car from a *delegación regional* to the firms to be inspected. The extension of the road network and the traffic in each province are indicators of the arrival cost to the firms which I use in the econometric analysis to instrument the enforcement measure. Information on the extension of the road network in each province and year was obtained from the Instituto Nacional de Estadísticas y Censos in the case of national roads, and from the Consejo Vial Federal in the case of provincial roads. The extension of the road network is measured in kilometers and was normalized by the corresponding province's territory. Information on the traffic in the road network of each province and year comes from the Asociación Argentina de Carreteras. This variable is measured in number of vehicles and was normalized by the population of each province. Thus, the arrival cost is measured as number of per capita vehicles per kilometer of the ratio territory-road network. Finally, in order to include variation at the sectoral level the arrival cost is adjusted by the share of each productive sector in the total gross production value in the year 2004, which means that the share is predetermined. Information on the gross production value of each sector in the year 2004 was obtained from the Instituto Nacional de Estadísticas y Censos.

3.2. Outcome variables and individual characteristics

I explore the Argentine household survey, Encuesta Permanente de Hogares Continua (EPH-C) for the period 2005-2011 stacking quarterly data for each year.[8] The EPH-C covers 31 large urban areas which are home to around 70% of the Argentine urban population. Since the share of urban areas in Argentina is 87%, the sample of the EPH-C represents around 60% of the total population of the country.

Surveyed people are interviewed in the location where they live, but it may be the case that they work in a different province. That is usually the case among people living in Buenos Aires province and working in the CABA and the other way around. The questionnaire allows me to identify persons who work in a different province than where they live. With this information, I

[8] The four quarters are available for all the years with the only exception of 2007 where microdata for the fourth quarter is missing.

reassign these people to the province where they work, so they can be affected by the enforcement level of that province.[9]

The EPH-C contains data on several mandated benefits for wage employees (pension contributions, health insurance, paid vacations, annual extra monthly wage, paid sick days), some non-mandatory benefits (housing, food, and merchandise), hourly wages, and hours of work. All the information is reported by workers. Workers who do not receive the mandated benefits could be employed in a formal or an informal firm. Unfortunately, the survey does not contain information about the formality status of the firm where each worker is employed. Thus, the effects of the enforcement on mandated benefits and other labor market outcomes will be reflecting the average impact on the formal and the informal sectors of the economy.

The EPH-C provides data on individual characteristics used as control variables. They are age, indicator variables for educational levels, indicator variable of civil status, number of children under 14 years of age at home, and indicator variables for the size of the firm where each worker is employed.

3.3. Province characteristics

I use different sources of data to construct control variables related to the economic and institutional development of the provinces. I use the social expenditure and the primary result (total incomes – primary expenditures) as political business cycle variables. They were obtained from the Direccion Nacional de Coordinacion Fiscal con las Provincias for each province and year. Both variables are defined in constant prices of 2005. The social expenditure is normalized by the total population of each province, while the primary result was calculated as a percentage of total provincial incomes. The institutional development of the provinces is measured by the absenteeism in provincial elections and was obtained from the Ministerio del Interior y Transporte. It is defined as the percentage of absent voters in provincial elections in year *t* and replicates the same value in the following years until a new election was performed. In most of the provinces the elections were carried out in 2003, 2007 and 2011. The percentage of absenteeism in 2003 was imputed to 2005 and 2006, while the percentage of absenteeism registered in 2007 was applied from 2007 to 2010. Information on the total population of each province and year was obtained from projections of the Instituto Nacional de Estadisticas y Censos based on census data. Models also control for demand shocks at the province and year level captured by the edification permits measured in squared kilometers and normalized by the total population in each province and year. This information was obtained from the Direccion Nacional de Coordinacion Fiscal con las Provincias. The remaining control variables are

[9] This procedure can be applied to people living in the province of Buenos Aires and working in the CABA and the other way around. For those living in Misiones, Formosa, Corrientes, Chaco, Santa Fe, Entre Rios, and Neuquen, it is possible to know who works in a different province, but not which that province is. I left this group of observations (only 0.11% of the sample of wage earners) outside the sample. For the remaining provinces the information is not available.

obtained from the EPH-C. They include the share of people that is poor according the unsatisfied basic needs indicator and the per capita household income at constant prices of 2005.

Some sample statistics for men and women are provided in Table 1. The sample of interest comprises wage employees aged between 16 and 65 in the case of men (the legislated retirement age for men), and between 16 and 60 for women (the legislated retirement age for women). Men and women in the sample have almost the same age on average (36 years), women are more educated that men (2 more years of education) and have a significantly lower employment rate (23 percentage points lower). For those who are employed, women tend to work more as wage employee and less as self-employed compared to men. Salaried women have a higher coverage of social security and employment regulation than salaried men. Around 69% of salaried women enjoy social security regulation, while the figure is 62% for salaried men. The gender difference is larger for the share of salaried workers covered by employment regulations: 48% for women and 36% for men. Salaried men tend to work more in small firms, and in agriculture and manufacturing sectors than salaried women. The monthly wage is significantly larger for salaried men, but the hourly wage is larger for women.

4. Theoretical mechanisms

When enforcement becomes stricter (labor inspections increase as a percentage of the total number of formal firms), the cost of not complying with labor market regulations increases for the firms: the probability of being detected becomes larger and with that, the probability of paying a fine that depends on the type of violation to the rules, increases as well. Firms are expected to react by complying with the rules they were evading (at least for some of the workers), which imply an increase in labor costs for them.

The increased compliance may impact men and women differently. Firms may prefer to increase the level of compliance among women because some labor regulations are cheaper for them. For instance, women tend to receive lower wages than men with similar characteristics (Tijdens and Van Klaveren, 2012). Thus, the contributions to the pension system and to the health insurance will be smaller, as they are a percentage of monthly earnings. Similarly, the cost in terms of the annual extra monthly wage will be lower as well. Women have higher turnover rates and with that, lower average tenure than men (for a given age). This implies a lower cost of layoffs for women in case the firm needs to adjust the size of its labor force in the future, because the severance pay is proportional to tenure and monthly earnings (Montenegro and Pages, 2004). On the other hand, firms may prefer to increase the level of compliance among men for at least two reasons. First, women enjoy a longer maternity leave compared to men.[10] Second, if a firm was paying below the minimum wage level, it may prefer to comply with this labor regulation for men instead of women due to the lower average tenure of women.

[10] The maternity leave in the private sector is three months for women and two days for men (MTEySS, 2010).

The increased labor costs resulting from stricter labor inspections can lead firms to make an adjustment that can take several manners. Firms can reduce the size of their labor force (extensive margin of adjustment) and with that, the level of production (Micco and Pages, 2006; Ahmad and Pages, 2007; Amin, 2008; Almeida and Carneiro, 2009); or they can switch to a capital intensive technology avoiding the increase in labor costs and the reduction in the production level (Loayza, 1996).[11] The level of investment can also be hurt and with that, labor productivity can be negatively affected (Besley and Burgess, 2004; Scarpetta and Tressel, 2004; Autor et al., 2007). Firms can also adjust by affecting some job attributes (intensive margin of adjustment). For instance, they can reduce hourly wages, or they can decrease the level of non-mandatory benefits, such as meals and housing. This adjustment may also impact differently on men and women. Regarding the extensive margin, the decline in women employment can be larger than the decline for men (given a reduction in labor demand) due to the larger female labor supply elasticity (Montenegro and Pages, 2004). Firms may also prefer to lay off women more than men because their severance pay will be lower. The reasoning is that job turnover is larger among women implying lower average job tenure compared to men, and monthly earnings for women are also below the level for men (Montenegro and Pages 2004).[12] On the other hand, firms may prefer to have more women than men in their labor force because the higher turnover rates among women imply that they will probably quit before attaining a high level of tenure, reducing future severance payment costs (Pages and Montenegro, 1999).

A possible associated effect of the extensive margin of adjustment is that workers who lose their jobs may offer their hours of work in the informal sector. This effect is possible because labor inspections are focused on formal firms. The shift in employment towards the informal sector will depend on workers' valuation of the mandated benefits being enforced (Almeida and Carneiro, 2012; Almeida et al., 2013). Considering women as secondary workers, they are expected to accept a job without mandated benefits more than men, because for secondary workers the gain from mandated benefits is lower if another member of the household already has those benefits, i.e. their husbands (Galiani and Weinschelbaum, 2011). Because the household survey data of Argentina does not contain information on the formality status of the firm where each person is employed, this possible impact cannot be tested directly. However, if the share of wage earners receiving mandated benefits at the province-sector level falls with an increase in the enforcement measure, that could be interpreted as an expansion of the employment in the informal sector (which is not the target of labor inspections). The reasoning follows the previous explanation about how the firms are expected to react when faced with an increase in the degree of enforcement: when enforcement becomes stricter, the cost of not complying with labor market regulations increases for the firms, and they are expected to react by complying with the rules they were evading. Thus, firms in the formal sector of the economy

[11] Firms may also want to reduce their size (in terms of employees) as a way to reduce the chances of being inspected (the probability of detection usually increases with the size of a firm).

[12] Severance pay in Argentina is calculated as one monthly earning per year of tenure in the firm (or period of time greater than three months in case the worker is laid off before obtaining the first year of tenure), considering the best monthly earning usually received.

who were not complying with all or some dimensions of the mandated benefits are expected to increase the level of compliance, but never to decrease it. The resulting increase in the cost of formal labor can lead firms to adjust some variables to compensate for the reduced benefits. One possible adjustment is the reduction in the size of the labor force. Laid off workers are the ones who, depending on their valuation of the mandated benefits in the formal sector, may offer their work in the informal sector of the economy. This reallocation of workers from a job with mandated benefits to a job without these benefits is also possible *within* the formal sector (a firm is formal when declares at least one employee in the social security system) where workers can obtain a job in a productive sector facing a comparatively lower increase in the enforcement of labor market regulations.

Reductions in firms' size (in terms of number of employees) may induce changes in the composition of employment by employment category as well. On the one hand, laid off workers may switch from being wage earners to self-employment. On the other hand, increased compliance with labor market regulations may increase labor supply for wage jobs which are now more attractive, and an increase in the share of wage earners is possible through a reduction in hourly wages. The first effect (increase in the share of self-employed workers) is expected to prevail for women due to a possible lower valuation of mandated benefits by them in comparison to men. For men, an increase in the share of wage earners is possible if their labor supply for wage jobs with mandated benefits increase and wages go down. The increase in labor supply may come from wage earners in the informal sector of the economy, wage earners in formal firms from productive sectors facing a comparatively lower increase in enforcement, self-employed workers, or non working people (unemployed or out of the labor force).

Regarding the intensive margin of adjustment, reductions in wages can affect women more than men because women can be considered "outsiders" with less bargaining power and less negotiating abilities (Montenegro and Pagés, 2004; Bertrand, 2011). However, the final effect on hourly wages will also depend on the reallocation of workers between the formal and the informal sectors, because average hourly wages are usually lower in the informal part of the economy (given workers' characteristics). For instance, because of the lower severance pay for women, firms may choose to lay off women when face with an increase in enforcement and increase the compliance with labor market regulations among men. The higher level of compliance will make wage jobs more attractive for men who will increase their labor supply in the formal sector and decrease their labor supply in the informal sector. The final effect on average hourly wages will depend on how many men reallocate from the informal to the formal sector and on the elasticities of labor demand and supply.

Reductions in the provision of non-mandated benefits such as food and housing are also expected. In the presence of wage rigidities and firing costs this set of benefits should be easier to adjust for firms, especially if they are provided voluntarily. However, if the provision of non-mandated benefits consists of an in-kind part of the monthly pay, the expected effect of an increase in the enforcement of labor market regulations is not clear. Firms may prefer to increase

in-kind payments as that will provide them with more liquidity to face the increase in labor costs.[13]

5. Empirical strategy

In this section I detail the econometric strategy to analyze the relationship between enforcement of labor market regulations and indicators of mandated benefits in the Argentine labor market on the one hand, and the relationship between enforcement and other labor market outcomes, on the other hand.

In absence of firm level data, I use information from the Argentine household survey from 2005 to 2011 where workers report their own working conditions. I perform the analysis separately for the samples of men and women. The sample of men includes men aged 16 to 65 (the legislated retirement age for men), while the sample of women includes those aged 16 to 60 (the legislated retirement age for women). The estimation of separated models for men and women (instead of a model for a whole sample with an interaction term) is meant to capture the differences in characteristics of working men and women and more importantly, the different returns to observable characteristics. The sample includes wage employees from the private sector who are employed in the productive sectors inspected by the MTEySS.[14,15]

The main specification regresses an indicator variable for overall measures of compliance with social security regulations (the employee receives contributions to the pension system and to the health insurance system) and employment regulations (the employee receives paid vacations, annual extra monthly wage, paid sick days, earns at list the minimum wage, and works no more than the maximum weekly hours) and other labor market outcomes such as hourly wages, non-mandated benefits, and employment category, for individual *i*, in province *p*, in productive sector *s*, and year *t* (Y_{ipst} in equation (1) below) on the measure of enforcement for province *p*, productive sector *s*, and year *t*, which is defined as the logarithm of the number of inspected firms per hundred formal firms (E_{pst} in equation (1)).[16] A set of individual characteristics is included as control variables (X_{ipst} in equation (1)). This set includes age and age squared, indicator variables for the educational level, an indicator variable of civil status, and

[13] Labor regulations in Argentina allow the payment of up to 20% of the monthly wage in products, food or housing. Social security contributions have to be calculated both on in-kind payment and in-cash payments (MTEySS, 2013b).

[14] There are two reasons to work with the sample of wage earners. First, labor inspections are directed to employer-employee labor relationships. Second, data of mandated benefits is only available for this employment category in the household survey of Argentina.

[15] The public sector is not subject to labor inspections of the MTEySS.

[16] The correlation between social security regulations is positive and very high (0.95 for the entire period), meaning that workers receive contributions to both the pension and the health insurance systems or do not receive contributions to any of them. The correlation between employment regulations is lower, especially when the compliance with the minimum wage and maximum hours of work are considered. The Appendix presents estimations for each regulation analyzed one at a time.

the number of children under 14 years of age at home. The model also controls for indicator variables for the size of the firm where individual *i* is employed.

Several variables at the province level with variation over time are included in different specifications to control for characteristics that can be correlated with the level of enforcement and can affect the level of compliance as well (W_{pt} in equation (1)). The first group of variables includes the logarithm of the social per capita expenditure in province *p* and year *t*, and the primary result (total incomes – primary expenditures) as a percentage of total incomes in province *p* and year *t*. These two controls are justified by the heterogeneous political business cycles of the provinces which can lead provincial governments to implement expansionary/contractionary policies (captured by the social per capita expenditure and the primary result as a percentage of total incomes of the province). The political business cycle can affect the level of enforcement (Piore and Schrank, 2008; Ronconi, 2010; Murillo et al., 2011; Ronconi, 2012). For instance, labor inspection efforts may be reduced during recessionary periods to protect the economic activities of the provinces, or can be stricter during a boom, especially for expansionary activities. The level of enforcement can also increase during electoral years, as the protection of workers' rights is an important electoral issue. These two variables capturing the political business cycle of the provinces can also affect the level of compliance for at least two reasons. First, the implementation of expansionary policies may reduce unemployment generating a tighter labor market and increasing employees' bargaining power to successfully demand the compliance with labor market regulations. Second, an expansionary policy can increase the provincial level of prices reducing the real cost of some labor market regulations (for instance, the contributions to the pension system which are a percentage of monthly earnings) and increasing the level of compliance.

The second group of variables with variation at the province and year level includes the logarithm of the percentage of absenteeism in provincial elections. This variable intends to control for the quality of provincial institutions -a low value of this indicator is expected to reflect a good institutional environment. The quality of institutions is relevant in the estimation of the relationship between enforcement and compliance with labor regulations. The level of enforcement in a province could be high because it has a good institutional environment. Then, a positive relationship between compliance and enforcement would be capturing the better quality of institutions.

The last group of control variables at the province level includes the logarithm of the population, the logarithm of the per capita household income, the unsatisfied basic needs poverty indicator, and the logarithm of building permits per capita. All these variables have variation over time. The first three (population, per capita income, and poverty) capture the level of development of the province, while the last one (building permits per capita) intends to control for demand shocks.

All the specifications include province, productive sector, and year fixed effects (δ_p,δ_s, and δ_t in equation (1) respectively), while one of the specification also adds province trends ($I_p * T_t$,

where T_t is a categorical variable). The standard errors are clustered at the province and sector level. According to the description of the labor inspection system in Argentina, the number and intensity of labor inspections are organized geographically and by productive sector considering several factors, such as the past number of inspected firms and workers, and the season of more activity in some productive sectors (i.e. agricultural sector). These characteristics can lead to autocorrelation of the residuals at the province and sector level which can be accounted for by clustering the standard errors.

The equation to be estimated for the samples of men and women is the following:

$$Y_{ipst} = \beta X_{ipst} + \gamma E_{pst} + \alpha W_{pt} + \delta_p I_p + \delta_s I_s + \delta_t I_t + \varepsilon_{ipst}. \quad (1)$$

The parameter of interest in equation (1) is γ. There are reasons to believe that E_{pst} is potentially correlated with the error term. The first one is a reverse causality argument. A low level of compliance with labor market regulation can result in a higher level of enforcement. The second one is an omitted variables argument. The enforcement level can be correlated with unobserved institutional and development time-varying characteristics at the province level (not captured by the province fixed effects), generating a spurious correlation with the compliance with labor market regulations. For instance, a positive association between the level of compliance and the enforcement measure could be reflecting a positive association between the level of development, the quality of institutions and the degree of enforcement (assuming a positive impact of better institutions and development on compliance). A similar argument can be made at the sectoral level. A shock that impacts negatively on some productive sectors is expected to reduce both the level of compliance and the enforcement measure (labor inspections focus on expansionary economic activities). Then, the coefficient γ could be biased upward reflecting the interaction between the negative impact of the shock on the compliance with labor market regulations and the negative impact on the enforcement measure.

Considering the possible endogeneity of the enforcement measure in equation (1), I implement and instrumental variable strategy. The proposed instrument is a measure of the arrival cost of labor inspectors to the firms. Labor inspectors travel by car from a *delegación regional* in province *p* to the firms to be inspected in some location of province *p*. The extension of the road network in province *p* provides a measure of the arrival cost to the firms. With a wider network, a higher geographic dispersion of firms is expected, increasing the arrival cost in terms of money and time.[17] The arrival cost is also affected by the traffic in the road network in each province. A larger number of vehicles is expected to increase the cost as well. The instrumental variable is defined as follows:

$$Z_{pst} = log\left(RN_{pt} * T_{pt}\right) * shr_{s,04}^{GVP}. \quad (2)$$

[17] The *delegaciones regionales* are based in the main cities of each province (e.g. capital city) where a large share of firms is expected to be located. A measure of the geographic dispersion of firms in each province's territory would improve the instrument as an arrival cost measure. However, the lack of that information does not affect the validity of the instrument.

The variable RN_{pt} is the extension of the provincial road network (national plus provincial roads) in kilometers divided by the provincial territory. This variable differs greatly between provinces, but the variation over time is small. The variable T_{pt} measures the traffic in the provincial road network as the number of crossing vehicles per capita in province *p* and year *t*. The arrival cost is defined as the logarithm of the number of crossing vehicles per capita per kilometer of the ratio territory-provincial roads. This measure only varies at the province and time level. In order to add variation at the sectoral level, I multiplied it by the share of each productive sector in the total gross production value in year 2004. The reasoning is that labor inspections focus on expansionary activities, avoiding the penalization to go to subsistence sectors. Then, a sector with a larger share of the gross production value is expected to receive more labor inspections. Considering that a higher share of the gross production value is probably associated with a higher level of compliance (violating the exclusion restriction of the instrument), I predetermined the share using data of the year 2004.

One may argue that the extension of the provincial road network is capturing the level of development of each province, generating a violation to the exclusion restriction of the instrument. The reasoning is that a wider road network eases the access to the main markets of the province, allowing cities which are further away from them to obtain products and services they would not have obtained otherwise.[18] Thus, the key to the relationship between the extension of road networks and the development of the provinces is the distance separating remote locations from the main markets (i.e., the capital of the province or other main cities). Given that the extension of road networks is essentially unchanged in my data, this effect will be captured by the province fixed effects. If some extension of the road network is implemented with the passing of time, I expect to capture the possible correlation between the change in the configuration of distances to the main markets within each province and the level of development through the inclusion of province trends, and also through other controls for provinces' economic development (per capita income, population, poverty, and aggregate demand). Similarly, the measure of traffic in provincial road networks could be capturing the development of the provinces because more traffic is associated to a larger number of vehicles. Again, I expect to control for this possible connection through province trends and other controls capturing the level of development of the provinces over time.

Table 2 provides de first stage results for the samples of men and women, and for different specifications. Column (1) controls for individual characteristics (age and age squared, indicator variables for the educational level, an indicator variable of civil status, number of children under 14 years of age at home, and indicator variables for the size of the firm where individual *i* is employed), the logarithm of the social per capita expenditure in province *p* and year *t*, the primary result as a percentage of total incomes in province *p* and year *t*, and the percentage of absenteeism in provincial elections. Column (2) includes all the previous controls and adds the logarithm of the population, the logarithm of household per capita income, the unsatisfied basic

[18] Roads are the main option to connect geographic points in Argentina. Railroads are not widespread.

needs poverty indicator, and the logarithm of building permits per capita in each province and year. Finally, column (3) adds province trends to column (2). The province trends are included to capture any remaining factors specific to the provinces and with variation over time that could be correlated with the enforcement measure and with labor market outcomes. Because labor inspections are planned at the province level, the existence of omitted factors of this type is possible. For instance, policy decisions by provincial governments such as provincial taxes may impact both on the enforcement measure (revenues needs can lead to increases in tax rates and in firms' inspections) and on the compliance with labor market regulations (higher tax rates can result in a reduction in the level of compliance with labor market regulations) and on other labor market outcomes.

The measure of the arrival cost of labor inspectors is statistically significant in all the proposed specifications for the samples of men and women, and the estimates are remarkable stable across specifications. As expected, an increase in the measure of arrival cost reduces the degree of enforcement. Specifically, for the sample of men, an increase of 1% in the arrival cost reduces the enforcement in around 0.86%. For the sample of women, the reduction in the enforcement measure is of 0.67% for each 1% increase in the arrival cost.

6. Empirical results

6.1. Enforcement of labor market regulations and compliance with mandated benefits

In this sub-section I detail the results obtained from the estimation of the relationship between enforcement of labor market regulations and indicators of mandated benefits in the Argentine labor market. With this analysis, I test the first piece of the expected response of the firms that was described in Section 4. When the level of enforcement increases, firms are expected to react by complying with the rules they were evading. This effect is possible in the Argentine labor market as the share of wage employees without mandated benefits was around 35% during the analyzed period.

Panel (a) of Table 3 presents the results for the model of compliance with social security regulations (the employee receives contributions to the pension system and to the health insurance system) regressed on the enforcement measure and the control variables described above. Results are shown separately for the samples of men and women, and for different model specifications. OLS estimations are also provided.

Results from IV estimations indicate that the effect of the enforcement of labor market regulations at the province and sector level on the compliance with social security regulations is positive and strong for the sample of men and for all the specifications proposed. A 10% increase in the enforcement effort in the province and sector where a male employee is located leads to an increase of 1 percentage point in the level of compliance among men. The magnitude of the effect is important in a province like Córdoba where the average annual increase of the enforcement level was of 13.8%. Fort the sample of women, the γ coefficient is negative but not

significant statistically at the usual levels. The effect of the enforcement measure on each social security benefit analyzed separately is provided in the Appendix and indicates a reduction in the provision of health insurance for women of almost 2 percentage points for each 10% increase in the enforcement effort (significant at 10% level).

Panel (b) of Table 3 depicts the results when the dependent variable is the compliance with employment regulations (the employee receives paid vacations, annual extra monthly wage, paid sick days, earns at list the minimum wage, and works no more than the maximum weekly hours). Similarly to previous estimates, the effect is positive and statistically significant for the sample of men. The magnitude of the effect is smaller than before: a 10% increase in the enforcement measure in the province and sector where a male employee is located leads to an increase of around 0.6 percentage points in the compliance with employment regulations among men. The effects for the sample of women are again negative and significant at 10% level using specifications 2 and 3. The magnitude indicates a reduction of 1.5 percentage points in the share of female wage earners who receives all employment benefits at the province and sector level for each 10% increase in the enforcement measure.

The sign of OLS bias is not clear in theory. On the one hand, enforcement can be stricter in more developed provinces, where the level of compliance is also higher (positive bias). On the other hand, a positive shock to a province economy could lead to a stricter enforcement policy and to a reduction in the level of compliance if regulations are unreasonably stringent (negative bias). OLS estimations in Panels (a) and (b) of Table 3 have the same sign as IV estimates in most cases and the standard errors are smaller as expected. The magnitudes of OLS estimates are smaller (in absolute value) compare to IV estimates, suggesting the presence of a negative bias for men and a positive bias for women. However, OLS estimates are not statistically significant in any case.

Tables A1 and A2 in the Appendix show the results for the mandated benefits analyzed one at a time. A higher level of enforcement leads to increases in the share of male wage employees with contributions to the pension system, in the share with contributions to the health insurance system, and in the shares receiving paid vacation time, the annual extra monthly wage, paid sick days, and a monthly pay equal or above the legal minimum regardless the model specifications. The only not significant effect is for the share of male employees who works no more than the legal maximum of weekly hours. On the contrary, there is a reduction in the share of female wage employees receiving health insurance, paid vacation time, the annual extra monthly wage, paid sickdays, and working less than the legal maximum of weekly hours. All the results for women are significant at 10% level.

The negative impact of a higher level of enforcement on the share of women that in each province-sector combination receives social security and employment mandated benefits are statistically weak but suggests a reallocation of women across firms in the same productive sector or across sectors, probably after being laid off from their job. A story where a firm decides to comply with labor market regulation for men but to reduce the level of compliance among

women is difficult to maintain. Firms react to a higher level of enforcement by complying with the regulations they were evading (at least for some of the workers without the mandated benefits before the increase in the enforcement measure). A substitution of men for women with mandated benefits would make sense if the enforcement efforts or the penalties in case of being detected not complying with the labor laws were different by gender. But that is not the case. However, the evidence is not enough to conclude that women moved from the formal to the informal sector of the economy. It could be the case that women reallocated to a productive sector where the increase in enforcement was comparatively lower and accepted a position without mandated benefits in a firm that combines registered and unregistered workers (formal firm). This story is in line with women having a low valuation of mandated benefits, especially the health insurance, as they can have access to them through other members of their family who work and receive mandated benefits.

In sum, provinces and sectors with higher enforcement of labor market regulations have higher levels of compliance with both social security and employment mandated benefits for the sample of men. A general pattern of higher compliance with labor market regulation as a result of higher enforcement (with no distinction between men and women) was also reported by Ronconi (2010) for Argentina, Almeida and Carneiro (2012) and Almeida et al. (2013) for Brazil. The opposite was found for the sample of women, although these results are weaker statistically. The evidence suggests the reallocation of women across firms (in the same or in other productive sector) where they get jobs without mandated benefits.

6.2. Enforcement of labor market regulations and other labor market outcomes

Previous results have indicated a higher compliance with labor market regulations for men in provinces and productive sectors where the enforcement is higher. According to the theoretical discussion in Section 5, firms will look for an adjustment mechanism to compensate for the increased labor cost of formal employees.

In Tables 4 to 6, I analyze different labor market outcomes that can be affected by the increase in the enforcement level for the samples of men and women. Panel (a) in Table 4 relates the logarithm of hourly wages to the enforcement measure and the same controls used in previous tables. The expected result here is a reduction in hourly wages as a result of a higher level of enforcement, probably for workers earning above the minimum wage, with a possible larger effect for women who are "outsiders" with less bargaining power and less negotiating abilities. Results indicate that provinces and sectors with larger increases in the enforcement measure have larger increases in wages for men and larger reductions for women, but none of the estimated effects are statistically significant. This lack of effect could be hiding heterogeneous responses along the distribution of the logarithm of hourly wages. Panels (b) to (d) in Table 4 show the results obtained when the response variables are the 10th percentile of the distribution of the logarithm of hourly wages in each province and sector for men and women, the 50th percentile and the 90th percentile respectively. For the sample of men, a higher level of

enforcement leads to increases in the value of the 10th and 50th percentiles of the log wage distribution and to reductions in the upper tail of the distribution (90th percentile), but none of these effects is significant statistically. The positive effect on the 10th percentile is very close to be significant at the 10% level, and it is compatible with the increase in the compliance with the minimum wage regulation for men. For the sample of women, higher levels of enforcement at the province and sector level reduce hourly wages along the entire distribution. The reductions are decreasing in the percentile of the log wage distribution, but not significant statistically.

The next set of outcome variables are related to non-mandated benefits, such as the provision of free meals at work, the provision of housing, and the provision of products. The expected result here is a reduction in the provision of these benefits, without a clear pattern by gender. Results in Table 5 show that for both men and women, the impact of a higher level of enforcement in the province and sector where a worker is located is very small in magnitude and not significant statistically in all the specifications.

Finally, I analyze how the changes in the enforcement level across provinces, sectors and over time impact on the share of wage earners and on the share of self-employed workers. The expected results are ambiguous. On the one hand, firms are expected to reduce the number of wage employees (extensive margin of adjustment). On the other hand, the increased compliance with mandated benefits for men may lead male workers who do not receive those benefits (unregistered workers, unemployed, and people out of the labor force) to offer their job for a lower wage in formal firms from productive sectors where the level of compliance increased the most. This adjustment, in line with a competitive labor market model, would imply an increase in the share of wage employees among men. For the sample of women, the persistent negative effect of higher enforcement levels on the compliance with labor market regulations seems to be indicating a reallocation of women to an informal firm or to a formal firm in a productive sector where the increase in enforcement was comparatively lower. Women that fail to obtain a job as wage earner may work as self-employed.

For the sample of men, results in Panel (a) of Table 6 indicate that provinces and sector with larger increases in the enforcement measure have higher increases in the share of wage earners among employed workers. The impact is of 0.9 percentage points for each 10% increase in the enforcement measure. This is consistent with the story of men valuing mandated benefits and offering their job in the formal sector, where the level of compliance is increasing. Results for the share of self-employed workers in Panel (b) of Table 6 are negative and significant for men (at 10% level). The reduction in the share of self-employed workers is of 0.7 percentage points for each 10% increase in enforcement. One important question is who the self-employed are. They could be persons working at the bottom of the job structure, hoping to get out of that employment category where entry is not restricted and earnings are low. On the other hand, they could belong to a restricted-entry category where a sizeable accumulation of financial and/or human capital is needed to enter and where earnings are high (Fields, 1990). The comparison of the educational level and labor earnings of self-employed workers, salaried formal and salaried

informal workers indicate that self-employed are similar to informal wage earners.[19] Thus, self-employment seems to be a not-desired employment category.

For the sample of women, higher enforcement leads to reductions in the share of wage employees and increases in the share of self-employed at the province and sector level, but none of the effects is significant statistically. These results are consistent with women moving across firms, from jobs where they received labor and social security benefits to jobs where they do not receive them, but without changing their employment category (they continue being wage employees).

To sum up, the models estimated in this section indicated that the increased compliance with labor market regulations for men led to an increase in their labor supply in the formal sector, because a job in the formal sector is now more attractive (i.e. higher chances of receiving mandated benefits which are highly valued by male workers), and to a resulting increase in wage employment and a reduction in self-employment. The expected wage reduction in the formal sector resulting from the increase in labor supply was probably canceled out by the increase in hourly wages in the informal sector where labor supply of wage employees probably fell, and by an increase in labor demand for formal workers (due to the reduction in wages). Wage rigidities could be another explanation for the lack of wage adjustment, especially at the lower tail of the wage distribution due to the presence of a minimum wage. However, the evidence pointed out to lack of wage adjustment along the entire distribution of log wages for men.

For women, higher enforcement led to an increase in non-compliance with labor market regulations for them. The way in which this result can be reconciled with the expected reaction of firms facing an increase in labor inspections is through women being laid off from a job with mandated benefits in the formal sector, offering their job to informal firms or to formal firms in sectors with lower increases in enforcement, and obtaining a job as a wage earner without mandated benefits. These results can also be interpreted as women suffering the adjustment that firms need to make to compensate for the increase in labor costs for men.

7. Additional estimations

7.1. Relocation decisions of firms

This first test intends to control for the fact that firms may decide to relocate when the share of inspected firms is increasing in the province and sector the firm belongs to. One determinant of the location decisions of firms is the distance to the main product and intermediate products markets which are probably located in the capital of the province or some other main cities. These are the cities where the *delegaciones regionales* are located in each province. Thus, if a

[19] The average years of education over the 7 years covered by the data are 12.2 for formal salaried workers (with social security benefits), 10.3 for informal salaried (without social security benefits), and 10.7 for the self-employed. The average real labor earnings are 1213.5 pesos for formal salaried, 644.6 pesos for informal salaried, and 757.5 pesos for self-employed workers.

firm decides to move further away from the inspection agencies, this will imply to move away from the main markets too. To control for this determinant of the location of firms, I include a measure of transportation costs at the province level. The measure is the retail oil price for each province and year. The reasoning is that a lower (higher) oil price will reduce (increase) the transportation costs from/to the main markets and it will be capturing the location decisions of firms.[20]

Data of oil prices comes from the Secretaria de Energía. The information contains retail prices of different fuels and oil types (gasoil, compressed natural gas, fuels) in all gas stations in each province and year. The measure was computed as the average price at all gas stations in province *p* and year *t*.

IV estimations are shown in Tables 7, 8 and 9 for the samples of men and women. Results for men are mostly unchanged. Higher enforcement leads to a higher compliance with social security and employment regulations for men at the province and sector level. There is no evidence of any wage adjustment for them, and the share of wage earners increases while the share of self-employed workers falls. Results for women indicate that higher enforcement of labor regulations reduce the level of compliance with both social security and employment regulations using the last specification. The analysis of the labor market regulations one by one indicates a reduction in all social security and employment benefits.[21] These results are in line with estimates in the previous section. The effect of enforcement on average wages and on the percentiles of the log wage distribution is negative but not significant most of the times. The only significant result is the reduction in average hourly wages using specification 3. Finally, the share of female wage earners falls with stricter enforcement, while the share of self-employed workers increases, but none of these effects is significant. These results are consistent with the main estimations in previous section.

7.2. Increased effectiveness of labor inspections over time

The second test deals with the simultaneous reduction in the enforcement efforts over time and the increase in the effectiveness of labor inspections. Section 2 showed that both the number of inspected firms and the share of inspected firms per hundred formal firms fell over time, especially since 2006, while the number of non-registered workers detected as a percentage of the total number of inspected workers increased. According to MTEySS (2013a), inspections have been adjusted over time using information from past experiences in order to achieve the same number of non-registered workers through the inspection of fewer firms. One could argue that the changes in the enforcement measure over time are not really capturing the enforcement

[20] The location decisions of firms would be better captured by characteristics of the cities where firms are located within each province. However, I am working with worker level data, and this level of geographical detail (city where the worker is employed) is not available in Argentine household surveys.

[21] Results of the robustness tests on each social security and employment benefit analyzed separately are available upon request.

efforts and the deterrence effect that labor inspections may generate. In order to include in the model the changes in the effectiveness of labor inspections over time, I add as control variables the regularization rate in each province and year, and the regularization rate in each productive sector and year. The regularization implies the inclusion of a worker in the formal registration system where employers must inform about hiring and termination decisions, when his employer was detected evading the labor regulations in a previous inspection. A labor relationship is considered to be regularized if the registration takes place before the moment of the deposition, which implies the registration was the result of the labor inspection. The rate is calculated as a percentage of unregistered workers detected by labor inspections.

Information on the regularization rate in each province and year, and in each productive sector and year comes from the MTEySS. Data on the regularization rate of sectors within each province is not available. For that reason, I use two different variables.

Results in Tables 10, 11 and 12 indicate that the effect of enforcement of labor market regulations on labor market outcomes for the sample of men is robust to the inclusion of the regularization rates as control variables. For the sample of women, the findings show no change in the share receiving social security and employment benefits. The analysis of each labor market regulation separately reveals no change in the share receiving pension contributions or health insurance contribution, implying that the finding in previous section is not robust to the inclusion of the regularization rates as control variables. On the other hand, there is a reduction in the share of women receiving paid sickdays and working less than the legal maximum of weekly hours (employment benefits). As previous results, there is no significant change in hourly wages or in the shares of female wage employees and self-employed. Thus, in general, the main results from previous section are genuine effects of the enforcement measure. They were not only generated by a better focalization of labor inspections, but also by a deterrence effect.

7.3. Number of labor inspection agencies in each province

This test consists of considering the existence of more than one *delegación regional* in some of the provinces. The instrumental variable used in the previous section was defined as a measure of the arrival cost of labor inspectors to firms. That measure was proportional to the extension of the road network and the traffic in each province and year. One may worry that the measure of the arrival cost is overestimated in provinces having more than one *delegación regional*. Even though the MTEySS (2013a) does not specify how labor inspections are organized geographically when more than one *delegación regional* coexist in the same province, it is reasonable to think that each *delegación* covers certain geographic area of the province. If that is the case, the extension of road networks would be overestimating the arrival cost of labor inspections. To capture this aspect of labor inspections, I redefine the instrumental variables by dividing the previous definition by the number of *delegaciones regionales* in each province.

Results obtained using the new definition of the instrument are presented in Tables 13, 14 and 15. For the sample of men, higher enforcement at the province and sector level leads to increases in the compliance with social security and employment regulations. The effects are larger than previous findings. There is a positive effect of enforcement of labor market regulations on hourly wages at the bottom of the log wage distribution for men. This effect did not appear before, but is consistent with the increased compliance with the minimum wage. Finally, there is an increase in the share of wage earners and a reduction in the share of self-employed workers, which is in line with previous findings, although the effects are larger than in Section 6. For the sample of women, higher enforcement leads to a reduction in the compliance with social security and employment regulations, regardless the model specifications. Hourly wages are also reduced on average and at the bottom of the wage distribution, while the shares of female wage earners and self-employed workers do not change.

7.4. Province development variables with variation across productive sectors

The last test relates to a possible violation of the exclusion restriction of the instrumental variable. The extension of the provincial road network and the traffic measure used to construct the instrument may be capturing the level of development of each province. In Section 5, I argued that the development of the provinces is captured through province fixed effects, other province controls, and province trends. However, the extension of the provincial roads and the traffic measure are interacted with the sectoral share of the gross production value in the construction of the instrument, meaning that the relevant variation is the change in the arrival cost measure across sectors. In order to better control for the potential violation of the exclusion restriction of the instrument, I include as additional explanatory variables the interaction of province development variables such as social per capita expenditure, primary result, absenteeism in provincial elections, province per capita income, population, poverty, and aggregate demand with the share of each productive sector in total employment in province p and year t.

Main results are shown in Tables 16, 17 and 18. For the sample of men, the increase in the compliance with social security and employment regulations as a result of a higher level of enforcement is confirmed. The effects are of a smaller magnitude compare to previous findings and weaker statistically. There is no evidence of any wage adjustment for men, and the share of wage employees increases, while the share of self-employed does not change. For women, there is no change in the share receiving social security coverage or employment benefits, not even in the analysis of each benefit separately. Hourly wages and the shares of wage employees and self-employed do not change.

To sum up, the increased compliance with labor market regulations as a consequence of stricter enforcement for the sample of men is robust to the inclusion of additional control variables, and to the re-definition of the instrument. The same is generally true for the increase in the share of male wage earners, the reduction in the share of self-employed workers, and the lack

of change in hourly wages. These results confirm previous findings, and reassure the story line presented before. Faced with an increase in enforcement, firms increase the compliance with labor market regulations for men. Formal jobs become more attractive for them, probably because men have a high valuation of mandated benefits. The increase in labor supply in the formal sector should reduce hourly wages. But that reduction is offset by the increase in hourly wages in the informal sector where labor supply fell, and probably by an increase in labor demand for formal workers too (due to the reduction in wages). Finally, the share of wage earners increases and self-employment declines due to the higher attractiveness of salaried employment with mandated benefits.

For the sample of women, the reduction in the provision of mandated benefits as a result of higher enforcement (either the overall indicators or some of them considered individually) was confirmed in three out of four tests. Hourly wages and the shares of female wage earners and self-employed did not change with the enforcement measure in most of the cases, confirming previous estimations. The only exception was the reduction in average hourly wages and wages at the bottom of the log wage distribution in one of the tests. Thus, even when results for the sample of women were less robust and statistically weaker, the evidence indicates a reduction in the provision of mandated benefits for them. Considering that is not reasonable for a firm to increase the level of compliance among men and to reduce it among women (labor inspections and fines are not heterogeneous by gender), these results suggest a reallocation of women from firms where they were receiving mandated benefits to other firms where they work as unregistered workers.[22] Women can be prepared to accept a job without mandated benefits if they can have access to some of them through other household member, typically their husbands. Thus, the way firms compensate for the higher labor costs due to the increase compliance with labor market regulations for men is through laying off women, who managed to obtained a job as wage earners but quitting mandated benefits.

8. Conclusions

In this paper I explored microdata from Argentine household surveys for the period 2005-2011 to analyze (i) how changes in the enforcement of labor market regulations affect different indicators of compliance among men and women, and (ii) how changes in the enforcement of the labor law generates adjustments of some labor market outcomes (different than the compliance level) for men and women separately. I took advantage of the highly decentralized labor inspection system in Argentina, which allowed me to construct an enforcement measure (number of inspected firms per hundred formal firms) with variation at the province, productive sector, and time level. The econometric strategy linked indicators of compliance with labor market regulations (obtained from workers' reports) and other labor market outcomes such as hourly wages, percentiles of the wage distribution, indicators of the provision of non-mandated benefits, and the structure of

[22] This could be a reallocation to a firm that combines workers with and without mandated benefits (formal firm) or to a firm where none of the workers are registered (informal firm).

occupation by employment categories (wage employment versus self-employment), with the enforcement measure and with a rich set of individual socioeconomic and labor characteristics, and economic, institutional and development characteristics of the Argentine provinces.

The theoretical mechanisms analyzed in this paper were the following. When firms face stricter enforcement, the cost of not complying with labor market regulations increases, i.e. the probability of being caught by the tax authority and of paying a fine is higher. Firms are expected to react by complying with the rules they were evading, which imply an increase in labor costs for them. The increased compliance may impact men and women differently because (i) labor regulations usually present some differences across gender, and that is the case in Argentina, and (ii) differences in some labor characteristics may lead firms to avoid labor regulation among women more than men or the other way around, e.g. differences in average tenure, in average earnings. The increased labor costs resulting from the stricter enforcement can lead firms to make an adjustment that can take several manners. Firms can reduce the size of their labor force and they can also adjust by affecting some job attributes, such as hourly wages or the provision of non-mandated benefits. This adjustment may also impact men and women differently depending, for instance, on the severance pay firms will have to pay if they lay off workers. A possible associated effect to the firm's size adjustment is that workers who lose their jobs may offer their hours of work in the informal sector. That effect is possible because labor inspections are focused on formal firms in Argentina. Thus, the linkages across markets can result in effects on the informal sector of the economy, even if enforcement is focused only on firms in the formal sector.

To deal with the potential endogeneity of the enforcement measure, I implemented and instrumental variable strategy. The proposed instrument was a measure of the arrival cost of labor inspectors to the firms defined as the logarithm of the number of per capita crossing vehicles per kilometer of the ratio territory-roads in each province and year, multiplied by the share of each productive sector in the total gross production value in the year 2004.

The findings revealed very different effects of an increase in enforcement on compliance and other labor market outcomes among men and women. Higher enforcement leads firms to increase the compliance with labor market regulation among men. The share of male employees receiving pension contributions, health insurance, paid vacation time, paid sick days, and a wage above the legal minimum increases at the province and sector level. Consequently, formal jobs become more attractive for them. The increase in labor supply in the formal sector should reduce hourly wages. However, hourly wages do not change in my results. The expected reduction is probably offset by the increase in hourly wages in the informal sector where labor supply fell, and by an increase in labor demand for formal workers too (due to a large reduction in wages). Finally, the share of wage earners increases and self-employment declines for men due to the higher attractiveness of wage employment with mandated benefits. There is no change in the provision of non-mandated benefits for men. For the sample of women, higher enforcement leads to a reduction in the provision of mandated benefits with no changes in hourly wages, in the

share of female wage earners and in the share of self-employed, and in the provision of non-mandated benefits. Considering that is not reasonable for a firm to simultaneously increase the level of compliance among men and to reduce it among women (labor inspections and fines are not heterogeneous by gender), these results suggest a reallocation of women from firms where they were receiving mandated benefits to other firms where they work as unregistered workers (in the formal or in the informal sector). All these findings are robust to the inclusion of several province characteristics of economic and institutional development, to controls related to the cost of access to main markets, and to different definitions of the instrument.

This paper contributed directly to the literature that analyzes heterogeneous labor market effects of labor regulations across gender, and to the literature that studies the effects of enforcement of the labor law (not the law by itself) on labor outcomes. To my knowledge, there was no evidence linking the enforcement of labor market regulations to labor market outcomes of men and women, or using three sources of variation of the data (geographic location, economic sector and time). The results revealed a heterogenous pattern of adjustment across gender when firms face a stricter level of enforcement. Firms increase the compliance with labor market regulations among men and compensate for the higher labor costs through the laying off of female employees, who manage to get a job as wage earners without mandated benefits. These results bring additional evidence about how the regulatory environment can impact on the decisions that firms and male and female workers make about participating in the informal sector. More importantly, they stress that both the written labor regulation and the degree of enforcement are essential parts in the provision of social and labor protection.

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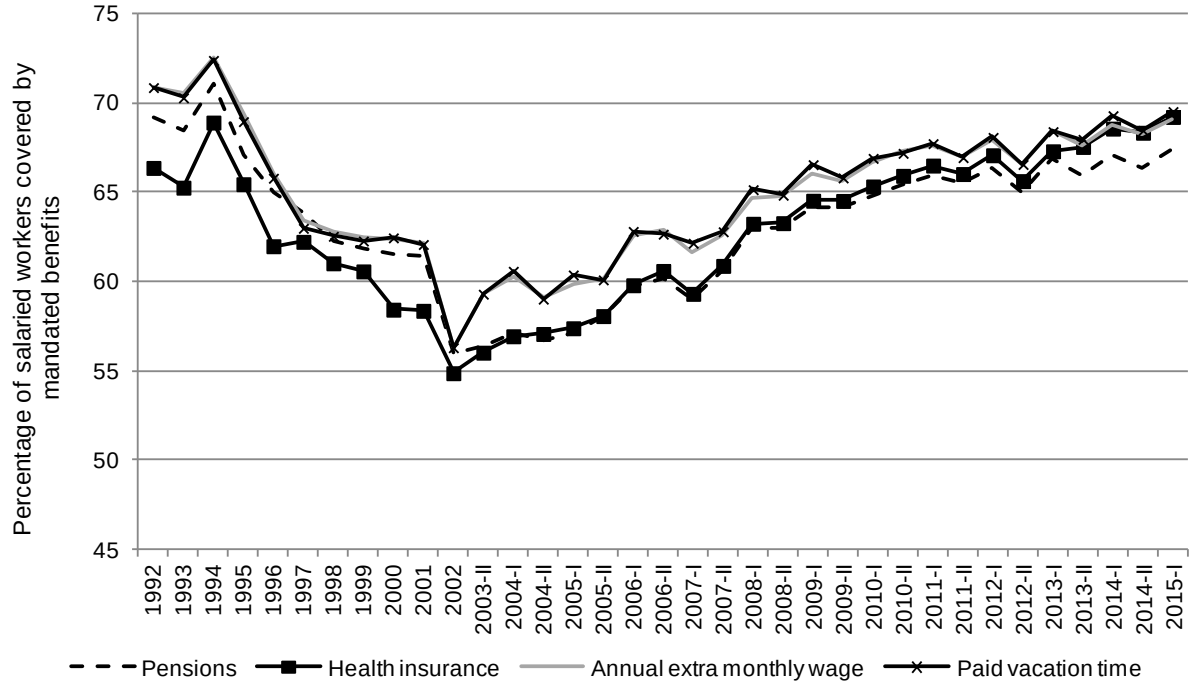
Figure 1

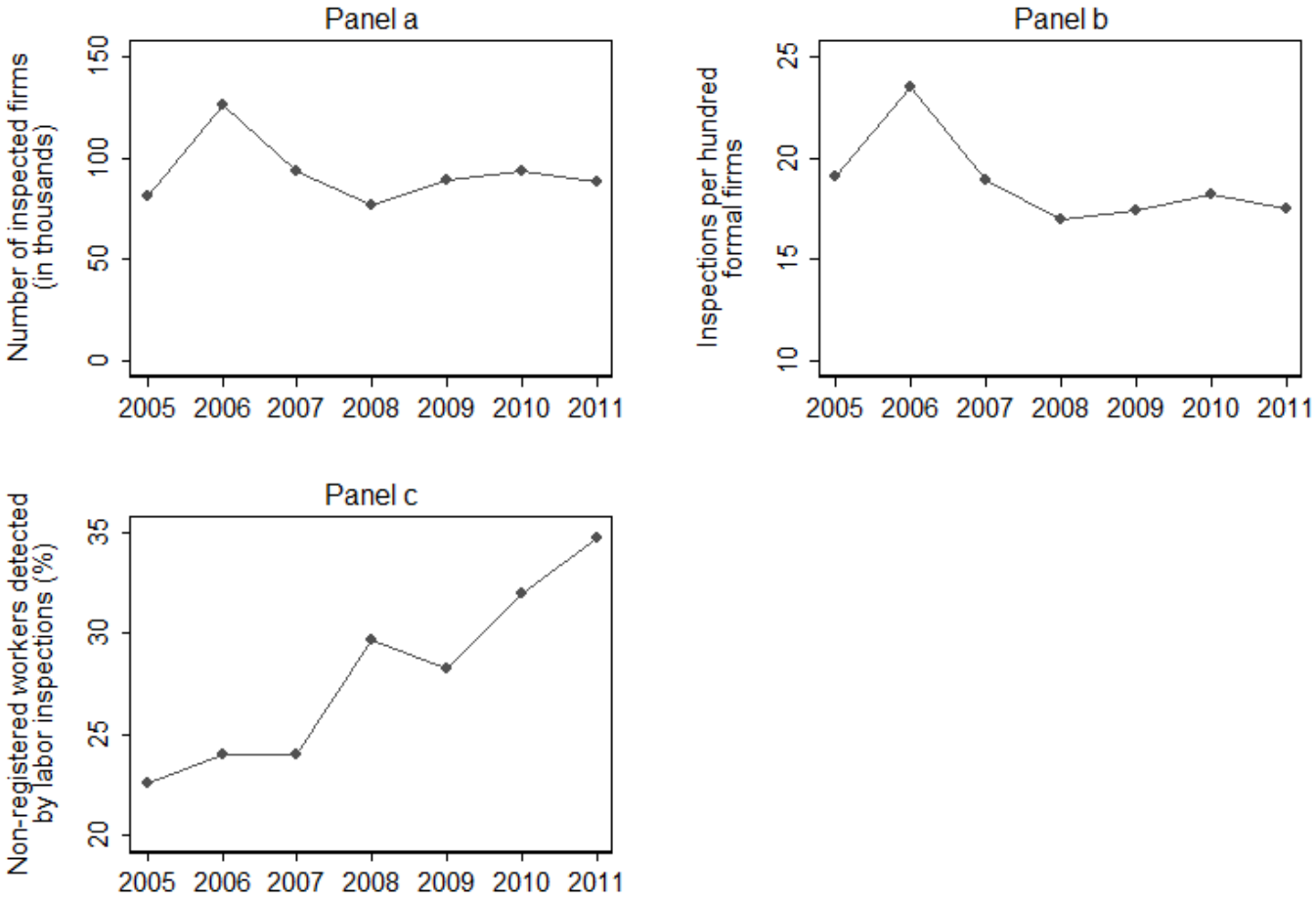
Percentage of compliance with mandated benefits by type of benefit. Wage earners 1992-2015



Source: Own elaboration based on SEDLAC (2016).

Figure 2

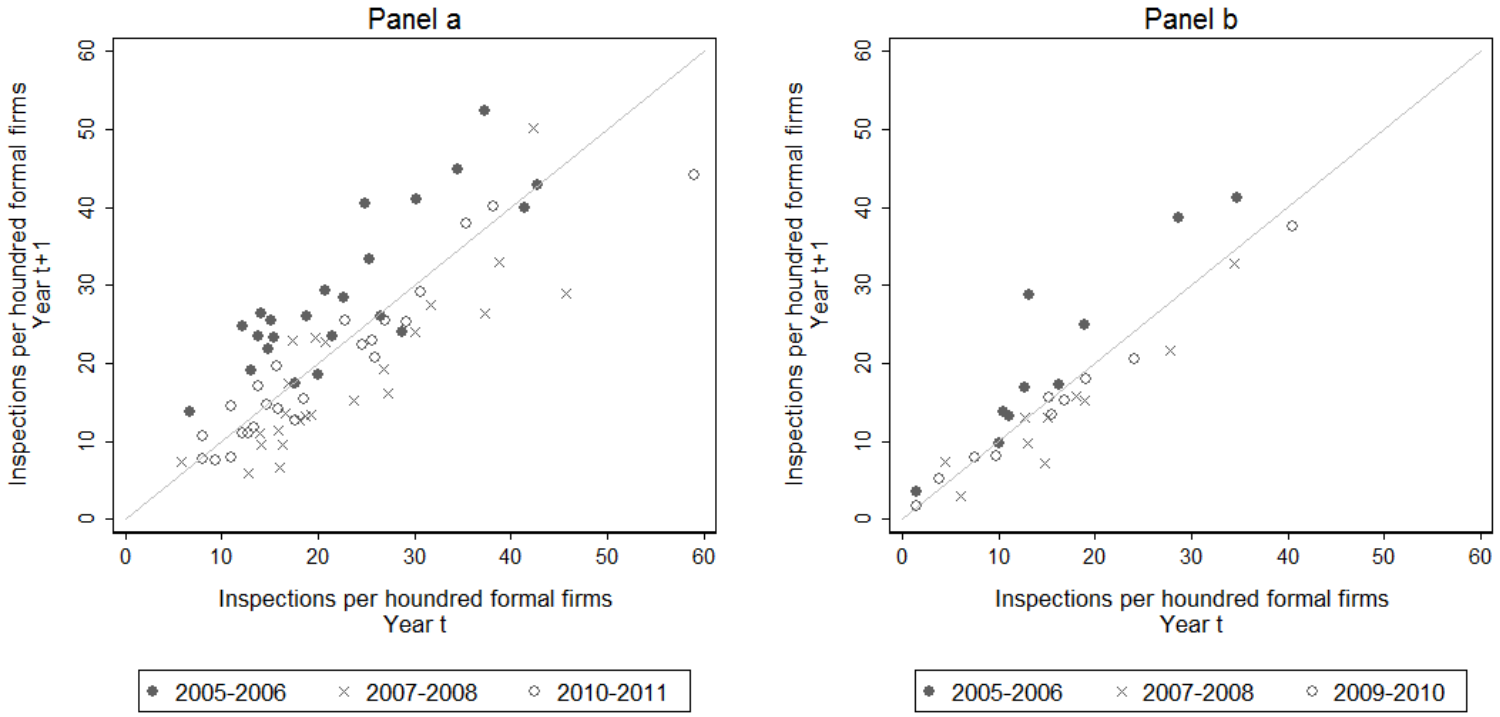
Description of the labor inspection system
2005-2011



Source: Own elaboration based on Ministerio de Trabajo, Empleo y Seguridad Social.

Figure 3

Annual changes in the enforcement measure across provinces and productive sectors



Source: Own elaboration based on Ministerio de Trabajo, Empleo y Seguridad Social and EPH-C.

Table 1

Descriptive statistics

	Women	Men		Women	Men
Age	35.84	36.16	Share working on medium firms	32.12	28.78
	(0.038)	(0.031)		(0.002)	(0.001)
Years of education	12.96	10.77	Share working om large firms	47.54	47.33
	(0.011)	(0.009)		(0.002)	(0.001)
Employment rate	51.61	74.94	Share working in agriculture sector	0.62	1.96
	(0.001)	(0.001)		(0)	(0)
Share of wage employment	81.89	74.03	Share working in manufacturing sector	24.58	45.09
	(0.001)	(0.001)		(0.002)	(0.002)
Share of self-employment	14.30	20.14	Share working in service sector	87.09	75.49
	(0.001)	(0.001)		(0.001)	(0.001)
Share covered by social security regulations	69.28	62.32	Hourly wage (in 2005 pesos)	6.70	5.96
	(0.002)	(0.001)		(0.02)	(0.017)
Share covered by employment regulations	48.09	35.77	Monthly wage (in 2005 pesos)	405.15	796.73
	(0.002)	(0.001)		(1.045)	(1.443)
Share working on small firms	20.34	23.89	Number of observations	83,906	148,166
	(0.001)	(0.001)			

Source: Own elaboration based on EPH-C.

Notes: Standard errors in parenthesis. The sample comprises men aged 16-65 and women aged 16-60. All statistics correspond to salaried employees with the exception of the employment rate, the share of wage employment, and the share of self-employment. Small firms are those with 5 employees or less; medium firms are those that have between 6 and 40 employees; large firms have 41 employees or more.

Table 2
Enforcement of labor market regulations and arrival costs of labor inspectors

Dependent variable:	Log(enforcement measure)		
	(1)	(2)	(3)
Men			
Log(arrival cost)*shr04	-0.856	-0.863	-0.867
	[0.271]***	[0.270]***	[0.269]***
Observations	148,166	148,166	148,166
R^2	0.686	0.688	0.697
Women			
Log(arrival cost)*shr04	-0.661	-0.671	-0.672
	[0.317]**	[0.314]**	[0.313]**
Observations	83,906	83,906	83,906
R^2	0.715	0.721	0.732

Notes: OLS estimations. All models include province, sector and year fixed effects. Model (1) controls for individual characteristics (age and age squared, indicator variables for the educational level, an indicator variable of civil status, number of children under 14 years of age at home, and indicator variables for the size of the firm where each person is employed), the logarithm of the social per capita expenditure in each province and year, the primary result as a percentage of total incomes in each province and year, and the percentage of absenteeism in provincial elections. Column (2) adds the logarithm of the population, the logarithm of household per capita income, the unsatisfied basic needs poverty indicator, and the logarithm of building permits per capita in each province and year. Column (3) adds province trends. Standard errors clustered at the province-sector level in brackets. *** significant at 1%, ** significant at at 5%, * significant at 10%.

Table 3
Enforcement of labor market regulations and compliance with mandated benefits

Dependent variable:	Panel a: =1 if workers receives social security benefits				Panel b: =1 if worker receives employment benefits			
	OLS	IV (1)	IV (2)	IV (3)	OLS	IV (1)	IV (2)	IV (3)
Men								
Log(enforcement measure)	0.0103	0.103	0.103	0.103	0.00578	0.0665	0.0652	0.0649
	[0.00968]	[0.0348]***	[0.0346]***	[0.0343]***	[0.00707]	[0.0263]**	[0.0255]**	[0.0254]**
Observations	148,166	148,166	148,166	148,166	148,166	148,166	148,166	148,166
R^2	0.286	0.276	0.276	0.277	0.168	0.163	0.163	0.164
Women								
Log(enforcement measure)	-0.00486	-0.187	-0.184	-0.184	0.00528	-0.151	-0.152	-0.152
	[0.0131]	[0.117]	[0.115]	[0.114]	[0.0108]	[0.0933]	[0.0921]*	[0.0919]*
Observations	83,906	83,906	83,906	83,906	83,906	83,906	83,906	83,906
R^2	0.253	0.215	0.217	0.218	0.233	0.209	0.209	0.210

Notes: OLS and IV estimations. The instrumental variable is the logarithm of the arrival cost of labor inspectors to firms. All models include province, sector and year fixed effects. Model (1) controls for individual characteristics (age and age squared, indicator variables for the educational level, an indicator variable of civil status, number of children under 14 years of age at home, and indicator variables for the size of the firm where each person is employed), the logarithm of the social per capita expenditure in each province and year, the primary result as a percentage of total incomes in each province and year, and the percentage of absenteeism in provincial elections. Column (2) adds the logarithm of the population, the logarithm of household per capita income, the unsatisfied basic needs poverty indicator, and the logarithm of building permits per capita in each province and year. Column (3) adds province trends. OLS column shows the result from specification (3). Standard errors clustered at the province-sector level in brackets. *** significant at 1%, ** significant at at 5%, * significant at 10%.

Table 4

Enforcement of labor market regulations and hourly wages

Dependent variable:	Panel a				Panel b			
	Log(hourly wages)				10th percentile of log(wage) distribution			
	OLS	IV (1)	IV (2)	IV (3)	OLS	IV (1)	IV (2)	IV (3)
Men								
Log(enforcement measure)	0.0118	0.0500	0.0513	0.0503	0.0176	0.108	0.108	0.107
	[0.00999]	[0.0381]	[0.0380]	[0.0378]	[0.0197]	[0.0665]	[0.0660]	[0.0660]
Observations	148,166	148,166	148,166	148,166	148,166	148,166	148,166	148,166
R^2	0.362	0.361	0.361	0.361	0.868	0.846	0.847	0.852
Women								
Log(enforcement measure)	0.0117	-0.245	-0.241	-0.241	0.0285	-0.556	-0.549	-0.549
	[0.0164]	[0.156]	[0.150]	[0.149]	[0.0379]	[0.399]	[0.388]	[0.386]
Observations	83,906	83,906	83,906	83,906	83,906	83,906	83,906	83,906
R^2	0.384	0.352	0.354	0.355	0.880	0.580	0.593	0.605

Table 4 (cont.)

Enforcement of labor market regulations and hourly wages

Dependent variable:	Panel c: 50th percentile of log(wage) distribution				Panel d: 90th percentile of log(wage) distribution			
	OLS	IV (1)	IV (2)	IV (3)	OLS	IV (1)	IV (2)	IV (3)
Men								
Log(enforcement measure)	0.00813	0.0349	0.0341	0.0327	0.0149	-0.0265	-0.0237	-0.0241
	[0.0133]	[0.0588]	[0.0586]	[0.0586]	[0.00942]	[0.0597]	[0.0587]	[0.0583]
Observations	148,166	148,166	148,166	148,166	148,166	148,166	148,166	148,166
R^2	0.911	0.906	0.907	0.909	0.870	0.860	0.864	0.866
Women								
Log(enforcement measure)	0.0283	-0.270	-0.266	-0.267	0.0459	-0.255	-0.249	-0.250
	[0.0258]	[0.215]	[0.209]	[0.208]	[0.0220]**	[0.203]	[0.195]	[0.195]
Observations	83,906	83,906	83,906	83,906	83,906	83,906	83,906	83,906
R^2	0.912	0.759	0.770	0.773	0.822	0.603	0.628	0.635

Notes: OLS and IV estimations. The instrumental variable is the logarithm of the arrival cost of labor inspectors to firms. All models include province, sector and year fixed effects. Model (1) controls for individual characteristics (age and age squared, indicator variables for the educational level, an indicator variable of civil status, number of children under 14 years of age at home, and indicator variables for the size of the firm where each person is employed), the logarithm of the social per capita expenditure in each province and year, the primary result as a percentage of total incomes in each province and year, and the percentage of absenteeism in provincial elections. Column (2) adds the logarithm of the population, the logarithm of household per capita income, the unsatisfied basic needs poverty indicator, and the logarithm of building permits per capita in each province and year. Column (3) adds province trends. OLS column shows the result from specification (3). Standard errors clustered at the province-sector level in brackets. *** significant at 1%, ** significant at 5%, * significant at 10%.

Table 5

Enforcement of labor market regulations and the provision of non-mandated benefits

Dependent variable:	Panel a				Panel b				Panel c			
	=1 if worker receives free meals				=1 if worker receives housing				=1 if worker receives products			
	OLS	IV (1)	IV (2)	IV (3)	OLS	IV (1)	IV (2)	IV (3)	OLS	IV (1)	IV (2)	IV (3)
Men												
Log(enforcement measure)	0.00254	-0.00182	-0.00180	-0.00140	-0.000624	0.0332	0.0329	0.0328	0.00107	-0.00285	-0.00288	-0.00295
	[0.00469]	[0.0190]	[0.0192]	[0.0193]	[0.00277]	[0.0242]	[0.0239]	[0.0237]	[0.00110]	[0.00464]	[0.00470]	[0.00465]
Observations	148,166	148,166	148,166	148,166	148,166	148,166	148,166	148,166	148,166	148,166	148,166	148,166
R^2	0.122	0.122	0.122	0.122	0.064	0.044	0.045	0.045	0.019	0.018	0.018	0.018
Women												
Log(enforcement measure)	0.00187	0.0161	0.0159	0.0159	0.000656	0.00679	0.00661	0.00667	0.00195	-0.000579	-0.000583	-0.000471
	[0.00581]	[0.0325]	[0.0321]	[0.0321]	[0.000493]	[0.00490]	[0.00467]	[0.00470]	[0.00199]	[0.0114]	[0.0110]	[0.0108]
Observations	83,906	83,906	83,906	83,906	83,906	83,906	83,906	83,906	83,906	83,906	83,906	83,906
R^2	0.142	0.141	0.141	0.141	0.012	0.009	0.009	0.010	0.027	0.027	0.027	0.027

Notes: OLS and IV estimations. The instrumental variable is the logarithm of the arrival cost of labor inspectors to firms. All models include province, sector and year fixed effects. Model (1) controls for individual characteristics (age and age squared, indicator variables for the educational level, an indicator variable of civil status, number of children under 14 years of age at home, and indicator variables for the size of the firm where each person is employed), the logarithm of the social per capita expenditure in each province and year, the primary result as a percentage of total incomes in each province and year, and the percentage of absenteeism in provincial elections. Column (2) adds the logarithm of the population, the logarithm of the household per capita income, the unsatisfied basic needs poverty indicator, and the logarithm of building permits per capita in each province and year. Column (3) adds province trends. OLS column shows the result from specification (3). Standard errors clustered at the province-sector level in brackets. *** significant at 1%, ** significant at 5%, * significant at 10%

Table 6
Enforcement of labor market regulations and the shares of wage and self-employment

Dependent variable:	Panel a				Panel b			
	=1 if employed as salaried worker				=1 if self-employed			
	OLS	IV (1)	IV (2)	IV (3)	OLS	IV (1)	IV (2)	IV (3)
Men								
Log(enforcement measure)	0.00456	0.0913	0.0915	0.0913	-0.00284	-0.0724	-0.0723	-0.0718
	[0.00764]	[0.0403]**	[0.0397]**	[0.0393]**	[0.00690]	[0.0392]*	[0.0386]*	[0.0382]*
Observations	305,449	305,449	305,449	305,449	305,449	305,449	305,449	305,449
R^2	0.144	0.134	0.134	0.134	0.113	0.105	0.105	0.105
Women								
Log(enforcement measure)	0.0183	-0.0191	-0.0182	-0.0179	-0.0139	0.0256	0.0248	0.0244
	[0.0106]*	[0.0882]	[0.0871]	[0.0865]	[0.00882]	[0.0726]	[0.0717]	[0.0713]
Observations	173,844	173,844	173,844	173,844	173,844	173,844	173,844	173,844
R^2	0.158	0.156	0.156	0.157	0.115	0.113	0.113	0.113

Notes: OLS and IV estimations. The instrumental variable is the logarithm of the arrival cost of labor inspectors to firms. All models include province, sector and year fixed effects. Model (1) controls for individual characteristics (age and age squared, indicator variables for the educational level, an indicator variable of civil status, number of children under 14 years of age at home, and indicator variables for the size of the firm where each person is employed), the logarithm of the social per capita expenditure in each province and year, the primary result as a percentage of total incomes in each province and year, and the percentage of absenteeism in provincial elections. Column (2) adds the logarithm of the population, the logarithm of household per capita income, the unsatisfied basic needs poverty indicator, and the logarithm of building permits per capita in each province and year. Column (3) adds province trends. OLS column shows the result from specification (3). Standard errors clustered at the province-sector level in brackets. *** significant at 1%, ** significant at 5%, * significant at 10 %.

Table 7

Robustness tests 1

Enforcement of labor market regulations and compliance with mandated benefits

Dependent variable:	Panel a			Panel b		
	=1 if social security benefits			=1 if employment benefits		
	IV	IV	IV	IV	IV	IV
	(1)	(2)	(3)	(1)	(2)	(3)
Men						
Log(enforcement measure)	0.104	0.103	0.103	0.0666	0.0652	0.0649
	[0.0351]***	[0.0345]***	[0.0342]***	[0.0263]**	[0.0255]**	[0.0254]**
Observations	148,166	148,166	148,166	148,166	148,166	148,166
R^2	0.276	0.276	0.277	0.163	0.163	0.164
Women						
Log(enforcement measure)	-0.185	-0.184	-0.165	-0.153	-0.152	-0.138
	[0.117]	[0.115]	[0.0950]*	[0.0945]	[0.0924]	[0.0778]*
Observations	83,907	83,907	83,907	83,907	83,907	83,907
R^2	0.215	0.216	0.224	0.207	0.207	0.212

Notes: IV estimations. The instrumental variable is the logarithm of the arrival cost of labor inspectors to firms. All models include province, sector and year fixed effects, and province oil prices. Model (1) controls for individual characteristics (age and age squared, indicator variables for the educational level, an indicator variable of civil status, number of children under 14 years of age at home, and indicator variables for the size of the firm where each person is employed), the logarithm of the social per capita expenditure in each province and year, the primary result as a percentage of total incomes in each province and year, and the percentage of absenteeism in provincial elections. Column (2) adds the logarithm of the population, the logarithm of household per capita income, the unsatisfied basic needs poverty indicator, and the logarithm of building permits per capita in each province and year. Column (3) adds province trends. Standard errors clustered at the province-sector level in brackets. *** significant at 1%, ** significant at 5%, * significant at 10%.

Table 8

Robustness tests 1

Enforcement of labor market regulations and hourly wages

Dependent variable:	Panel a Log(hourly wages)			Panel b 10th percentile of log(wage) distribution		
	IV (1)	IV (2)	IV (3)	IV (1)	IV (2)	IV (3)
Men						
Log(enforcement measure)	0.0512	0.0512	0.0503	0.108	0.108	0.107
	[0.0380]	[0.0380]	[0.0378]	[0.0665]	[0.0660]	[0.0660]
Observations	148,166	148,166	148,166	148,166	148,166	148,166
R^2	0.361	0.361	0.361	0.847	0.847	0.852
Women						
Log(enforcement measure)	-0.245	-0.241	-0.216	-0.556	-0.550	-0.497
	[0.156]	[0.150]	[0.125]*	[0.399]	[0.388]	[0.327]
Observations	83,907	83,907	83,907	83,907	83,907	83,907
R^2	0.349	0.351	0.357	0.580	0.592	0.649

Dependent variable:	Panel c 50th percentile of log(wage) distribution			Panel d 90th percentile of log(wage) distribution		
	IV (1)	IV (2)	IV (3)	IV (1)	IV (2)	IV (3)
Men						
Log(enforcement measure)	0.0345	0.0340	0.0326	-0.0269	-0.0237	-0.0242
	[0.0590]	[0.0587]	[0.0587]	[0.0600]	[0.0587]	[0.0584]
Observations	148,166	148,166	148,166	148,166	148,166	148,166
R^2	0.906	0.907	0.909	0.860	0.865	0.866
Women						
Log(enforcement measure)	-0.271	-0.267	-0.238	-0.256	-0.250	-0.229
	[0.216]	[0.209]	[0.177]	[0.204]	[0.195]	[0.168]
Observations	83,907	83,907	83,907	83,907	83,907	83,907
R^2	0.759	0.770	0.798	0.602	0.628	0.659

Notes: IV estimations. The instrumental variable is the logarithm of the arrival cost of labor inspectors to firms. All models include province, sector and year fixed effects, and province oil prices. Model (1) controls for individual characteristics (age and age squared, indicator variables for the educational level, an indicator variable of civil status, number of children under 14 years of age at home, and indicator variables for the size of the firm where each person is employed), the logarithm of the social per capita expenditure in each province and year, the primary result as a percentage of total incomes in each province and year, and the percentage of absenteeism in provincial elections. Column (2) adds the logarithm of the population, the logarithm of household per capita income, the unsatisfied basic needs poverty indicator, and the logarithm of building permits per capita in each province and year. Column (3) adds province trends. Standard errors clustered at the province-sector level in brackets. *** significant at 1%, ** significant at 5%, * significant at 10%.

Table 9

Robustness tests 1

Enforcement of labor market regulations and the shares of wage and self-employment

Dependent variable:	Panel a: =1 if employed as salaried worker			Panel b: =1 if self-employed		
	IV (1)	IV (2)	IV (3)	IV (1)	IV (2)	IV (3)
Men						
Log(enforcement measure)	0.0915	0.0915	0.0913	-0.0728	-0.0728	-0.0722
	[0.0404]**	[0.0397]**	[0.0394]**	[0.0394]*	[0.0387]*	[0.0383]*
Observations	305,449	305,449	305,449	305,452	305,452	305,452
R^2	0.134	0.134	0.134	0.104	0.104	0.105
Women						
Log(enforcement measure)	-0.0190	-0.0184	-0.0194	0.0255	0.0249	0.0250
	[0.0892]	[0.0884]	[0.0877]	[0.0731]	[0.0724]	[0.0717]
Observations	173,846	173,846	173,846	173,846	173,846	173,846
R^2	0.150	0.150	0.150	0.110	0.110	0.110

Notes: IV estimations. The instrumental variable is the logarithm of the arrival cost of labor inspectors to firms. All models include province, sector and year fixed effects, and province oil prices. Model (1) controls for individual characteristics (age and age squared, indicator variables for the educational level, an indicator variable of civil status, number of children under 14 years of age at home, and indicator variables for the size of the firm where each person is employed), the logarithm of the social per capita expenditure in each province and year, the primary result as a percentage of total incomes in each province and year, and the percentage of absenteeism in provincial elections. Column (2) adds the logarithm of the population, the logarithm of household per capita income, the unsatisfied basic needs poverty indicator, and the logarithm of building permits per capita in each province and year. Column (3) adds province trends. Standard errors clustered at the province-sector level in brackets. *** significant at 1%, ** significant at 5%, * significant at 10%.

Table 10

Robustness tests 2

Enforcement of labor market regulations and compliance with mandated benefits

Dependent variable:	Panel a			Panel b		
	=1 if social security benefits			=1 if employment benefits		
	IV	IV	IV	IV	IV	IV
	(1)	(2)	(3)	(1)	(2)	(3)
Men						
Log(enforcement measure)	0.103	0.103	0.103	0.0663	0.0650	0.0647
	[0.0346]***	[0.0344]***	[0.0342]***	[0.0262]**	[0.0254]**	[0.0253]**
Observations	148,166	148,166	148,166	148,166	148,166	148,166
R^2	0.276	0.276	0.277	0.163	0.164	0.164
Women						
Log(enforcement measure)	-0.188	-0.185	-0.185	-0.155	-0.155	-0.155
	[0.120]	[0.117]	[0.116]	[0.0967]	[0.0952]	[0.0952]
Observations	83,907	83,907	83,907	83,907	83,907	83,907
R^2	0.214	0.216	0.217	0.206	0.207	0.207

Notes: IV estimations. The instrumental variable is the logarithm of the arrival cost of labor inspectors to firms. All models include province, sector and year fixed effects, and the province and sector regularization rates. Model (1) controls for individual characteristics (age and age squared, indicator variables for the educational level, an indicator variable of civil status, number of children under 14 years of age at home, and indicator variables for the size of the firm where each person is employed), the logarithm of the social per capita expenditure in each province and year, the primary result as a percentage of total incomes in each province and year, and the percentage of absenteeism in provincial elections. Column (2) adds the logarithm of the population, the logarithm of household per capita income, the unsatisfied basic needs poverty indicator, and the logarithm of building permits per capita in each province and year. Column (3) adds province trends. Standard errors clustered at the province-sector level in brackets. *** significant at 1%, ** significant at 5%, * significant at 10%.

Table 11

Robustness tests 2

Enforcement of labor market regulations and hourly wages

Dependent variable:	Panel a: Log(hourly wages)			Panel b: 10th percentile of log(wage) distribution		
	IV (1)	IV (2)	IV (3)	IV (1)	IV (2)	IV (3)
Men						
Log(enforcement measure)	0.0499	0.0512	0.0503	0.108	0.108	0.106
	[0.0381]	[0.0380]	[0.0378]	[0.0665]	[0.0659]	[0.0659]
Observations	148,166	148,166	148,166	148,166	148,166	148,166
R^2	0.361	0.361	0.361	0.847	0.847	0.852
Women						
Log(enforcement measure)	-0.249	-0.244	-0.245	-0.560	-0.553	-0.552
	[0.159]	[0.153]	[0.153]	[0.406]	[0.395]	[0.393]
Observations	83,907	83,907	83,907	83,907	83,907	83,907
R^2	0.348	0.350	0.351	0.576	0.590	0.601

Dependent variable:	Panel c: 50th percentile of log(wage) distribution			Panel d: 90th percentile of log(wage) distribution		
	IV (1)	IV (2)	IV (3)	IV (1)	IV (2)	IV (3)
Men						
Log(enforcement measure)	0.0347	0.0339	0.0325	-0.0263	-0.0235	-0.0239
	[0.0587]	[0.0585]	[0.0586]	[0.0595]	[0.0585]	[0.0582]
Observations	148,166	148,166	148,166	148,166	148,166	148,166
R^2	0.906	0.907	0.909	0.861	0.865	0.866
Women						
Log(enforcement measure)	-0.275	-0.270	-0.271	-0.259	-0.252	-0.254
	[0.220]	[0.213]	[0.213]	[0.207]	[0.199]	[0.199]
Observations	83,907	83,907	83,907	83,907	83,907	83,907
R^2	0.756	0.767	0.769	0.600	0.625	0.629

Notes: IV estimations. The instrumental variable is the logarithm of the arrival cost of labor inspectors to firms. All models include province, sector and year fixed effects, and the province and sector regularization rates. Model (1) controls for individual characteristics (age and age squared, indicator variables for the educational level, an indicator variable of civil status, number of children under 14 years of age at home, and indicator variables for the size of the firm where each person is employed), the logarithm of the social per capita expenditure in each province and year, the primary result as a percentage of total incomes in each province and year, and the percentage of absenteeism in provincial elections. Column (2) adds the logarithm of the population, the logarithm of household per capita income, the unsatisfied basic needs poverty indicator, and the logarithm of building permits per capita in each province and year. Column (3) adds province trends. Standard errors clustered at the province-sector level in brackets. *** significant at 1%, ** significant at 5%, * significant at 10%.

Table 12

Robustness tests 2

Enforcement of labor market regulations and the shares of wage and self-employment

Dependent variable:	Panel a			Panel b		
	=1 if employed as salaried worker			=1 if self-employed		
	IV	IV	IV	IV	IV	IV
	(1)	(2)	(3)	(1)	(2)	(3)
Men						
Log(enforcement measure)	0.0916	0.0919	0.0916	-0.0726	-0.0725	-0.0719
	[0.0404]**	[0.0399]**	[0.0396]**	[0.0393]*	[0.0388]*	[0.0384]*
Observations	305,449	305,449	305,449	305,449	305,449	305,449
R^2	0.134	0.134	0.134	0.105	0.105	0.105
Women						
Log(enforcement measure)	-0.0205	-0.0194	-0.0192	0.0265	0.0256	0.0253
	[0.0909]	[0.0896]	[0.0890]	[0.0744]	[0.0734]	[0.0729]
Observations	173,846	173,846	173,846	173,846	173,846	173,846
R^2	0.150	0.150	0.150	0.110	0.110	0.111

Notes: IV estimations. The instrumental variable is the logarithm of the arrival cost of labor inspectors to firms. All models include province, sector and year fixed effects, and the province and sector regularization rates. Model (1) controls for individual characteristics (age and age squared, indicator variables for the educational level, an indicator variable of civil status, number of children under 14 years of age at home, and indicator variables for the size of the firm where each person is employed), the logarithm of the social per capita expenditure in each province and year, the primary result as a percentage of total incomes in each province and year, and the percentage of absenteeism in provincial elections. Column (2) adds the logarithm of the population, the logarithm of household per capita income, the unsatisfied basic needs poverty indicator, and the logarithm of building permits per capita in each province and year. Column (3) adds province trends. Standard errors clustered at the province-sector level in brackets. *** significant at 1%, ** significant at 5%, * significant at 10%.

Table 13

Robustness tests 3

Enforcement of labor market regulations and compliance with mandated benefits

Dependent variable:	Panel a			Panel b		
	=1 if social security benefits			=1 if employment benefits		
	IV	IV	IV	IV	IV	IV
	(1)	(2)	(3)	(1)	(2)	(3)
Men						
Log(enforcement measure)	0.118	0.118	0.117	0.0838	0.0837	0.0837
	[0.0407]***	[0.0409]***	[0.0408]***	[0.0299]***	[0.0300]***	[0.0300]***
Observations	148,166	148,166	148,166	148,166	148,166	148,166
R^2	0.273	0.272	0.274	0.160	0.160	0.161
Women						
Log(enforcement measure)	-0.101	-0.101	-0.0949	-0.0772	-0.0759	-0.0713
	[0.0479]**	[0.0472]**	[0.0442]**	[0.0401]*	[0.0391]*	[0.0366]*
Observations	83,907	83,907	83,907	83,907	83,907	83,907
R^2	0.241	0.242	0.243	0.224	0.225	0.225

Notes: IV estimations. The instrumental variable is the logarithm of the arrival cost of labor inspectors to firms corrected by the number of delegaciones regionales in each province. All models include province, sector and year fixed effects. Model (1) controls for individual characteristics (age and age squared, indicator variables for the educational level, an indicator variable of civil status, number of children under 14 years of age at home, and indicator variables for the size of the firm where each person is employed), the logarithm of the social per capita expenditure in each province and year, the primary result as a percentage of total incomes in each province and year, and the percentage of absenteeism in provincial elections. Column (2) adds the logarithm of the population, the logarithm of household per capita income, the unsatisfied basic needs poverty indicator, and the logarithm of building permits per capita in each province and year. Column (3) adds province trends. Standard errors clustered at the province-sector level in brackets. *** significant at 1%, ** significant at 5%, * significant at 10%.

Table 14

Robustness tests 3

Enforcement of labor market regulations and hourly wages

Dependent variable:	Panel a: Log(hourly wages)			Panel b: 10th percentile of log(wage) distribution		
	IV (1)	IV (2)	IV (3)	IV (1)	IV (2)	IV (3)
Men						
Log(enforcement measure)	0.0603	0.0604	0.0597	0.179	0.180	0.178
	[0.0372]	[0.0372]	[0.0372]	[0.0633]***	[0.0633]***	[0.0634]***
Observations	148,166	148,166	148,166	148,166	148,166	148,166
R^2	0.360	0.360	0.361	0.808	0.808	0.815
Women						
Log(enforcement measure)	-0.122	-0.120	-0.112	-0.281	-0.279	-0.262
	[0.0683]*	[0.0668]*	[0.0619]*	[0.157]*	[0.154]*	[0.143]*
Observations	83,907	83,907	83,907	83,907	83,907	83,907
R^2	0.372	0.373	0.374	0.794	0.797	0.808

Dependent variable:	Panel c: 50th percentile of log(wage) distribution			Panel d: 90th percentile of log(wage) distribution		
	IV (1)	IV (2)	IV (3)	IV (1)	IV (2)	IV (3)
Men						
Log(enforcement measure)	0.0646	0.0659	0.0645	-0.00708	-0.00603	-0.00604
	[0.0494]	[0.0492]	[0.0494]	[0.0493]	[0.0492]	[0.0490]
Observations	148,166	148,166	148,166	148,166	148,166	148,166
R^2	0.899	0.899	0.902	0.864	0.867	0.869
Women						
Log(enforcement measure)	-0.0736	-0.0714	-0.0653	-0.0797	-0.0761	-0.0738
	[0.0865]	[0.0848]	[0.0800]	[0.0824]	[0.0802]	[0.0691]
Observations	83,907	83,907	83,907	83,907	83,907	83,907
R^2	0.892	0.894	0.897	0.777	0.787	0.790

Notes: IV estimations. The instrumental variable is the logarithm of the arrival cost of labor inspectors to firms corrected by the number of delegaciones regionales in each province. All models include province, sector and year fixed effects. Model (1) controls for individual characteristics (age and age squared, indicator variables for the educational level, an indicator variable of civil status, number of children under 14 years of age at home, and indicator variables for the size of the firm where each person is employed), the logarithm of the social per capita expenditure in each province and year, the primary result as a percentage of total incomes in each province and year, and the percentage of absenteeism in provincial elections. Column (2) adds the logarithm of the population, the logarithm of household per capita income, the unsatisfied basic needs poverty indicator, and the logarithm of building permits per capita in each province and year. Column (3) adds province trends. Standard errors clustered at the province-sector level in brackets. *** significant at 1%, ** significant at 5%, * significant at 10%.

Table 15

Robustness tests 3

Enforcement of labor market regulations and the shares of wage and self-employment

Dependent variable:	Panel a			Panel b		
	=1 if employed as salaried worker			=1 if self-employed		
	IV	IV	IV	IV	IV	IV
	(1)	(2)	(3)	(1)	(2)	(3)
Men						
Log(enforcement measure)	0.142	0.142	0.141	-0.120	-0.120	-0.119
	[0.0562]**	[0.0562]**	[0.0558]**	[0.0534]**	[0.0534]**	[0.0530]**
Observations	305,449	305,449	305,449	305,449	305,449	305,449
R^2	0.119	0.119	0.120	0.091	0.090	0.092
Women						
Log(enforcement measure)	0.0709	0.0703	0.0700	-0.0544	-0.0540	-0.0539
	[0.0552]	[0.0553]	[0.0552]	[0.0482]	[0.0483]	[0.0483]
Observations	173,846	173,846	173,846	173,846	173,846	173,846
R^2	0.148	0.148	0.149	0.110	0.110	0.110

Notes: IV estimations. The instrumental variable is the logarithm of the arrival cost of labor inspectors to firms corrected by the number of delegaciones regionales in each province. All models include province, sector and year fixed effects. Model (1) controls for individual characteristics (age and age squared, indicator variables for the educational level, an indicator variable of civil status, number of children under 14 years of age at home, and indicator variables for the size of the firm where each person is employed), the logarithm of the social per capita expenditure in each province and year, the primary result as a percentage of total incomes in each province and year, and the percentage of absenteeism in provincial elections. Column (2) adds the logarithm of the population, the logarithm of household per capita income, the unsatisfied basic needs poverty indicator, and the logarithm of building permits per capita in each province and year. Column (3) adds province trends. Standard errors clustered at the province-sector level in brackets. *** significant at 1%, ** significant at 5%, * significant at 10%.

Table 16

Robustness tests 4

Enforcement of labor market regulations and compliance with mandated benefits

Dependent variable:	Panel a			Panel b		
	=1 if social security benefits			=1 if employment benefits		
	IV	IV	IV	IV	IV	IV
	(1)	(2)	(3)	(1)	(2)	(3)
Men						
Log(enforcement measure)	0.0404	0.0328	0.0332	0.0348	0.0301	0.0293
	[0.0197]**	[0.0190]*	[0.0191]*	[0.0169]**	[0.0151]**	[0.0147]**
Observations	148,166	148,166	148,166	148,166	148,166	148,166
R^2	0.286	0.286	0.287	0.167	0.168	0.168
Women						
Log(enforcement measure)	-0.331	-0.292	-0.286	-0.321	-0.277	-0.276
	[0.299]	[0.243]	[0.238]	[0.294]	[0.231]	[0.227]
Observations	83,906	83,906	83,906	83,906	83,906	83,906
R^2	0.140	0.171	0.178	0.134	0.165	0.168

Notes: IV estimations. The instrumental variable is the logarithm of the arrival cost of labor inspectors to firms. All models include province, sector and year fixed effects, and the interaction between province development variables and the employment share of each sector in each province and year. Model (1) controls for individual characteristics (age and age squared, indicator variables for the educational level, an indicator variable of civil status, number of children under 14 years of age at home, and indicator variables for the size of the firm where each person is employed), the logarithm of the social per capita expenditure in each province and year, the primary result as a percentage of total incomes in each province and year, and the percentage of absenteeism in provincial elections. Column (2) adds the logarithm of the population, the logarithm of household per capita income, the unsatisfied basic needs poverty indicator, and the logarithm of building permits per capita in each province and year. Column (3) adds province trends. Standard errors clustered at the province-sector level in brackets. *** significant at 1%, ** significant at 5%, * significant at 10%.

Table 17

Robustness tests 4

Enforcement of labor market regulations and hourly wages

Dependent variable:	Panel a: Log(hourly wages)			Panel b: 10th percentile of log(wage) distribution		
	IV (1)	IV (2)	IV (3)	IV (1)	IV (2)	IV (3)
Men						
Log(enforcement measure)	-0.0442	-0.0346	-0.0343	0.0342	0.0460	0.0442
	[0.0485]	[0.0415]	[0.0411]	[0.0317]	[0.0285]	[0.0279]
Observations	148,166	148,166	148,166	148,166	148,166	148,166
R^2	0.361	0.362	0.362	0.888	0.888	0.892
Women						
Log(enforcement measure)	-0.545	-0.463	-0.453	-0.949	-0.762	-0.743
	[0.501]	[0.379]	[0.368]	[0.845]	[0.615]	[0.598]
Observations	83,906	83,906	83,906	83,906	83,906	83,906
R^2	0.242	0.290	0.298	0.126	0.445	0.489

Dependent variable:	Panel c: 50th percentile of log(wage) distribution			Panel d: 90th percentile of log(wage) distribution		
	IV (1)	IV (2)	IV (3)	IV (1)	IV (2)	IV (3)
Men						
Log(enforcement measure)	-0.0391	-0.0308	-0.0326	-0.0813	-0.0632	-0.0650
	[0.0569]	[0.0506]	[0.0510]	[0.0627]	[0.0519]	[0.0523]
Observations	148,166	148,166	148,166	148,166	148,166	148,166
R^2	0.916	0.919	0.920	0.849	0.865	0.866
Women						
Log(enforcement measure)	-0.695	-0.568	-0.559	-0.505	-0.389	-0.380
	[0.647]	[0.479]	[0.469]	[0.498]	[0.354]	[0.346]
Observations	83,906	83,906	83,906	83,906	83,906	83,906
R^2	0.128	0.443	0.477	0.183	0.488	0.518

Notes: IV estimations. The instrumental variable is the logarithm of the arrival cost of labor inspectors to firms. All models include province, sector and year fixed effects, and the interaction between province development variables and the employment share of each sector in each province and year. Model (1) controls for individual characteristics (age and age squared, indicator variables for the educational level, an indicator variable of civil status, number of children under 14 years of age at home, and indicator variables for the size of the firm where each person is employed), the logarithm of the social per capita expenditure in each province and year, the primary result as a percentage of total incomes in each province and year, and the percentage of absenteeism in provincial elections. Column (2) adds the logarithm of the population, the logarithm of household per capita income, the unsatisfied basic needs poverty indicator, and the logarithm of building permits per capita in each province and year. Column (3) adds province trends. Standard errors clustered at the province-sector level in brackets. *** significant at 1%, ** significant at 5%, * significant at 10%.

Table 18

Robustness tests 4

Enforcement of labor market regulations and the shares of wage and self-employment

Dependent variable:	Panel a			Panel b		
	=1 if employed as salaried worker			=1 if self-employed		
	IV	IV	IV	IV	IV	IV
	(1)	(2)	(3)	(1)	(2)	(3)
Men						
Log(enforcement measure)	0.0802	0.0761	0.0761	-0.0738	-0.0704	-0.0698
	[0.0505]	[0.0442]*	[0.0438]*	[0.0524]	[0.0463]	[0.0456]
Observations	305,449	305,449	305,449	305,449	305,449	305,449
R^2	0.138	0.140	0.140	0.107	0.108	0.109
Women						
Log(enforcement measure)	-0.144	-0.0972	-0.0794	0.141	0.0982	0.0805
	[0.147]	[0.108]	[0.0802]	[0.137]	[0.103]	[0.0769]
Observations	173,846	173,846	173,846	173,846	173,846	173,846
R^2	0.129	0.145	0.150	0.085	0.102	0.107

Notes: IV estimations. The instrumental variable is the logarithm of the arrival cost of labor inspectors to firms. All models include province, sector and year fixed effects, and the interaction between province development variables and the employment share of each sector in each province and year. Model (1) controls for individual characteristics (age and age squared, indicator variables for the educational level, an indicator variable of civil status, number of children under 14 years of age at home, and indicator variables for the size of the firm where each person is employed), the logarithm of the social per capita expenditure in each province and year, the primary result as a percentage of total incomes in each province and year, and the percentage of absenteeism in provincial elections. Column (2) adds the logarithm of the population, the logarithm of household per capita income, the unsatisfied basic needs poverty indicator, and the logarithm of building permits per capita in each province and year. Column (3) adds province trends. Standard errors clustered at the province-sector level in brackets. *** significant at 1%, ** significant at 5%, * significant at 10%.

Appendix

Table A1

Enforcement of labor market regulations and compliance with social security regulations one by one

Dependent variable:	Panel a				Panel b			
	=1 if worker receives contributions to the pension system				=1 if worker receives health insurance			
	OLS	IV (1)	IV (2)	IV (3)	OLS	IV (1)	IV (2)	IV (3)
Men								
Log(enforcement measure)	0.0119	0.104	0.104	0.103	0.00962	0.105	0.105	0.104
	[0.00981]	[0.0350]***	[0.0349]***	[0.0346]***	[0.00935]	[0.0347]***	[0.0344]***	[0.0340]***
Observations	148,166	148,166	148,166	148,166	148,166	148,166	148,166	148,166
R^2	0.288	0.278	0.278	0.279	0.289	0.278	0.278	0.279
Women								
Log(enforcement measure)	-0.00599	-0.196	-0.194	-0.193	-0.00794	-0.189	-0.186	-0.186
	[0.0132]	[0.122]	[0.119]	[0.119]	[0.0129]	[0.115]	[0.112]*	[0.112]*
Observations	83,906	83,906	83,906	83,906	83,906	83,906	83,906	83,906
R^2	0.253	0.212	0.213	0.215	0.252	0.214	0.215	0.217

Notes: OLS and IV estimations. The instrumental variable is the logarithm of the arrival cost of labor inspectors to firms. All models include province, sector and year fixed effects. Model (1) controls for individual characteristics (age and age squared, indicator variables for the educational level, an indicator variable of civil status, number of children under 14 years of age at home, and indicator variables for the size of the firm where each person is employed), the logarithm of the social per capita expenditure in each province and year, the primary result as a percentage of total incomes in each province and year, and the percentage of absenteeism in provincial elections. Column (2) adds the logarithm of the population, the logarithm of household per capita income, the unsatisfied basic needs poverty indicator, and the logarithm of building permits per capita in each province and year. Column (3) adds province trends. OLS column shows the result from specification (3). Standard errors clustered at the province-sector level in brackets. *** significant at 1%, ** significant at 5%, * significant at 10%.

Table A2

Enforcement of labor market regulations and compliance with employment regulations one by one

Dependent variable:	Panel a				Panel b			
	=1 if worker receives paid vacation time				=1 if worker earns a wage equal or above the legal minimum			
	OLS	IV (1)	IV (2)	IV (3)	OLS	IV (1)	IV (2)	IV (3)
Men								
Log(enforcement measure)	0.0108	0.0989	0.0992	0.0987	0.0161	0.0661	0.0631	0.0625
	[0.00911]	[0.0355]***	[0.0354]***	[0.0351]***	[0.00562]***	[0.0188]***	[0.0182]***	[0.0181]***
Observations	148,166	148,166	148,166	148,166	148,166	148,166	148,166	148,166
R^2	0.278	0.269	0.269	0.270	0.249	0.245	0.246	0.246
Women								
Log(enforcement measure)	0.000264	-0.182	-0.180	-0.180	0.00883	-0.113	-0.114	-0.115
	[0.0123]	[0.112]	[0.109]*	[0.109]*	[0.00853]	[0.0713]	[0.0701]	[0.0699]
Observations	83,906	83,906	83,906	83,906	83,906	83,906	83,906	83,906
R^2	0.220	0.180	0.181	0.183	0.247	0.230	0.232	0.232

Table A2 (cont.)

Enforcement of labor market regulations and compliance with employment regulations one by one

Dependent variable:	Panel c: =1 if worker receives annual extra monthly wage				Panel d: =1 if worker receives paid sickdays			
	OLS	IV (1)	IV (2)	IV (3)	OLS	IV (1)	IV (2)	IV (3)
Men								
Log(enforcement measure)	0.0112	0.102	0.102	0.102	0.0103	0.108	0.108	0.108
	[0.00962]	[0.0357]***	[0.0355]***	[0.0352]***	[0.00964]	[0.0378]***	[0.0375]***	[0.0371]***
Observations	148,166	148,166	148,166	148,166	148,166	148,166	148,166	148,166
R^2	0.280	0.270	0.270	0.271	0.281	0.270	0.270	0.271
Women								
Log(enforcement measure)	0.00104	-0.192	-0.190	-0.190	-0.00346	-0.196	-0.193	-0.193
	[0.0131]	[0.119]	[0.116]	[0.115]*	[0.0126]	[0.116]*	[0.113]*	[0.113]*
Observations	83,906	83,906	83,906	83,906	83,906	83,906	83,906	83,906
R^2	0.226	0.181	0.183	0.184	0.229	0.184	0.186	0.188

Table A2 (cont.)

Enforcement of labor market regulations and compliance with employment regulations one by one

	Panel e			
Dependent variable:	=1 if worker works not more than the legal maximum of weekly hours			
	OLS	IV (1)	IV (2)	IV (3)
Men				
Log(enforcement measure)	-0.00765	-0.0146	-0.0153	-0.0151
	[0.00744]	[0.0334]	[0.0333]	[0.0332]
Observations	148,166	148,166	148,166	148,166
R^2	0.065	0.064	0.064	0.065
Women				
Log(enforcement measure)	-0.00735	-0.0880	-0.0863	-0.0858
	[0.00582]	[0.0523]*	[0.0504]*	[0.0500]*
Observations	83,906	83,906	83,906	83,906
R^2	0.052	0.038	0.039	0.039

Notes: OLS and IV estimations. The instrumental variable is the logarithm of the arrival cost of labor inspectors to firms. All models include province, sector and year fixed effects. Model (1) controls for individual characteristics (age and age squared, indicator variables for the educational level, an indicator variable of civil status, number of children under 14 years of age at home, and indicator variables for the size of the firm where each person is employed), the logarithm of the social per capita expenditure in each province and year, the primary result as a percentage of total incomes in each province and year, and the percentage of absenteeism in provincial elections. Column (2) adds the logarithm of the population, the logarithm of household per capita income, the unsatisfied basic needs poverty indicator, and the logarithm of building permits per capita in each province and year. Column (3) adds province trends. OLS column shows the result from specification (3). Standard errors clustered at the province-sector level in brackets. *** significant at 1%, ** significant at 5%, * significant at 10%.