On the Interface of Social Security and Tax Cost

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I. Introduction

When deciding to hire a worker formally or informally, is logical to consider both social security costs and tax implications. The employer knows that by paying social security, he benefits from a profit tax deduction equivalent to the tax rate times the labor costs, which would be impossible to obtain with informal hiring. In the specific case of Colombia, very small firms (86% of microbusinesses) are not obliged to pay taxes but if they want to hire workers formally, the payroll contribution involved is 47%. Meanwhile, larger firms are subject to profit taxes and VAT, but if they hire workers formally, paying the 47% contribution, are allowed to deduct all labor costs from the profit tax base (this deduction is valued at 42.5%). Therefore, the after-tax relative cost of hiring a formal worker vs hiring an informal one is only 4.7% for larger firms, ten times lower than in the case of smaller firms as shown in Table 1. In sum, the tax deduction benefits amount to almost the same as the cost of social security, incentivizing formal hiring among profit tax contributors' firms and discouraging them among nontax contributors firms.

Table 1. Relative costs of hiring formally

GROSS INCOME Cop$ millions. Yearly	**Profit tax. τ_Y**	**Social security τ_W**	**Profit tax deduction. $(1+\tau_W)\,\tau_Y$**	**Relative cost of hiring formally: Social security – tax deduction**
< 48	0%	47%	0%	**47%**
> 48	29%	47%	147%*29%=42%	**4.7%**

Despite the logic of this statement, the interface between social security and tax deductions has seldom been considered by the literature, and theoretical models tend to include taxes as a parameter that impacts gross revenues rather than those net of formal labor cost. As this paper shows, considering profit tax deductions has important implications from the point of view of policy recommendations. For example, it creates unequal incentives to hire formally between tax-contributors and tax-exempted firms. Similarly, it implies that any increase in labor costs results in fewer fiscal revenues via higher tax deductions, although the higher informality derived from higher lever cost tends to offset the initial impact.

Another inflexibility often disregarded in general equilibrium models is the minimum wage, even though it limits the pass-through of payroll taxes to wages, causing asymmetries.[3] When payroll taxes decrease, formal wages adjust upwards and absorb some of the impact, but when payroll taxes increase, formal wages cannot freely move downwards and the informal wages paid by formal firms and informality are subject to further adjustments. Therefore, not accounting for these

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[3] An exception is the work of Kugler (2009).

mechanisms can lead to a substantial underestimation of the impacts of an increase on payroll taxes on informality, and informal wages paid by formal firms.

These two features, the asymmetric tax structure and the minimum wage, are important for analyzing labor reforms, particularly the one recently proposed by Colombian authorities. The methodology we used to follow this objective was to simulate the proposed tax reform in a model initially created by Ulyssea (2018) and extended by Fernandez (2023), which we further adapt to the Case of Colombia by including tax deductions, minimum wages, and tax-exempt brackets.

This paper is structured as follows: the second section presents the reform submitted by the Colombian government; the third section, a literature review of the impact of a broader set of policy recommendations; the fourth section, describes the model used to measure the impacts; the fifth section, simulates the proposed reform, comparing the outcomes with those of the opposite policy and with those that would be obtained in a model that do not consider tax deductions and/or minimum wages. The sixth section illustrates the impact of alternative labor reforms, and the seventh section concludes.

II. The recent market labor reform proposed by the Colombian Government, and some estimations of its potential impact on labor costs.

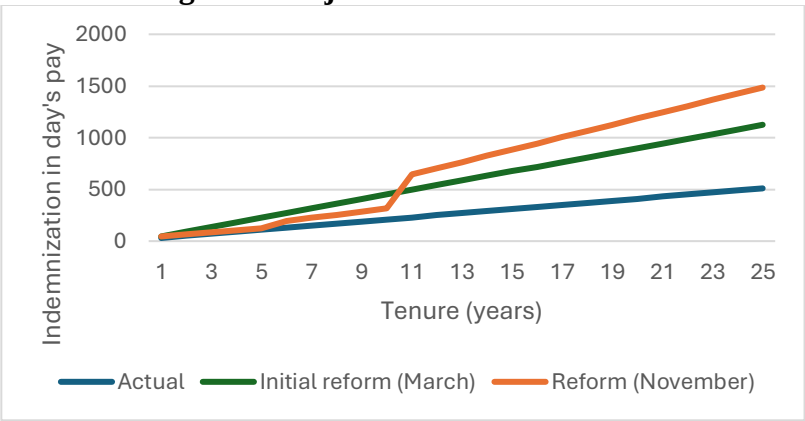
In March 2023, the Colombian government submitted to Congress a labor reform, resubmitted a new version in August, and yet another one in November. Some regulations included in November's reform have been already approved by the House of Representatives in a first debate. The reform will face three more debates. In contrasts to the 2002 labor reform that focused in the flexibilization of the labor market, this 2023 reform is very much focused on increasing the well-being of formal workers. As explained previously, improving worker's benefits and protection can increase consumption and stimulate the economy, but at the same time generates costs that firms must incur to fulfill some of these new requirements. Morales, Bonilla, Flórez, Hermida, Lasso, Morales, and Pulido (2023), and Mejía (2023) estimate the measurable costs of a previous version of this reform from the point of view of firms. The most important changes proposed by the reform, and our preliminary estimations of the costs generated to firms, can be summarized in four groups, as follows:

Job protection. The proposed labor reform increases the burden and costs of dismissals. The goal is to protect workers, but it also makes formal contracts more costly and rigid. In the actual legislation, firms can fire workers arguing justified or unjustified causes, the former is subject to demands and the latter to extra-costs. The cost of an unjustified dismissal for open-ended contracts is equivalent to 30 days' wage after the first year of work, plus 20 days' pay for each additional tenure year. Among fix-term contracts compensations should cover unpaid resources but cannot be lower to 15 days' pay.

The reform sets a minimum unjustified layoff cost of 45 days' pay for all contracts. In open ended contracts, it also sets an incremental extra-cost per year of tenure, reaching up to 60 days' pay for 10 years-tenure, as shown in Figure 1. Dismissals will need to be approved by authorities and unjustified dismissals will not be allowed, for specific sociodemographic groups as union leaders, workers with disabilities, pregnant women, workers with chronic diseases, and workers within less

than 3 years to retirement. There is also a special protection for layoffs caused by automation or by mining and oil companies closures resulting from decarbonization policies.

Figure 2: Unjustified Dismissal Costs



Source: Own calculations based on legislations and submitted reforms.

Preliminary estimates indicate that the increase in layoff costs would increase the unjustified layoff compensation package in 92%, which translates into an increase of 1.2-1.9% in formal workers average wages, depending on the assumed share of unjustified layoffs,[4] and creates a discontinuity that might incentivize dismissals at certain tenures. For example, a worker with 9 years of tenure would obtain a compensation equivalent to 285 days' pay if dismissed without a just cause. The same worker in the same situation, but with 10 years of tenure would obtain 585 day's pay, which could introduce incentives for the firm to dismiss him before this date. Similarly, future hires of protected workers will be severely discouraged by the reform because unjustified dismissals are not allowed.

Worker's benefits: The submitted labor reform also aims at reducing overwork. In Colombia, labor activities performed in excess of the 8 hours workweek, after 9 pm (nocturne), or in holidays and Sundays are subject to extra-charges of 25%, 35% and 75%, respectively. The maximum 48 hours workweek was recently reduced by law to 42 hours in a progressive schedule that will end in 2026. The Government proposal sets already the 42 hours maximum workweek; sets the nocturne extra hours after 7 pm; increases the holiday and Sunday's extra-charges to 100% and limits the nocturne hours per worker to a maximum of 2 per day and 12 per week. The estimated cost of this new regulation is an increase of between 1.9 and 3.8 pp of wages[5]. Other benefits directed to specific groups of the population are quotas on workers with disabilities, flexible jobs schedules for workers that have care responsibilities at home, a minimum work-form-home allowance, and increases on paternity leave benefits.

[4] Bonilla et al (2023) and Mejía (2023) estimated that with the first version of the reform the unjustified layoff compensation package increased in 92% which translates to an increase of between 1.2% and 1.9%. As can be seen in Graph 1, the new version of the reform (orange line) does not increase much the average cost of the reform but creates non-linearities that incentivize arbitrage.

[5] According to Bonilla et al (2023) the cost of providing workers with these extra benefits is equivalent to increases in the payroll of between 2.4 and 4.8 pp This estimative was performed for a previous version of the reform that restricted the nocturnal hours from 9pm to 6pm. The new version sets the nocturnal hours from 7pm, therefore is possible to assume that the extra cost related to the component of nocturnal hours is 66% of the one estimated for the previous reform. The other components remain unchanged.

Labor contracts: One of the main aims of the labor reform is to restore open-ended contracts as the prevalent labor agreement[6]. This is important to increase labor stability but can make formal labor more expensive and inflexible. According to the proposed reform, fix-term labor contracts cannot be offered for permanent activities of the firm, and service contracts are restricted to those jobs not related with the core business of the firm and will require social security payments and vacations. If requirements in any of those types of contracts are not meet, they operate as open-ended contracts. As most service contracts fulfill the no-core-business requirement in Colombia, the estimated impact of this regulation should be low. However, the test of the reform opens the door to lawsuits and uncertainties which impact is difficult to be estimated[7].

Apprentice. One of the strongest impacts of the reform is related to apprenticeship contracts. In the current legislation, firms with more than 15 workers must have one apprentice per 20 workers[8], who are remunerated at the minimum wage or 75% of it if the labor market is tight. The reform sets a minimum wage floor and doubles the number of apprentices, at a ratio of one apprentice per 10 workers, in firms with more than 200 workers. The estimated impact of this regulation is an increase in the labor cost of between 0.43 and 2 pp of wages, depending on the non-observance rate[9].

New hiring agreements. The reform also created new hiring agreements for rural, journalists, telework with foreign companies and digital platforms workers. Digital platforms can choose between hiring workers as dependents or hire them as independent workers and pay 60% of their social security contributions (estimated over 40% of workers' income with no minimum wage requirement) and full workplace risk insurance[10]. With the reform, rural workers also get the possibility of obtaining social security on a daily basis, and microbusiness on a weekly basis, under certain circumstances. These new agreements created for digital platforms, microbusiness, and the rural sector, might have a positive outcome in terms of job satisfaction and formalization and opens the door for future job flexibilization in Colombia.

Outsourcing agreements. Finally, another chapter of the reform sets limits to outsourcing hiring firms. With the reform these firms must be focused in a certain sector, cannot attend permanent labor needs, need to ensure workers the same benefits that get those hired directly by the headquarters, and assumes joint liability of labor costs. Similarly, one of the new requirements is that firms should directly hire workers in “contratos sindicales”, a figure that allowed outsourcing at a lower cost. Morales et al (2023) estimated the cost of banning those “contratos sindicales” in between 0.02% and 0.06% of wages.’

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[6] Colombia has three types of agreements: 1) open ended contracts in which employer pays benefits, vacation, social security contributions, and is liable for possible severance payments. 2) fix term contracts that cannot exceed one year, but can be renewed indefinitely, and 3) service agreements, a figure in which a worker or a firm receives an amount in exchange for a job, without labor benefits and/or workers subordination.

[7] Morales et al. (2023) estimated that the cost of in a previous version of the reform that didn’t allow service contract for permanent jobs generated a cost between 0% and 4.6% of the wage-bill depending on assumptions on the wage arrangement. However, a new version of the reform changed the not permanent requirement for a not core business requirement.

[8] One apprentice for firms with 15 to 20 workers

[9] According to Morales et al (2023), there are 162 thousand apprentices but there should be 437 thousand, a delinquency rate of 62%. After the reform firms should increase the wages of the actual number of apprentices (162 thousand) in 25% of the minimum wage (estimated in 0.24pp of the wage-bill), and on top of that, firms with more than 200 workers should double the number of apprentices, which means a 25% in the total number of apprentices. In sum, the total cost of the reform should be around 0.43 pp if the same delinquency rate is observed, and 2 pp if the legislation in the new reform is fully enforced.

[10] Morales et al (2023) estimated the digital platforms costs of the previous version of the reform in 0.25 of the wage bill but this was assuming that the platforms must pay 100% of the social security cost and taxable income that couldn’t be lower than a minimum wage.

Unions One of the more extensive chapters or the reforms is related to unions. This proposed regulation forbids labor negotiations with groups outside the union and guarantees and facilitates the right of strike. But more important, the reform allows for sectoral unions negotiations, that could oblige small firms to follow propositions agreed upon with large firms, without regarding their considerations.

Fiscal cost: Given that formal payrolls are tax deductible, about 35% of the cost of this increase will fall on the Government, via lower profit taxes. This, by itself, means a fiscal cost of nearly 0.3% of the GDP, and between 3% and 7% of income-tax revenues. Similarly, labor costs for Government workers should also increase.

Heterogeneous impacts. Another important consideration is that small firms tend to be disproportionally hit by the reform. Not only because the percentage of charges over payroll is higher for micro business but also because these firms are too small to pay taxes (income below the income tax threshold COP 50 million) and cannot get the 35% income tax deduction that is earned by larger firms.

Overall impact. The reform is very much oriented towards providing higher protection and benefits to those workers who already have a formal job. This is likely to increase welfare of *those who are able to retain their formal jobs.* However, it also increases firms' labor costs between 2.4 pp and 5.9 pp. (preliminary calculations). Similarly, the reform almost doubles the cost of dismissals, which can be equivalent to increases of between 1.15 pp and 1.94 pp of the payroll (preliminary estimations). Table 5 summarizes these estimations in three scenarios. However, the costs associated with unions benefits and the eventual legal lawsuits due to ambiguities can even be more expensive. Paradoxically the workers that have higher potential for being affected by the reform are those that the reform wants to protect, since the hiring cost increase.

Table 5. Impact of the reform in terms of payroll taxes

	Low	Medium	High
Aprentices	0.42	1.19	1.97
Extra hours	1.92	2.65	3.78
42 hours per week (maximum)	0.7	0.7	0.7
Holidays	0.3	0.5	1.1
Night hours	0.924	1.452	1.98
Sindicate workers	0.02	0.04	0.06
Digital platforms	0.02	0.03	0.04
Increasing in payroll taxes	2.4	3.9	5.8
Dismissal costs	1.15	1.59	1.94
Payroll taxes including dismissals	3.5	5.5	7.8

Source: author's calculations

Most important is that the impact of the reform does not end with firms having higher cost, but it also implies less employment. Therefore, the real cost of the reform can only be estimated along with displacement effects and productivity figures. This is a good reason to use a General Equilibrium Models in measuring the repercussions of the reform.

III. Literature review of policy recommendations oriented towards improving the functioning of the Colombian labor market.

According to the previous section, the reform proposed by the government can be analytically studied through four aspects: payroll taxes, job protection, job flexibility and unions. Below is a literature review of the policy recommendations regarding these aspects. We also include enforcement and other policies oriented towards increase labor and firm formalization, to be able to compare the proposed reform with other kind of reforms oriented towards increase formalization.

Payroll taxes. While on average the literature shows no impacts of payroll taxes on employment, the evidence on the impact on formality is mixed. Antón and Rasteletti (2018) found that reducing payroll taxes had a significant impact on the decision of hiring formally for the case of Mexico. Empirically, Rocha et al (2018) show that halving the tax burden for microentrepreneurs in Brazil induced some formalization, but the effects are small, and the policy reform likely led to tax revenues losses. Meanwhile Chacaltana (2016) founds no impacts on formality of the reduction of the non-wage labor costs of microenterprises in 2003 from 54% to 17% of the salary and a similar regime created for large firms in 2008. Jaramillo, 2013 finds that this lack of impact is due to deficiencies in the monitoring of firms, which highlights the importance of having comprehensive approaches.

The impact evaluations of the labor reforms in Colombia (1990, 2002 and 2012) tend to be mixed in respect to increases on labor costs. The 2002 reform reduced the extra-hours; lowered dismissal costs and corrected some non-linearities; allowed a lesser wage for apprentices but created quotas and created specific programs to promote employment. According to Gaviria (2002), the reform increased the number of apprentices (although the reason is difficult to track) and reduced underemployment based on insufficient working hours but the impacts on employment and formalization were scarce[11]. Similarly, García and Guataquí (2009) found that the reform increased working hours rather employment. On the other hand, Núñez (2005) argued that the 2002 reform increased the duration of employment and reduced the duration of unemployment, since the probability of finding a job increased. Likewise, according to Amarante, Arim and Santamaria (2005), the 2002 labor reform had positive impacts on the probability to find a job, reduced the average hours worked per worker and disincentivized informal jobs.

The reduction of payroll contributions paid by the employer from 29.5% to 16% in Colombia, is one of the most studied. Results include 1.9% higher formal salaries and average increases in the formality rate on 4.14%. (Kugler and Kugler, 2017, Morales and Medina (2017), Herrera-Prada, 2017, Bernal et al. 2017, Fernández and Villar 2017, Antón 2014 and Garlati and Bertorli 2020). Morales et al (2023) estimate the impact of the labor reform proposed in March 2023 by estimating the cost of regulation on a payroll equivalent and using the average impact on formal employment found in the literature. According to the authors, an increase in 6.73 pp in payroll taxes (medium scenario of the increases of firm's cost generated by the reform) would reduce the formality rate in 2pp and therefore, cause a loss of approximately 454 thousand jobs. Preliminary estimates that

[11] Gaviria used as control groups manufacture and small firms, under the assumption that those were less affected of the reform. However, given that large firms get a tax deduction and labor costs, in contrast with small firms, this is not necessarily the case.

apply the same procedure to the new version of the reform presented on November, dictate that an increase in 4 pp (the medium range of an estimation of the increase in firms cost – minimum of 2.4pp and maximum of 6.9pp- the exclude the impact of the increase in dismissal costs) would imply a reduction of the formality rate in 1.2 pp and a loss of 265 thousand jobs (a range of between 295 and 400 jobs).

The impacts estimated from general equilibrium models are also less encouraging. Ulyssea (2018) shows that lower payroll taxes translate into higher wages but not higher formalization and produce substantial tax revenues losses. Fernández (2023) found similar results for the case of Colombia, but with informality reductions concentrated on small firms. In fact, changes in payroll taxes tend to hurt more small firms that are not obliged to pay taxes and therefore, do cannot use the labor costs tax deduction on profit taxes to mitigate increases in payroll taxes. For the same reason the impact of reducing payroll taxes is comparable to a flat profit tax policy, since it creates tax-incentives for small firms to hire workers formally.

Whereas the previous evidence is estimated in regard a reduction of payroll taxes it is not clear that it can be directly apply to the case when payroll taxes are increased. As stated by Kugler, Kugler and Herrera (2017) "it is not feasible to pass-through higher payroll taxes to employees as lower wages, so it is more likely that increases in payroll taxes reduce formal employment". Kugler (2009) is one of the few articles that analyzes increasing in payroll taxes episodies, finding that a 10% increase in payroll taxes reducing fornal employment in manufacturing by 5%

Job protection. To the extent that firing costs can be interpreted as fixed entry costs to firms, Heckman and Pages (2000), and Ulyssea (2010) show that reducing those could lead to formalization and better aggregate outcomes, which is similar in spirit to the counterfactual results in Ulyssea (2018), and other papers in the literature (see Ulyssea, 2020 for a review). For the case of Colombia, Fernández (2023) found that a reduction on entry cost incentivize formalization of small firms, but this do not have much impact on labor formalization or tax revenues, since most of this small firms are tax-exempted and do not have incentives to hire their workers formally.
However, for the case of Colombia, Kugler (2003), found that a decline in job security, and particularly the de-regulation of temporary contracts- leaded to a reduction in both employment and unemployment duration, but also to a decline in unemployment rates. Similarly in a panel of countries that includes, Colombia, Heckman and Pagés (2002) found that an increase of 1% in the dismissals cost causes a long run a reduction of 0.05% in the occupation rate, although the results for Latin America were not as strong as in the case of the OECD countries. Applying this elasticity to the dismissal cost, in a preliminary version, the 92% increase in the dismissal cost would imply a reduction of 2.6pp in the long run occupation rate, but as noted before long tenure workers would be disproportionally affected.

Job flexibility. A recent paper by Carry (2023) examines the direct effect of the introduction of minimum workweek of 24 hours in France in 2014, affecting 15% of jobs. The paper shows that the reform increased total hours worked by 1% due to positive general equilibrium effects, but concentrated hours among fewer workers as unemployment rose by 2%. Even though the reform intended to benefit potentially more vulnerable workers by reducing involuntary part-time work, it increased gender inequality. Relatedly, we now have evidence that regulatory rigidity in the formal sector may be one of the drivers of higher informality among women. Berniell et al (2021)

found that women in Chile show a 38% increase in informal employment after their first birth, while men are unaffected. This could be motivated by the fact that women cannot work part-time in the formal sector. The same type of evidence emerges from Brazil (Britto et al, 2023). In the case of Colombia, a 2014 reform implemented a policy that allowed, for the first time, to make social security contributions based in weekly labor hours.

Morales and Otero (2021) found that a 2014 reform in Colombia increased the probability of enter the formal sector within the target population (low-wage, part-time workers). Similarly, after the reform, the number of formal workers increased in 6% among firms that use new contracts relative to the firms that do not hire low-wage, formal, part-time workers under the new tax form. However, daily wages declined temporarily after the reform.

Unions. Card (1992) estimates that unions have an impact of 30% in the union wage gap for lower wage workers and 10% for higher wage workers and that changes in the level and pattern of unionism. Particularly the decline of unions among lower wage workers have been an important component of the growth in wage inequality. Changes in unionization account for one-fifth of the increase of the variance of adult male wages between 1973 and 1987. Overall, we have limited evidence on the effects of unions on formalization and overall labor market performance in developing countries.

Minimum wages. Conditional on employment, higher minimum wages increase earnings of low skill workers and can have positive aggregate effects if these workers respond by increasing their consumption. However, minimum wages set substantially above workers' productivity can lead to lower demand for formal workers because existing formal firms can downsize or switch some of their employees to informal contracts, because it can discourage entry into the formal sector altogether or induce higher exit of formal incumbents.

Using a difference in differences design, Card (1992) found no decrease in teenagers employment after an increase in the US-Federal minimum wage, Card and Krueger (1994) found similar results with an increase in fast-food minimum wage in New Jersey. However, Neumark Wascher (2000) found the opposite results using administrative records. Meta-analysis literature also finds mixed results: While Neumark and Wascher (2006) found negative effects of minimum wages over employment for the US, particularly among the low-skilled, De Linde Leonard, Stanley and Doucouliagos (2014) found no effects in the case if the UK.

Similarly in developing countries, Andalon and Pagés (2008) found negative impacts of the minimum wage legislation on formal employment as well as an increase in informality in Kenya and Maloney (2004) in a meta-analysis found that the minimum wage has impacts both in the higher reaches of the formal distribution and in the informal labor markets that magnify its distortionary effects beyond what was previously thought; but Lemos (2009) and Millea et al. (2017) found no results in Brazil and South Africa, respectively. In the case of Colombia, Arango, Flores and Guerrero (2020) found that an increase of one percentage point (pp) in the ratio of the minimum wage increases the probability of having an informal job by 0.21 pp. This effect is greater in cities with higher informality rates and consequently with lower labor productivity of less educated workers. Finally, Maloney (2004) found an elasticity of employment with respect to minimum wage of 0.15pp.

A rapidly growing literature has emphasized the role of market structure, and in particular the fact that market power in labor markets could justify the existence of minimum wages, as it would reduce wage markdowns without any (or limited) effect on employment. This literature has largely focused on developed economies, but recent studies suggest that there is significant local labor market power in developing countries as well (Amodio, Medina and Morlacco, 2023; Sharma, 2023; Felix, 2023), which could imply limited employment effects from the minimum wage. Nevertheless, results remain mixed even in this new strand of literature. Engbom and Moser (2022) find that the substantial minimum wage increases in Brazil led to a substantial reduction in wage inequality in the formal sector without any disemployment effects. However, Haanwinckel and Soares (2021) argue that informality would have declined more without the minimum wage increase. Along the same lines, Parente (2022) provides evidence that the minimum wage leads to higher wage inequality in the informal sector, which by its turn increases overall inequality in Brazil. The model counterfactuals further show that the increase in wage inequality caused by the minimum wage comes mostly from a substantial increase in informality.

Enforcement. Enforcement can ensure that the laws that protect workers are effectively applied, and therefore improve the labor conditions of those that already have a formal job. It can also impact the number of formal jobs, since more firms and workers are forced to formalize. However, it can also have negative impact in the number of firms and workers that participate in the market. One of the most known examples is the case of South Africa where a high enforcement is associated with a low rate of informality but a high rate of unemployment (Fernández, Lilenstein, Ooosthusien and Villar (2017).

The results both from reduced-form studies and structural models suggest that enforcement is very effective in reducing informality but can have substantial unintended consequences. Andrade et al. (2016) - who randomly assign municipal inspectors to firms in the state of Minas Gerais, Brazil - show that the impact of receiving an additional inspector visit is quite high, with an effect of 21-27 percentage points in firms' registration. Bujanda and de la Parra (2020) use random work-site inspections by the Ministry of Labour in Mexico to analyze the effects of increasing the cost for formal firms of hiring informal workers. The authors find a 7-percentage point increase in the quarterly probability of being formalized by their employer for informal workers in establishments that were inspected. However, they also that quarterly transitions from inspected establishments to unemployment increase from 2.9% to 4.1%. At the firm level, they document a negative and significant effect on total formal employment. On a different dimensions Bosch, Fernández and Villa (2015) analyze a program that reminds microentrepreneurs to fulfill their social security obligations and find an impact of 15% increase in payments and a 7 p.p. in the compliance rate. However, this increase is concentrated around the month the booklet was delivered and disappears three months after the intervention.

Finally, Ulyssea (2018) counterfactual simulations show that higher enforcement substantially reduces informality, but at the cost of displacing a lot of low-productivity informal firms. Dix-Carneiro et al. (2023) show that, despite increasing unemployment, higher enforcement leads to lower informality and higher welfare in equilibrium.

Correcting wrong incentives of social policies. The design of social policy can unintentionally generate incentives for informality. Garganta and Gasparini (2015) found that monetary transfers to households with dependent and/or disabled minor children in Argentina, decreased formalization by 7.4 percentage points. De Holanda Barbosa (2014) and Leite et al (2014), found that Bolsa Familia in Brazil did not affect the distribution of employed people between formal and informal work, but De Brauw (2014) finds a negative effect on the labor supply of rural women. In the case of Mexico, Barros (2009) and Gallardo (2006) found that Seguro Popular did not affect labor force participation or the transition of formal workers to the informal sector. Maybe this finding is due to low valuation to Seguro Popular's Benefits (Conti et al. 2018). In the case of subsidized health programs, the effect may be more difficult to identify if workers do not internalize or value this benefit. In the case of Colombia, Farné (2016) found that the subsidized health regime, which offers the same services as the contributory regime, increases the probability of informality by about 20 percentage points.

Firm formalization. Usually, firm formalization and labor formalization follow in the same direction. This is particularly true in cases where the firm formalization is done through single tax schemes, that include labor formalization facilities. The most successful cases in are probably Brazil and Uruguay stand out. Alaimo and others (2015) found that this regime contributed to the formalization of almost half a million microenterprises and two million jobs between 2000 and 2005 in the case of Brazil. Llambí and others (2014) considered that the simplified regime encouraged investments by microentrepreneurs and led to an increase between 10% and 35% in formal employment, According to Amarante and Perazzo (2013), the Uruguayan monotributo increased the number of contributing self-employed workers from 6% to 23% between 2006 and 2010. However, this is not always the case. When firm formalization is performed through higher business enforcement it can lead to higher labor informality, since small firms prefer to lose any contact with authorities and hire all their workers informality (Ulyssea, 2018).

Increases in education/ productivity. The results in Haanwinckel and Soares (2021) and Parente (2022) clearly show that policies that improve the skill composition of the labor force – such as educational policies – have a substantial positive impact on formalization and workers' welfare.

Information systems / Easy of enrollment. There is an extensive literature that empirically examines the effects of reducing registration costs on firm formalization. These reforms take different forms and shapes, but typically involve providing information about the formalization process and (but not always) covering all the monetary costs of registering the business. The message that comes from this literature is very clear, which is that these reforms alone do not produce any effects on formalization (Ulyssea, 2020). Put differently, reducing or eliminating registration costs might be a necessary condition to fostering formalization, but it is certainly not a sufficient condition.

Concerning the improvement in information systems to accelerate frictional unemployment in the case of Colombia, Morales, Ospino and Amaral (2021), after estimated a Beveridge curve, find that those segments of the labor market with higher vacancies published online show a 15% lower vacancy rate.

IV. Methodology

General Equilibrium Models are an adequate instrument to measure the impact of labor policies because of the indirect costs involved. These models can be macro or micro-oriented, and focused on workers or firms. The best model to measure those impacts is probably a microeconomic model, given that most of the decisions are taken at the firm level. It is also very important to use a methodology that recognizes the most important characteristics of the Colombian labor market as a high level of informality, binding minimal wages, and asymmetrical taxes.

One of the models that best understands informality in Latin America is Ulyssea (2018). According to this model, there are some firms too unproductive to be formal, others that could operate formally but prefer to be informal because is more profitable, and a third group of firms that find it more profitable to be formal. In turn, formal firms can opt to hire workers formally or informally, based on a cost-benefit analysis. Both decisions consider the taxes and contributions implied by formality, and the cost of being informal resulting from enforcement policies pursued by authorities. This model was calibrated for the case of Brazil and replicates very closely the firm and labor distributions, disaggregated by informality and skill level.

The model can be described as follows: Formal (s=f) and informal (s=i) firms face the same prices and production function. The later uses a Cobb-Douglas specification, with a productivity parameter (θ) and decreasing returns (α<1), whereas labor is a CES's mix of skilled and unskilled labor (ν=1 or ν=2) with a elasticity of substitution $\left(\frac{1}{\rho}\right)$. Output ($y_s$) is subject to taxes (profit tax (τ_y) and VAT(τ_{vat})) if the gross income is above the respective thresholds (T_{ty} and T_{tvat}) and if the firm decides to follow the formal path.

$y_s(\theta) = (1- \tau_y - \tau_{VAT})\theta {l_s}^{\alpha}$ s.t. $l_s = \left(\eta_s l_v^{\rho} + (1 - \eta_s) l_v^{\rho}\right)^{\frac{1}{\rho}}$ with *s=i,f* and *v=1,2*

τ_y=0 if $\theta ls^{\alpha} < T_{ty}$ *or s=i and* τ_{vat}=0 if $\theta ls^{\alpha} < T_{tvat}$ *or s=i*

Formal firms pay taxes if they are above the tax threshold, and social security for those workers that are hired formally, or a cost associated with the inherent risk for informal hires. This cost $T(L_i)$ increases quadratically in the number of workers $\left(1 + \frac{L_i}{b_i}\right) w_v L_i$ $v = 1,2$ based on a para meter b_i, that captures the probability and the cost of being caught by the autorities but can also indicate the implicit costs of avoiding media and comunications, or access to credit due to informality.

If formal firms hire informally (L_{fi}) they also face an enforcement cost $T(L_{fi}) = \left(1 + \frac{L_{fi}}{b_{fv}}\right) w_v L_{fi}$ $v = 1,2$ similar to the one described for informal firms. If formal firms hire formally (L_{ff}) they face a minimum wage, pay the social security, and obtain a labor costs tax deduction: $T(l_{ff}) = (1 + \tau_w)(1 - \tau_y)$ *max(w_v ,wmin).* When the marginal cost of hiring informal is lower than the marginal cost of hiring formal, formal firms hire all their employees informally up to a threshold. This threshold can be found by equaling the marginal cost of hiring formally and informally.

The maximization problem for an informal and a formal firm can be summarized as follows.

$$\max_{L_i} \pi_i = \theta l_i^{\alpha} - \left(1 - \frac{l_i}{b_i}\right) w_i l_i - FC_i \quad \text{s.t. } l_i = \left(\eta_i l_{\mathrm{v}}^{\rho} + (1 - \eta_i) l_v^{\rho}\right)^{\frac{1}{\rho}}$$

$$\max_{L_i} \pi_f = \theta l_f^{\alpha} - \left(1 - \frac{l_{vi}}{b_{vi}}\right) w_{vi} l_{vi} - (1 - \tau_y)(1 + \tau_w) w_{vf} l_{fv} - FC_f$$

s.t. $l_s = \left(\eta_f l_{\mathrm{v}}^{\rho} + (1 - \eta_f) l_v^{\rho}\right)^{\frac{1}{\rho}}$

with

$v = 1,2,\ l_s > 0,\ \alpha < 1,\ w_1 > w_2, FC_i < FC_f$

$\tau_y = 0\ if\ \theta {l_f}^{\alpha} < Y_y$

$\tau_{vat} = 0\ if\ \theta {l_f}^{\alpha} < Y_{vat}$

$\tau_{wmin} = max(w_v, wmin)$

where FC_s are the fix cost involved, $Y_{y,}$ the exempt bracket for profit taxes, $Y_{vat.}$ the exempt bracket for Vat, and *wmin*, the minimum wage.

Several firms enter the market and observe a productivity that distorts true productivity θ, only observed after entering the market. To enter the formal sector, firms must pay a fixed cost: Ef > Ei. If firms face unexpectedly low productivity, they exit the market before they start producing.

Representative household supplies labor with a Frish elasticity (ε) to labor benefits, in which skilled workers regard to formal labor conditions and unskilled workers to informal labor conditions,

$$Ls_{1,1} = Ls_{1,0}\left\{1 + \varepsilon\left(\frac{(\max(w_{1,t=0}, wmin)\left(1 + \tau_{w,t=0}\right)}{max(w_{1,t=1}, wmin)\left(1 + \tau_{w,t=1}\right)} - 1\right)\right\}$$

$$Ls_{2,1} = Ls_{2,0}\left\{1 + \varepsilon\left(\frac{(w_{2,t=0})}{w_{2,t=1}} - 1\right)\right\}$$

where Ls_1 and Ls_0 are the labor supplies in periods, $w_{i,t=0}$ and $w_{i,t=1}$ are the respective wages and $\tau_{w,t=0}$ and $\tau_{w,t=1}$ the payroll taxes.

Government income is equal to the sum of profit taxes and VAT. Profit taxes are assumed to be collected from total output, including the output produced by the informal workers, and the tax deduction cannot be bigger that the tax owned[12]. Social Security contributions made by workers are estimated but do not affect the outcome, since they are returned to the workers. Personal taxes are not considered since the income tax threshold is above the average wages.

$$Pt_f = \tau_y({\theta l_f}^{\alpha} + {\theta l_i}^{\alpha}) \text{-} \tau_y \min\{[w_1 l_1 + w_2 l_2)(1 + \tau_w)) + FC_f,\quad {\theta l_f}^{\alpha} - \quad (w_1 l_1 + w_2 l_2)(1 + \tau_w) - FC_f\}$$

[12] However, when maximizing, firms always assume that they will get positive profits.

The household derives utility solely from consuming the final good and taxes and social security revenues are assumed to be returned to consumers, which might be an extreme case, since it assumes 100% effectiveness of Government expenditure, and therefore can overestimate output.

Data sources: The main source of the model is the EEG, a database created by Fernández (2023) that compiles most business-level databases. A full description of the database can be found in the original article. The model will be calibrated for 2019, which is the most stable year with available information to reproduce the database. The data base is set to exclude firms with one worker but not self-employment with several workers, workers with high school education are considered skilled workers.

Estimation of the model: The model is estimated through a two-stage minimum distance estimator (SMD) that uses the value of some structural parameters (Table 2), and some guess values of estimated parameters and generates moments of the distribution functions of some key variables of the economy. Moments of simulated data distributions are compared with the same moments obtained from the distributions of the real data, and the estimated parameters are adjusted until the model converges.

Table 2. Structural parameters.

		Colombia	Source
w_2	Equilibrium wage unskilled informal (th)	687	GEIH 2019
w_1	Equilibrium wage skilled informal (th)	824	GEIH 2019
τ_w	Payroll/Payroll Contributions	0.47	Fernández & Mejía (2019)
τ_y	Income taxes	0.29	Statutary
V_0	Pareto parameter, ex ante productivity	6.60	Calibrated
κ_f	Exit probability of formal firms	0.16	GEIH
γ_f	Cost of operating in the formal sector / w_2		
γ_i	Cost of operating in the informal sector / w_2	0.61	GEIH
τ_{vat}	VAT tax (net of income tax deduction)	0.145	Statutary
	Bracket Profit tax	3,998	Statutary
	Bracket VAT	9,995	Statutary
ε	Frish elasticity	0.3	Prada & Rojas (2011)

Table 3 shows the value of the estimated parameters Brazil and Mexico found by Ulyssea (2018) and Alvarez (2021), respectively; and for the case of Colombia, the value of the initial guess, and the estimations with one model that do not considers tax deductions vs another does it . In the case of Colombia is possible to observe that the inclusion of tax deductions in the model impacts the intensive margin enforcement parameter for skill workers. This makes sense, since the interface of social security and tax deductions results on incentives for larger firms to hire formally, and incentives to smaller firms to hire informally, reducing the role of enforcement in shaping labor informality along the size distribution of firms. The impact only affects skilled workers since formal firms are intensive on skilled workers.

Table 3. Estimated parameters.

	Initial guess	No tax deduction	Tax deduction	Source of the initial guess
Intensive margin cost, skilled workers	2.61	4.25	9.91	Ulyssea (2018)
Intensive margin cost, unskilled workers	4.94	24.2	27.4	Ulyssea (2018)
Cost of extensive margin	5.01	2.91	3.52	Ulyssea (2018)
Exit probability of informal firms	0.24	0.19	0.20	GEIH (2019)
Cost of operating in the informal sector / w_2				
Cost of operating in the formal sector / w_2	1.9	1.80	1.78	EEG(2019)
Pareto shape parameter	2.99	2.87	2.98	EEG(2019)
Cost of entering the formal sector	1901	3427	2314	EEG(2019)
Cost of entering the informal sector	488	401	514	EEG(2019)
Cobb Douglas function parameter	0.50	0.64	0.61	PWT (2019)
Productivity variance ex post	0.24	0.68	0.63	Ulyssea (2018)
CES elasticity parameter	0.3	0.25	0.15	Medina Posso (2010)
Skilled worker CES share. Informal firms	0.59	0.67	0.63	EEG (2019)
Skilled worker CES share. Formal firms	0.88	0.76	0.79	EEG (2019)

Table 4 shows the fit of the model. As shown in the table, the fit of the model is similar after including or no tax deductions. However, the model is not very accurate in reproducing the extensive margin in firms with more than 10 workers and the intensive margin among firms with 3 to 5 workers.

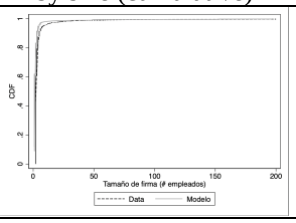
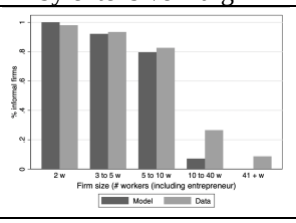
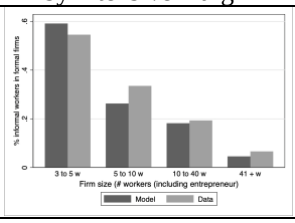
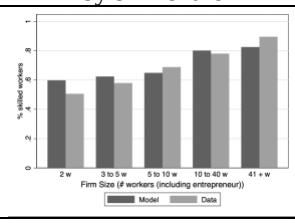
Table 4. Moments of the distribution

		Skilled= tertiary		
		Data	No deductions	Deductions
Informal workers (%)	Among dependents	37%	32%	36%
	Among unskilled	61%	65%	61%
	Among skilled	28%	24%	27%
Extensive Margin	All (>=2)	93%	91%	93%
	2-5 workers	96%	95%	96%
	6-10 workers	83%	94%	84%
	11+ workers	22%	4%	7%
Intensive Margin	3-10 workers	45%	60%	58%
	11-20 workers	26%	28%	21%
	21+ workers	9%	8%	9%
Informal firms distribution	2-5 workers	95%	95%	94%
	2-10 workers	99%	100%	100%
Formal firm distribution	2- 4 workers	44%	49%	48%
	5 -10 workers	10%	3%	14%
	11-20 workers	18%	19%	15%
	21-40 workers	13%	10%	10%
	41+ workers	15%	18%	13%

Source: EEG (2019), GEIH) and simulated data.

Regarding the fit of the whole distributions, Figure 1 shows the distribution of firms estimated by the model by size, extensive margin, intensive margin, and skill share. As explained before, the model reproduces very well all the moments, but is relatively less successful in explaining informality among large firms and overestimates labor informality in very small firms.

Figure 1. Model fit. Distribution of variables

by size (cumulative)	by extensive margin	by intensive margin	by skill share
			

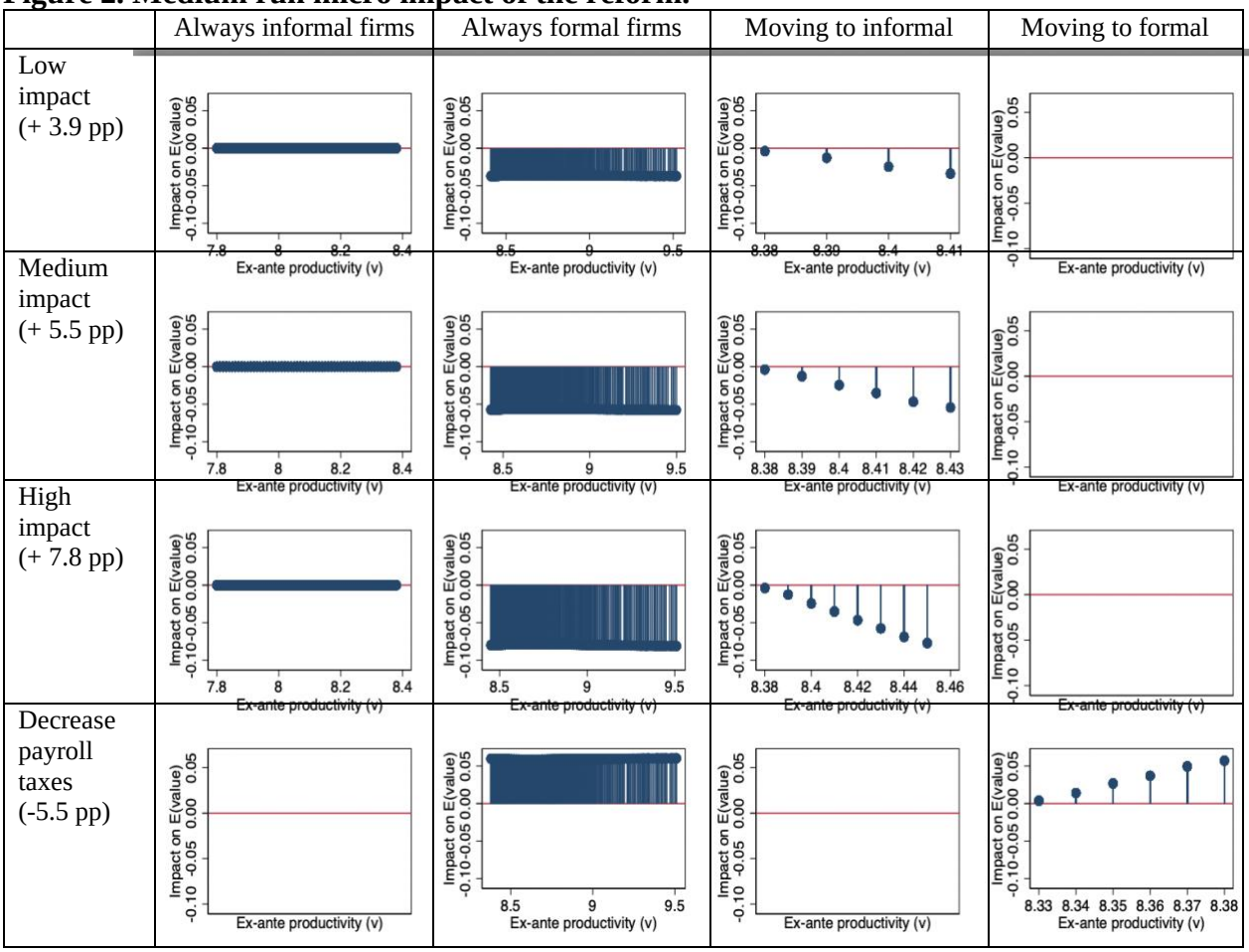
Source: Simulated data and EEG (2019). These results are only estimated for the model that considers high skill as tertiary education and takes tax deductions into account.

V. Simulations

The impact of the reform submitted by the Colombian government was estimated by both an increase in payroll taxes and fix and entry costs. Four scenarios were simulated: 1. Low impact (increase payroll taxes in 3.9 pp). 2. Medium impact (increase payroll taxes in 5.5 pp). 3. High impact (increase payroll taxes in 7.8pp). The impact of the policy simulations was estimated over the following outcomes: changes in productivity, output, labor informality, employment, business informality, informal output, collected taxes. We added a fourth scenario to simulate a decrease in payroll taxes of 5.5 pp in order to indicate how accurate is to use elasticities obtained in a reduction of payroll taxes scenarios when an increase in payroll scenario is proposed. In those scenarios it is also analyze the case in which wages are not yet adjusted, that resembles the medium term, and the case in which wages adjust, that resemble the long term.

Figure 2 shows the changes in the expected value of firms in four scenarios. As shown, a decrease in the payroll taxes, reduces the value of formal firms so some firms decide to become informal, while the opposite is true when payroll taxes are reduced. Regarding macro variables, in the medium run, the increase in payroll taxes increase labor informality. Results are perfectly symmetrical.

Figure 2. Medium run micro impact of the reform.



Source: Simulated data.

Table 5 shows the medium run macro impact of the reform. An increase in labor informality of 5.5-pp implies a 3-pp. increase on informality on the short run, evenly distributed among formal and informal workers. It also generates a soft impact on business informality, increasing informal output, but reducing output and productivity, since informal firms are less productive than formal firms. Congruently, profit and VAT taxes are reduced in between 0.5 and 1.25 pp. Nevertheless, Social Security revenues increase as expected with a rate increase. The tax deductions remain stable, because the increase in payroll taxes is offset by the increase in formality. In sum, the reduction in payroll taxes in the short run develops in opposite but symmetrical changes.

Table 5. Medium run macro impact of the reform

	Base	Change of payroll taxes			
		+ 3. pp	+ 5.5 pp	+ 7.8pp	-5.5 pp
Informal workers	0.36	0.38	0.39	0.40	0.33
Skilled informal workers	0.27	0.289	0.300	0.312	0.25
Unskilled informal workers	0.61	0.63	0.65	0.66	0.58
Informal firms	0.93	0.94	0.94	0.94	0.92
Informal GDP	0.28	0.29	0.30	0.31	0.26
TFP (policy/baseline)	1.000	0.999	0.998	0.997	1.003
OP (policy/baseline)	1.000	0.969	0.950	0.931	1.055
Output (policy/baseline)	1.00	0.99	0.98	0.97	1.03
Tax revenues /PIB	20.99%	20.4%	20.1%	19.7%	21.9%
VAT/PIB	10.19%	10.02%	9.90%	9.78%	10.4%
Profit Tax /PIB	10.80%	10.43%	10.20%	9.95%	11.4%
SS/PIB	12.6%	13.6%	14.1%	14.6%	10.8%
deductions/PIB	9.9%	9.9%	9.8%	9.8%	9.8%

Source: Simulated data.

However, as shown in Table 6, in the long run wages get affected to equalize the labor demand and the labor supply, that in turn is affected by the fact that some individuals decide to enter the labor market attracted by high benefits. One important outcome of this simulations is that payroll taxes does not have a symmetrical behavior, mostly because of the binding minimum wage. When payroll taxes go down, increasing wages absorb some of the adjustment. However, when payroll taxes go down formal wages are lower bounded. Firms have two ways of adjustment, hiring fewer formal workers or reducing the wage they pay for informal workers. These adjustments mostly take place among skilled workers since formal firms are intensive on skilled workers.

Indeed, if payroll taxes are reduced in 5.5 pp, firms might adjust formal and informal wages upwards, limiting the impact on informality to 2pp[13]. Meanwhile, if payroll taxes are increased in 5.5 pp, the adjustment on skilled informal wages and informality are larger (from -18pp and -10 pp respectively). This happens because the minimum wage does not allow formal wages to adjust freely. In sum, those studies that use the impact of the 2012 reform to estimate informality without further adjustments, underestimate the impact of the reform proposed by the Government. It is also true that as the informal wage decreases, it opens the gate for new small firms to enter the market, increasing output.

Table 6. Long run micro impact of the reform.

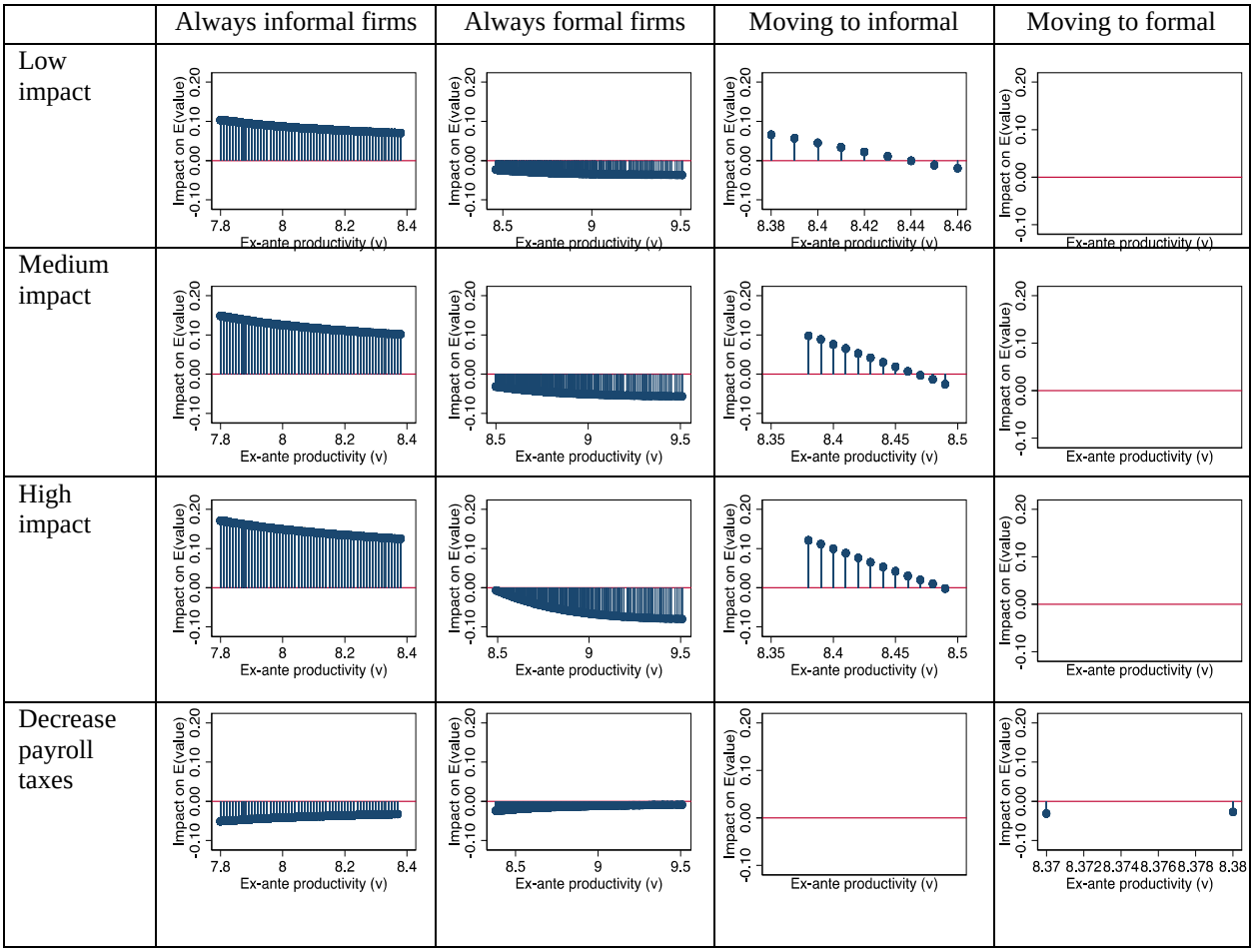
	Change in payroll taxes				
	Base	+ 3.9	+ 5.5	+ 7.8	-5.5
Informal workers	0.36	0.43	0.46	0.48	0.34
Skilled informal workers	0.27	0.36	0.40	0.43	0.25
Unskilled informal workers	0.61	0.65	0.66	0.63	0.58
Wage skilled informal workers	1.00	0.87	0.82	0.75	1.06
Wage unskilled informal workers	1.00	1.02	1.03	1.09	1.00
Informal GDP	0.28	0.34	0.37	0.37	0.27
Number of firms	1.00	1.12	1.18	1.16	0.94
Output (policy/baseline)	1.00	1.03	1.04	1.04	1.00

Source: Simulated data

[13] Given that the decrease in payroll has a more natural adjustment, it can be stipulate that for each point of reduction in payroll taxes, informality would decrease in 0.35 pp in the short run. Therefore the 2012 reform which reduced the payroll taxes in 13.5 pp would reduce informality in 4.8 pp. That is very close to what was found by Fernández and Villar (2017).

This asymmetry can also be observed on firm's dynamics. As it is shown in Figure 3, the impact on the value of firms is larger in absolute terms in the increasing-payroll-taxes scenario than in the decreasing-payroll-taxes scenario, and this can be explained by the lack of wage mobility in the later.

Figure 3. Long run micro impact of the reform.



Source: Simulated data

Table 7 shows other macroeconomic impacts when payroll taxes are affected. As wages do not absorb the whole impact of the reform, changes in business informality, productivity, and taxes are stronger when payroll taxes are increased with respect to the case when they are decreased. In particular, taxes are reduced between 1.8pp and 2pp, depending on the scenario, which is far from the no fiscal impact claimed by the government.

Table 7. Other long run macro impacts of the reform

	Base	Change of payroll taxes			
		+ 3.9 pp	+ 5.5 pp	+ 7.8pp	-5.5 pp
Informal firms	0.93	0.95	0.95	0.95	0.92
TFP (policy/baseline)	1.000	0.990	0.986	0.983	1.003
OP	1.00	0.94	0.90	0.89	1.02
Tax revenues /PIB	21.0%	19.2%	18.4%	18.1%	22.1%
VAT/PIB	10.19%	9.39%	9.03%	8.98%	10.3%
Profit Tax /PIB	10.80%	9.80%	9.35%	9.11%	11.7%
SS/PIB	12.6%	12.6%	12.6%	13.3%	10.3%
deductions/PIB	9.9%	9.1%	8.8%	9.0%	9.3%

Source: Simulated data

VI. Alternative reforms.

Another approach to improve the labor market functioning in Colombia is to improve the share of formal jobs in the economy (henceforth formalization), rather than to focus on improve formal workers' working conditions and pay. In contrast to the policies analyzed in previous sections, these policies seek to increase formalization (objective 2) via reducing the cost of hiring formal workers, such as a reduction in the minimum wage or making more flexible the rules to settle it; lowering payroll taxes; and reducing firing costs. Is also possible to include in this group policies oriented towards increasing the flexibility of formal contracts, including, or expanding the use of part-time contracts, or policies oriented to increase labor force participation, especially among women. There are also several policies designed to reduce business formalization with the hope of increasing labor formalization, such as the single tax schemes, the reduction in taxes and/or entrance fees to formality, and the enforcement of firm's formalization policies. The simulated policies are the following: 1. Equalizing entry cost of formal and informal firms. 2. Increasing enforcement on the extensive margin of informality. 3. Increasing enforcement on the intensive margin of informality 4. Lowering profit taxes 5. Lowering VAT taxes. 6. Setting a flat profit tax rate.

Figure 4 shows the micro impact of alternative policies in the short run. According to the figure, those oriented towards reduce the intensive margin of informality, such as increasing the enforcement cost, and a flat profit tax rate do not have much impact on firms, and they can even induce some firms to get fully informal in order to avoid the extra cost on the intensive margin. The figure also shows that decreasing taxes is the most positive policy for formal firms, and together with increasing the enforcement on the extensive margin, the most negative policy for informal firms.

Figure 4. Micro impact. Alternative policies

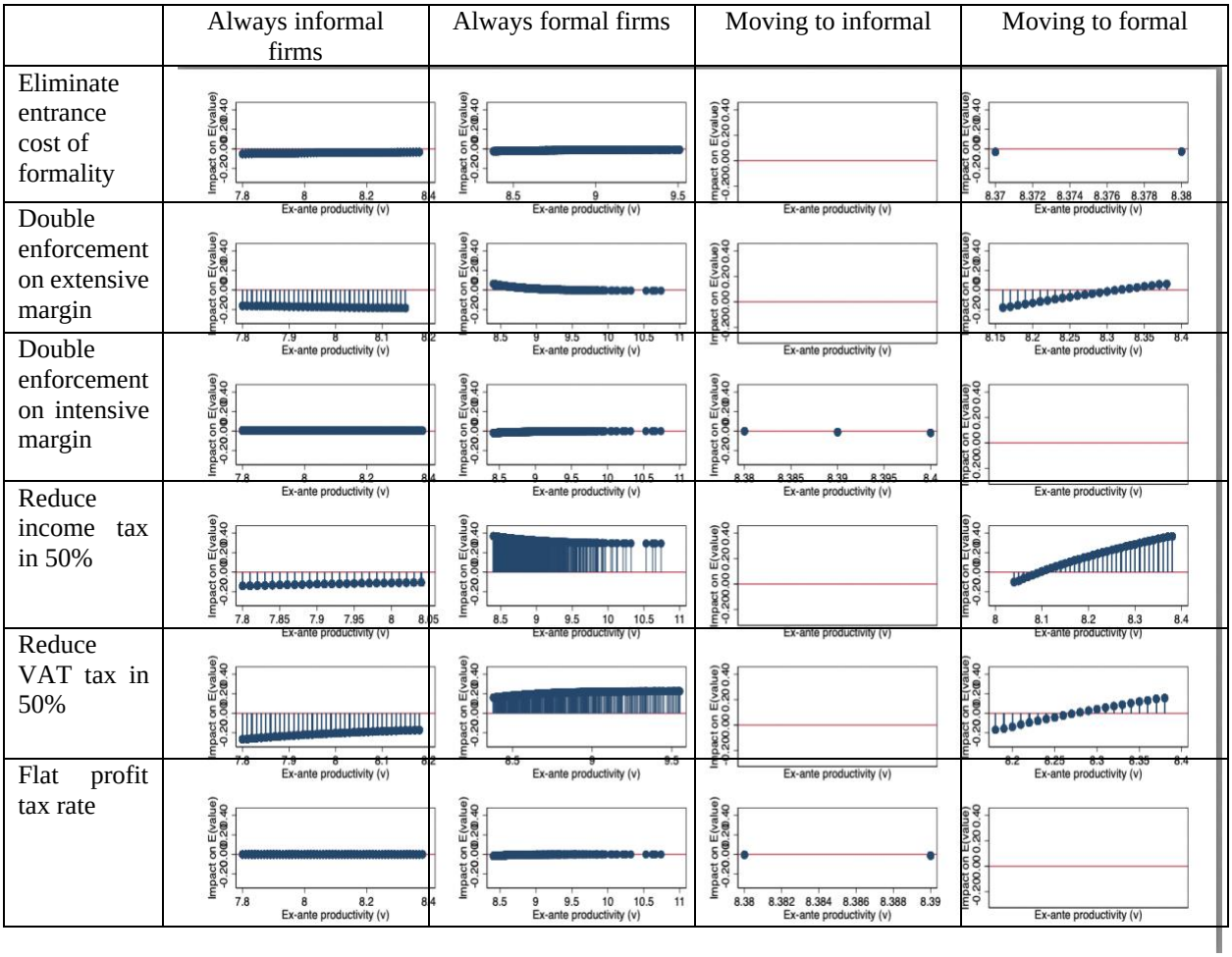


Table 6 shows the macro impact of the alternative policies. As expected, the policies that work directly on the extensive margin are the ones more successful in reducing business informality and the informal GDP: eliminate the entrance cost to formality, enforcement on the extensive margin and reducing taxes. However, the tax reductions face an important reduction in tax revenues that would not be able to be accommodated by the authorities.

Table 6. Macro impact

	Baseline	Eliminate entrance cost to formality	Double enforcement extensive margin	Double enforcement intensive margin	Reduce profit tax in 50%	Reduce VAT tax in 50%	Eliminate profit tax exempted margin
Informal firms	0.93	0.91	0.88	0.93	0.81	0.85	0.94
Informal GDP	0.28	0.27	0.23	0.29	0.19	0.18	0.29
Tax revenues /PIB	21.0%	23%	24%	22%	14%	15%	23%
VAT/PIB	10.2%	10.3%	10.7%	10.0%	11.2%	0.7%	10.1%
Profit Tax /PIB	10.8%	11.1%	11.8%	10.6%	0.8%	11.7%	10.7%
SS/PIB	12.6%	12.6%	13.0%	12.6%	12.7%	14.9%	12.6%
deductions/PIB	9.9%	9.9%	10.3%	9.8%	0.6%	11.8%	9.8%
Informal workers	0.36	0.35	0.31	0.35	0.33	0.22	0.357
Skilled informal workers	0.27	0.26	0.20	0.28	0.24	0.16	0.27
Unskilled informal workers	0.61	0.61	0.63	0.59	0.61	0.42	0.61
Skilled premium	1.20	1.21	1.41	1.20	1.25	1.30	1.20
Skilled wage (policy/ base)	1.00	1.01	1.01	1.00	1.10	1.19	1.00
Unskilled wage (policy/ base)	1.00	1.00	0.86	1.00	1.06	1.11	1.00
Mass of firms (policy/ base)	1.00	0.98	1.09	1.01	0.81	0.70	1.00
TFP (policy/baseline)	1.000	1.000	1.002	0.999	1.004	1.016	1.000
Output (policy/baseline)	1.00	1.01	1.03	0.99	0.99	0.99	0.99
OP	1.00	1.00	1.06	0.92	1.09	1.01	0.89

Source: Simulated data

VII. Conclusions

According to our estimations, the reform proposed by the government can generate a sizable increase on informality (from 7 to 12 pp) concentrated mostly on workers with completed high school. Wages for skilled informal workers would decline (from 12 to 25 pp), which would have positive impacts on already informal firms and could incentivize formal firms to become informal, as well as further entry into the informal by small firms. Productivity would decrease, although output can increase due to the increase in the number of firms. From the fiscal point of view, tax revenues are expected to fall between 1.8pp and 2pp, depending on the scenario, which is far from the null fiscal impact claimed by the government. In sum, the fact that the 2002 reform did not have a significant impact on informality and employment does not imply that the opposite would happen with a reform that reverses it. The reason is that in the presence of minimum wages impacts are not symmetric.

Therefore, rather than increasing the well-being of workers able to maintain their formal contracts, this paper proposes policies that increase the number of formal workers/firms. Among this, increasing enforcement on the extensive margin of informality or a tax reduction are among the policies with greatest positive impacts. From the fiscal point of view, eliminating entry costs into the formal sector, increasing enforcement, or eliminating the tax exempted bracket can be more appropriate.

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