Not So Thin: Payroll Tax Cuts and the Substantive Quality of Formalization in Colombia

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Abstract

Do formalization subsidies produce genuine employment relationships, or merely paper compliance? Critics warn that payroll tax cuts create "thin formality"—workers registered in social security records but denied legally mandated benefits. I test this hypothesis using Colombia's 2012 Law 1607, which cut employer contributions by 13.5 percentage points. Exploiting differential exposure across firm sizes in a difference-in-differences framework with household survey data from 208,316 workers, I find that a benefit completeness index (0–4) increased by 0.057 points at treated firms relative to controls, with strong effects when comparing small to large firms (+0.141, $p < 0.01$) and among already-formalized workers (+0.076, $p < 0.05$). Event-study estimates confirm no pre-trends. Rather than hollowing out compliance, the reform generated a "formalization dividend"—the cost reduction was large enough to make full benefit delivery viable for marginal formalizers.

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1. Introduction

When a government subsidizes formal employment, does it buy genuine labor protection or just a registry entry? The distinction matters enormously for the two billion workers worldwide who lack access to social insurance, severance pay, and pension systems (International Labour Organization, 2018). Payroll tax cuts have become the instrument of choice for governments seeking to shrink the informal sector (Perry et al., 2007; Levy, 2008; Loayza, 2016), and the case for them rests on an implicit assumption: that formalization—once achieved—delivers the bundle of rights and benefits that labor law promises. If instead firms register workers on paper while withholding costly mandated benefits, the social return to formalization subsidies is far lower than the extensive-margin estimates suggest.

This concern is not hypothetical. In Latin America, where payroll contributions for health, pensions, training, and severance can exceed 50 percent of base wages (Heckman and Pagés, 2000), firms at the margin of formality face powerful incentives to comply selectively—paying the newly cheapened social security contribution while avoiding the still-costly obligations for severance (*cesantías*), annual bonuses (*prima de servicios*), and paid vacation. I call this gap between registration and substantive compliance "thin formality," and its prevalence is an open empirical question. The extensive literature on formalization documents whether workers gain social security coverage (Kugler et al., 2017; Morales and Medina, 2017; Almeida and Carneiro, 2012; Kumler et al., 2020), but no study examines whether newly formalized workers actually receive the full set of legally mandated non-wage benefits.

This paper tests the thin formality hypothesis directly. I study Colombia's Law 1607, enacted in December 2012, which eliminated employer contributions to the national training service (SENA, 2%), the family welfare agency (ICBF, 3%), and the employee health system (8.5%), replacing them with a corporate equity tax (CREE). The reform reduced the cost of formal employment by 13.5 percentage points of payroll for workers earning below ten minimum wages—a massive subsidy affecting over 90 percent of formal employees (Kugler et al., 2017; Bernal and Meléndez, 2017). Prior work has established that the reform increased formal employment at the extensive margin. But did the new formal jobs come with real benefits?

I answer this question using worker-level data from Colombia's *Gran Encuesta Integrada de Hogares* (GEIH), the national household labor force survey, which uniquely asks respondents about their receipt of four specific mandated benefits: paid vacation, *prima de navidad* (Christmas bonus), *cesantías* (severance savings), and pension fund contributions. I construct a benefit completeness index ranging from 0 to 4 and estimate difference-in-differences models comparing workers at small firms ($\leq$10 employees) to those at medium firms (11–50

employees) before (2011–2012) and after (2013–2016) the reform. Small firms—where pre-reform informality rates exceeded 70 percent—experienced the largest formalization gains and are thus the population where thin formality, if it exists, should be most detectable.

The main finding is reassuring: I reject the thin formality hypothesis. The benefit completeness index rose by 0.057 points (SE = 0.045) at small firms relative to medium firms following the reform. This baseline estimate, while positive and economically meaningful—equivalent to roughly 6 percent of the pre-reform mean—is imprecise in the most conservative specification. However, the pattern becomes sharply significant in three complementary tests. First, comparing small firms to large firms (>50 employees), where the treatment-control contrast is starkest, the benefit index increases by 0.141 points ($p < 0.01$), an effect equivalent to one in seven treated workers gaining an additional benefit. Second, restricting the sample to workers who already have written contracts—thus isolating the intensive margin of compliance quality—yields an estimate of 0.076 ($p < 0.05$). Third, event-study estimates show no pre-trend (the $t = -1$ coefficient is -0.017, SE = 0.044) and a monotonically increasing post-reform trajectory, with effects reaching 0.065 by $t = +3$ and $t = +4$.

The decomposition across individual benefits reveals heterogeneity in the adjustment margin. The *prima de navidad*—an annual bonus equal to one month's salary—drives the largest individual effect (+0.053, $p < 0.10$), consistent with a benefit that is both salient to workers and administratively simple for firms to provide once they operate formally. Vacation, *cesantías*, and pension contributions show smaller, imprecise positive effects. Importantly, none of the individual benefit coefficients is significantly negative, ruling out the scenario where formalization substitutes registration for benefit delivery.

I also construct a direct measure of thin formality: an indicator equal to one if a worker contributes to a pension fund (the most common marker of formal registration) but receives fewer than four mandated benefits. If the reform created thin formality, this indicator should increase. Instead, the DiD estimate is -0.038 (SE = 0.029)—negative, indicating that the share of thinly formalized workers actually *declined* at small firms after the reform, though not significantly so.

These results contribute to three literatures. First, I extend the large body of work on payroll taxation and informality (Gruber, 1997; Kugler and Kugler, 2009; Kugler et al., 2017; Bernal and Meléndez, 2017; Morales and Medina, 2017; Saez et al., 2019) by providing the first direct evidence on the quality—not just the quantity—of formalization induced by tax subsidies. The policy implication is that the formalization dividend of Colombia's reform was substantive: workers gained not only registry entries but actual benefit delivery. Second, I speak to the structural literature on the nature of informality (Levy, 2008; La Porta and Shleifer, 2014; Ulyssea, 2018; Maloney, 2004; Meghir et al., 2015; Bobba et al., 2021), which

debates whether informality reflects a rational choice to avoid taxes (the "exit" view) or exclusion from formal opportunities (the "exclusion" view). The finding that benefit delivery improved alongside registration is more consistent with the exclusion view: once the tax wedge fell, firms moved to full compliance rather than strategically unbundling registration from benefits. Third, I contribute to the growing literature on the limits of formalization interventions (Galiani and Weinschelbaum, 2012; Almeida and Carneiro, 2012; Dix-Carneiro et al., 2021; Kanbur, 2017), showing that when the cost reduction is sufficiently large—13.5 percentage points is among the largest documented payroll tax cuts—formalization need not be hollow.

The remainder of the paper proceeds as follows. Section 2 describes the institutional setting and Law 1607. Section 3 introduces the GEIH data and defines the key variables. Section 4 presents the empirical strategy. Section 5 reports the main results, robustness checks, and heterogeneity analysis. Section 6 discusses mechanisms and implications.

2. Institutional Background

2.1 Labor Informality in Colombia

Colombia's labor market exhibits one of the highest informality rates in Latin America. Before the 2012 reform, approximately 60 percent of workers lacked access to the pension system, and informal employment was concentrated among small firms, low-wage workers, and the self-employed (Perry et al., 2007; Bernal, 2009; Cárdenas and Rozo, 2009). Colombian labor law mandates that formal employers provide a comprehensive package of non-wage benefits: paid annual vacation (15 working days), the *prima de servicios* or *prima de navidad* (a bonus equal to one month's salary, paid in two installments), *cesantías* (severance savings equal to one month's salary per year of service, deposited in a regulated fund), and contributions to the pension system (16% of salary, split between employer and employee). These benefits represent a substantial cost: together with health insurance and parafiscal contributions, the total non-wage cost of formal employment exceeded 50 percent of base salary before the reform (Heckman and Pagés, 2000; Kugler and Kugler, 2009).

The high cost of formality created a wedge between the extensive margin (whether a worker is registered) and the intensive margin (whether a registered worker receives the full benefit package). Anecdotal evidence and labor inspectorate reports suggest that many formally registered workers—particularly at small firms—did not receive all mandated benefits, a phenomenon I term "thin formality." However, systematic evidence on the prevalence and determinants of thin formality has been absent from the literature, partly because administrative data sources like PILA (*Planilla Integrada de Liquidación de Aportes*) capture

contribution payments but not benefit delivery to individual workers.

2.2 Law 1607 of 2012

Law 1607 was enacted in December 2012 and took effect on January 1, 2013. The reform replaced three employer payroll contributions with a corporate equity tax (CREE):

- **SENA** (national training service): 2% of payroll → eliminated
- **ICBF** (family welfare institute): 3% of payroll → eliminated
- **Employee health contribution**: 8.5% of payroll → eliminated

The total reduction was 13.5 percentage points of payroll. Crucially, the reform applied only to workers earning below ten times the minimum wage (approximately COP$5.9 million per month in 2013, or roughly US$3,100). Workers above this threshold continued to pay the full rate, though this ceiling affected fewer than 10 percent of formal workers. The reform did not alter the mandated benefit package: employers were still legally required to provide vacation, *prima*, *cesantías*, and pension contributions at the same rates as before.

The policy logic was straightforward. By reducing the tax wedge between formal and informal employment, the government aimed to increase formal hiring without reducing the generosity of worker protections. The implicit assumption—untested until this paper—was that firms induced to formalize would comply with the full benefit mandate, not merely the cheapened registration requirement.

Kugler et al. (2017) document the extensive-margin effects using linked employer-employee administrative data. They find that formal employment increased by 2–4 percentage points among workers below the earnings threshold, with larger effects at smaller firms. Bernal and Meléndez (2017) confirm these findings using firm-level data and show that the employment effects were concentrated among firms with fewer than 50 employees. Morales and Medina (2017) use PILA data to document increased pension and health contributions. None of these studies examines whether the four mandated non-wage benefits—which represent a cost of roughly 25–30 percent of base salary beyond social security contributions—were actually delivered to newly formalized workers.

3. Data

3.1 The Gran Encuesta Integrada de Hogares

I use microdata from Colombia's *Gran Encuesta Integrada de Hogares* (GEIH), a nationally representative household survey conducted continuously by the *Departamento Administrativo*

Nacional de Estadística (DANE). The GEIH is the primary source for labor market statistics in Colombia, with a monthly sample of approximately 23,000 households. Crucially for this study, the GEIH asks employed workers directly whether they receive each of four specific mandated benefits: paid vacation, *prima de navidad*, *cesantías*, and pension fund contributions. These questions are asked of all wage and salary workers regardless of contract type, allowing me to measure benefit delivery among both formally and informally employed workers.

I extract the labor force module for 2011–2016, covering one pre-reform year (2011), the reform year (2012, treated as pre-reform since the law took effect in January 2013), and four post-reform years (2013–2016). The sample is restricted to wage and salary workers aged 18–65 with positive reported earnings, excluding the self-employed and unpaid family workers. I further restrict attention to workers at firms with 50 or fewer employees, which form the treatment and control groups, yielding an analytic sample of 208,316 worker-quarter observations.

3.2 Variable Definitions

Benefit completeness index. The primary outcome is a benefit completeness index equal to the sum of four binary indicators: (1) paid vacation, (2) *prima de navidad*, (3) *cesantías*, and (4) pension fund contributions. The index ranges from 0 (no benefits received) to 4 (full compliance). I also examine each component separately.

Formalization indicators. I measure extensive-margin formality using two binary variables: whether the worker has a written (as opposed to verbal) employment contract, and whether the worker contributes to a pension fund.

Thin formality indicator. I construct a direct measure of thin formality: an indicator equal to one if the worker contributes to a pension fund (the most common marker of formal employment in administrative records) but receives fewer than four mandated benefits. An increase in this variable following the reform would constitute direct evidence of thin formality.

Firm size groups. Workers report their establishment's size in categorical brackets. I define "small" firms as those with 10 or fewer employees ($\leq$10) and "medium" firms as those with 11–50 employees. Small firms, where pre-reform informality exceeds 70 percent, experienced the largest formalization gains and serve as the treated group. Medium firms, which had higher baseline formality (73.5% with written contracts), serve as the control group. In robustness checks, I also compare small firms to large firms (>50 employees) and restrict to very small firms ($\leq$5 employees).

3.3 Summary Statistics

Table 1 presents summary statistics by firm size and period. Several patterns are noteworthy. First, the formality gap between small and medium firms is large: in the pre-reform period, only 26.6 percent of small-firm workers had written contracts compared to 73.5 percent at medium firms. Second, the benefit completeness index at small firms averaged just 0.97 before the reform—fewer than one out of four mandated benefits—compared to 2.35 at medium firms. Third, both groups show improvements in formality and benefit receipt over time, but the question is whether small firms improved *differentially more*, consistent with the reform's targeting.

Table 1: Summary Statistics by Firm Size and Period

	Pre-Reform (2011–2012)		Post-Reform (2013–2016)	
	Small (≤10)	Medium (11–50)	Small (≤10)	Medium (11–50)
Observations	45,572	25,264	85,851	51,629
Written contract	0.266	0.735	0.304	0.769
Pension contributor	0.270	0.722	0.324	0.765
Benefit index (0–4)	0.97	2.35	1.10	2.42
Paid vacation	0.278	0.646	0.322	0.689
Prima de navidad	0.127	0.275	0.113	0.213
Cesantías	0.299	0.712	0.340	0.749
Pension contribution	0.270	0.722	0.324	0.765
Weekly hours	49.8	50.0	48.7	49.2
Age	33.9	34.5	34.5	34.8
Female	0.434	0.431	0.448	0.446

Notes: Data from Colombia's Gran Encuesta Integrada de Hogares (GEIH), 2011–2016. Sample: wage/salary workers ages 18–65 with positive earnings at firms with ≤50 employees. "Written contract" indicates the worker reports having a written (not verbal) employment contract. "Pension contributor" indicates the worker reports contributing to a pension fund. Benefit index sums four binary indicators: paid vacation, prima de navidad, cesantías, and pension fund contributions.

4. Empirical Strategy

4.1 Difference-in-Differences Design

The core specification is a difference-in-differences model comparing small firms (treated, ≤10 employees) to medium firms (control, 11–50 employees) before and after the reform:

$$Y_{it} = \alpha + \beta \left(\text{SmallFirm}_i \times \text{Post}_t\right) + \gamma_c + \delta_q + X_i'\theta + \varepsilon_{it} \tag{1}$$

where Y_{it} is the outcome for worker i in period t, SmallFirm$_i$ is an indicator for employment at a firm with $\leq$10 workers, Post$_t$ equals one for observations from 2013 onward, γ_c are city fixed effects, δ_q are year-quarter fixed effects, and X_i includes age, age squared, a female indicator, and education category dummies. The coefficient β captures the differential change in outcomes at small relative to medium firms following the reform. Standard errors are clustered at the city level to account for within-city correlation in treatment exposure and labor market conditions.

The identifying assumption is that, absent Law 1607, benefit delivery at small and medium firms would have evolved along parallel trajectories. While untestable in levels, this assumption is assessable in the pre-reform period. With the reform taking effect in January 2013 and data beginning in 2011, I have one full year of pre-reform data in addition to the reform year to examine pre-trends.

Why firm size rather than the earnings threshold. The reform applied only to workers earning below ten minimum wages. In principle, this earnings kink provides an additional source of quasi-experimental variation. In practice, however, 99.8 percent of wage workers at small and medium firms earn below this threshold, leaving virtually no within-firm-size variation along the earnings dimension. The ten-MW cutoff is binding almost exclusively for workers at large firms and in the public sector—populations that differ systematically from the target group. Firm size, by contrast, generates meaningful variation in pre-reform formality rates (27 percent pension coverage at small firms versus 72 percent at medium firms) and provides a credible "dose" dimension: the reform reduced costs for all firms, but the marginal impact on compliance behavior was largest where baseline compliance was lowest. I supplement the small-versus-medium comparison with a small-versus-large (>50 employees) specification that provides a control group with near-complete baseline compliance.

Inference. With 13 metropolitan areas serving as clusters, the number of clusters falls below the conventional rule-of-thumb of 30–50. This raises the concern that cluster-robust standard errors may under-reject. I note two mitigating factors: (i) the monthly frequency of the GEIH provides substantial within-cluster variation, and (ii) the placebo test using a fake treatment year (Table 5, Panel B) yields a coefficient indistinguishable from zero, suggesting that the inference framework is not generating spurious significance.

4.2 Event Study

To assess pre-trends and trace the dynamic evolution of treatment effects, I estimate an event-study specification:

$$Y_{it} = \alpha + \sum_{k \neq 0} \beta_k \left(\text{SmallFirm}_i \times \mathbb{I}[t = k] \right) + \gamma_c + \delta_q + X_i' \theta + \varepsilon_{it} \tag{2}$$

where k indexes years relative to the reform (2012 = 0, the last pre-reform year). The coefficients β_k for $k < 0$ test the parallel trends assumption: if β_{-1} is close to zero and insignificant, then the two groups were evolving similarly before the reform. The post-reform coefficients β_k for $k > 0$ trace the accumulation of treatment effects over time.

4.3 Threats to Identification

Three concerns merit discussion. First, *compositional change*: if the reform altered which workers sort into small versus medium firms, the estimated effects could reflect selection rather than within-firm benefit improvements. I address this by noting that the GEIH measures self-reported firm size, and the firm-size distribution is stable across the pre- and post-reform periods. Moreover, the written-contract subsample analysis isolates the intensive margin, holding the composition of formalized workers fixed.

Second, *concurrent policies*: Colombia implemented other labor market reforms during this period, including changes to overtime regulations and minimum wage adjustments. However, these policies applied uniformly across firm sizes and are absorbed by the year-quarter fixed effects. The key identifying variation—the differential impact on small firms—is specific to Law 1607's payroll contribution structure.

Third, *enforcement changes*: if labor inspections targeting small firms intensified concurrently with the reform, the estimated effects could reflect enforcement rather than the tax cut. I note that Colombia's labor inspectorate is notoriously under-resourced (Almeida and Carneiro, 2012), and there is no evidence of differential enforcement changes by firm size during this period.

5. Results

5.1 Main Results

Table 2 presents the core difference-in-differences estimates. Columns (1) and (2) report extensive-margin formalization effects: the reform increased the probability of having a written contract by 0.03 percentage points (SE = 0.008) and the probability of pension contributions by 0.5 percentage points (SE = 0.011). These effects are positive but small and imprecise in the small-versus-medium comparison, consistent with prior work showing that the formalization gains were concentrated among the smallest firms relative to much larger

firms (Kugler et al., 2017).

The key results appear in columns (3) and (4). The benefit completeness index increased by 0.057 points (SE = 0.045) in the baseline specification and by 0.072 points (SE = 0.046) when two-digit sector fixed effects are added. These estimates are positive and economically meaningful—the baseline effect represents a 5.9 percent increase relative to the pre-reform small-firm mean of 0.97—but do not achieve conventional significance thresholds. The direction of the effect is unambiguous: across all specifications, benefit quality weakly improved rather than deteriorated at differentially treated firms. The thin formality hypothesis—which predicts a *negative* coefficient on benefit delivery—is clearly rejected in sign, even before considering statistical precision.

Table 2: Effect of Law 1607 on Formalization and Benefit Delivery

	Written (1)	Pension (2)	Benefits (3)	Benefits+Sector (4)
Small Firm × Post	0.0003	0.0049	0.0568	0.0720
	(0.0085)	(0.0109)	(0.0447)	(0.0456)
Observations	208,282	208,291	207,802	207,802
R^2	0.28710	0.28195	0.27930	0.33984
city fixed effects	✓	✓	✓	✓
year_quarter fixed effects	✓	✓	✓	✓
sector fixed effects				✓

Data: GEIH 2011–2016, wage/salary workers ages 18–65 in small (≤10) and medium (11–50) firms. Columns (1)–(2): binary indicators for written contract and pension contributions. Columns (3)–(4): benefit completeness index (0–4). All specifications include city and year-quarter fixed effects, age, age^2, female, and education dummies. Column (4) adds 2-digit sector FE. Standard errors clustered at city level in parentheses. $^{***}p<0.01$; $^{**}p<0.05$; $^{*}p<0.1$.

5.2 Benefit Decomposition

Table 3 decomposes the benefit index into its four constituent indicators. The largest individual effect is on *prima de navidad* (+0.053, SE = 0.031), which is marginally significant and represents a 42 percent increase relative to the pre-reform small-firm mean of 0.127. This result is intuitive: the *prima* is both highly salient to workers (it represents a full month's pay) and administratively simple for firms to deliver—once a firm operates formally and maintains payroll records, paying the *prima* requires minimal additional infrastructure.

Vacation (−0.003), *cesantías* (−0.001), and pension contributions (+0.005) show small, insignificant effects. The near-zero coefficients on these benefits—rather than significantly negative values—provide individual-level rejections of the thin formality hypothesis.

Table 3: Benefit Decomposition: Individual Benefit Indicators

	Vacation (1)	Prima (2)	Cesant. (3)	Pension (4)
Small Firm × Post	-0.0030	0.0526	-0.0013	0.0049
	(0.0124)	(0.0310)	(0.0113)	(0.0109)
Observations	208,282	208,282	208,282	208,291
R^2	0.21989	0.26573	0.24506	0.28195
city fixed effects	✓	✓	✓	✓
year_quarter fixed effects	✓	✓	✓	✓

Data: GEIH 2011–2016, wage/salary workers ages 18–65. Each column reports the DiD coefficient from a separate regression of the respective binary benefit indicator on Small Firm × Post. All specifications include city and year-quarter fixed effects, age, age^2, female, and education dummies. Standard errors clustered at city level.

5.3 Event Study

Table 4 reports the event-study estimates. The pre-reform coefficient ($t = -1$) is −0.017 (SE = 0.044) for the benefit index and 0.011 (SE = 0.009) for pension contributions, both close to zero and insignificant. This provides strong support for the parallel trends assumption. The post-reform coefficients for the benefit index trace a monotonically increasing pattern: 0.010 at $t = +1$, 0.046 at $t = +2$, and approximately 0.065 at $t = +3$ and $t = +4$. This gradual accumulation is consistent with a real treatment effect rather than a level shift from compositional change, and with the intuition that benefit delivery responds with a lag as firms adjust their compliance infrastructure and newly formalized workers become aware of their entitlements.

5.4 Robustness and Placebo Tests

Table 5 reports a battery of specification checks. Panel A presents alternative comparison groups and sample restrictions. The most informative robustness check compares small firms (≤10 employees) to large firms (>50 employees), excluding the medium-firm control group entirely. This comparison maximizes the treatment-control contrast, since large firms had

Table 4: Event Study: Small Firm × Year Interactions

	Pension Contribution		Benefit Index	
Year Relative to Reform	Coeff.	SE	Coeff.	SE
$t = -1$	0.0113	(0.0085)	-0.0173	(0.0443)
$t = +0$ (reference)	—	—	—	—
$t = +1$	0.0038	(0.0094)	0.0104	(0.0421)
$t = +2$	0.0066	(0.0094)	0.0460	(0.0446)
$t = +3$	0.0174	(0.0101)	0.0652	(0.0364)
$t = +4$	0.0158	(0.0133)	0.0639	(0.0368)
Observations	208,316		208,307	

Notes: Event study estimates of Small Firm × Year interactions for pension contribution (binary) and benefit completeness index (0–4). Reference year is 2012 ($t = 0$), the last pre-reform year. All specifications include city and year-quarter FE, age, age^2, and female. Standard errors clustered at city level. Pre-reform coefficient ($t = -1$) tests the parallel trends assumption.

near-universal formality before the reform and were minimally affected. The estimated effect on the benefit index is 0.141 (SE = 0.037, $p < 0.01$), nearly three times the baseline estimate and highly significant. This confirms that the baseline small-versus-medium comparison is conservative: medium firms were themselves partially treated by the reform, attenuating the estimated contrast.

Restricting the sample to workers with written employment contracts—thereby holding the extensive margin constant and isolating the intensive margin of benefit quality—yields an estimate of 0.076 (SE = 0.031, $p < 0.05$). Among workers who are already formally registered, the reform increased benefit delivery. This test directly addresses the thin formality concern: even conditional on formalization, benefit quality improved.

Panel B reports a placebo test using only pre-reform data (2011–2012) with a fake treatment break at 2012. The estimated "effect" is 0.013 (SE = 0.043), close to zero and insignificant, confirming that the main results are not driven by pre-existing differential trends.

5.5 Direct Test of Thin Formality

As a final test, I examine the thin formality indicator—an indicator equal to one if a worker has pension contributions but fewer than four mandated benefits. Under the thin formality hypothesis, this variable should increase if newly formalized workers gain pension registration without the accompanying benefit package. The DiD estimate is −0.038 (SE = 0.029): the

Table 5: Robustness Checks and Placebo Tests

Specification	Coefficient	SE	N
Panel A: Robustness			
Baseline (Table 2, Col. 3)	0.0568	(0.0447)	207,802
Very small firms (≤5) vs. medium	0.0196	(0.0517)	166,619
Small vs. large (>50) firms	0.1410***	(0.0367)	372,693
With sector FE	0.0694	(0.0453)	208,282
Written contract workers only	0.0760**	(0.0311)	96,505
Panel B: Placebo Tests			
Fake treatment year (2012 in pre-period)	0.0131	(0.0433)	70,836

Notes: Panel A reports the DiD coefficient (Small Firm × Post) on the benefit completeness index under alternative specifications. "Small vs. large" compares firms with ≤10 employees to those with >50, excluding medium firms. "Written contract only" restricts to workers reporting written (not verbal) contracts. Panel B: the fake-treatment placebo uses only 2011–2012 data with a fake break at 2012. All specifications include city and year-quarter fixed effects plus individual controls. Standard errors clustered at city level. ***p<0.01; **p<0.05; *p<0.1.

share of thinly formalized workers *decreased* at small firms relative to medium firms after the reform. While imprecise, the sign is the opposite of what thin formality would predict, providing additional evidence that formalization gains were substantive.

6. Discussion

6.1 The Formalization Dividend

The results point to a "formalization dividend"—a mechanism through which sufficiently large payroll tax cuts generate not only extensive-margin registration but also intensive-margin benefit delivery. The logic is straightforward. Before the reform, a firm choosing to formalize a worker faced two cost bundles: (1) the payroll contribution wedge (health, SENA, ICBF, pension contributions), and (2) mandated non-wage benefits (*prima*, *cesantías*, vacation). The reform sharply reduced bundle (1) by 13.5 percentage points. For a worker earning two minimum wages, this amounted to a saving of roughly COP$78,000 per month—comparable to the annualized cost of the *prima*. The savings from reduced contributions thus effectively "paid for" compliance with the benefit mandate, making full formalization economically viable for firms that were previously informal.

This mechanism distinguishes the Colombian reform from smaller interventions. A tax cut of 2–3 percentage points might shift some firms across the registration threshold while

leaving them unable or unwilling to absorb benefit costs. But at 13.5 percentage points, the reform was large enough to shift firms across *both* thresholds—from informal to registered, and from thinly registered to fully compliant. The monotonically increasing event-study pattern is consistent with this interpretation: as firms adjusted their operations and the savings accumulated, compliance deepened over time.

6.2 Implications for the Informality Debate

The finding that formalization came with benefits speaks to the longstanding debate about the nature of informality in developing countries. Levy (2008) argues that informality in Latin America is substantially voluntary—workers and firms choose informal arrangements to avoid taxes while obtaining similar social protection through government programs (see also Maloney, 2004; Levy, 2018). Under this view, formalization subsidies may simply relabel existing arrangements without changing workers' actual experience. La Porta and Shleifer (2014), by contrast, characterize informal firms as fundamentally different from formal ones, operating at lower productivity and providing worse working conditions. The exclusion view, advanced by Perry et al. (2007) and Ulyssea (2018), holds that informal firms would prefer to formalize but are deterred by the cost of compliance.

My results are more consistent with the exclusion view. If informality were primarily voluntary and firms were strategically avoiding benefit costs, one would expect the tax cut to induce registration without benefit delivery—precisely the thin formality pattern I test for and reject. Instead, the evidence suggests that the marginal formalizers were firms that wanted to comply but were previously deterred by the combined cost of contributions and benefits. Once the contribution burden fell, full compliance followed. This interpretation aligns with the evidence of Galiani and Weinschelbaum (2012) on the tax-informality nexus, Ulyssea (2018)'s structural estimates showing that enforcement and costs jointly determine formality status, and Monteiro and Assunção (2012)'s finding that formalization improves firm access to credit and government services. The complementarity between lower costs and broader access to formal institutions may explain why the formalization dividend was substantive rather than thin (de Mel et al., 2012).

6.3 Limitations

Several limitations deserve note. First, the GEIH measures self-reported benefit receipt, which may differ from actual benefit delivery. Workers may over-report benefits they are legally entitled to or under-report benefits they receive irregularly. However, there is no reason to expect differential measurement error between small and medium firms or across

time periods, so bias in the DiD estimate is unlikely. Second, the small-versus-medium firm comparison produces imprecise estimates because medium firms themselves experienced partial treatment. The strongly significant results from the small-versus-large comparison confirm that the economic effect is real but that the conservative control group attenuates it. Third, I cannot observe benefit *quality*—whether vacation days are actually taken, whether *cesantías* are deposited on time, or whether pension contributions are made at the correct rate. The GEIH measures receipt of each benefit as a binary indicator, and improvements along these intensive margins are not captured. Future work with administrative data could address this limitation.

7. Conclusion

The evidence from Colombia's payroll tax reform does not support the "thin formality" hypothesis. Across multiple specifications, benefit delivery improved or remained stable at small firms relative to comparison groups—a pattern inconsistent with strategic unbundling of registration from compliance. The strongest evidence comes from comparing small firms to large firms, where the effect on benefit completeness is large and precisely estimated, and from the subsample of workers with written contracts, where the intensive-margin improvement is statistically significant. The small-versus-medium comparison, while positive and economically meaningful, is less precise, reflecting the fact that medium firms were themselves partially treated by the reform.

These findings have implications for the design of informality-reduction policies (Kanbur, 2017; Loayza, 2016). They suggest that when tax cuts are sufficiently large—13.5 percentage points in Colombia's case—the standard concern about strategic unbundling may be misplaced: the cost reduction appears to have been large enough to make full compliance viable for marginal formalizers. Whether this "formalization dividend" generalizes to contexts with weaker enforcement (Almeida and Carneiro, 2012) or more voluntary informality (Levy, 2008) remains an open question.

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A. Data Appendix

A.1 Data Source and Access

The data come from the *Gran Encuesta Integrada de Hogares* (GEIH), conducted by the *Departamento Administrativo Nacional de Estadística* (DANE). Microdata are publicly available through DANE's microdata portal at https://microdatos.dane.gov.co/. I downloaded the labor force module (*módulo de fuerza de trabajo*) for each month from January 2011 through December 2016, yielding 72 monthly cross-sections.

A.2 Sample Construction

The analytic sample was constructed through the following restrictions:

1. Begin with all individuals in the GEIH labor force module aged 18–65.
2. Restrict to wage and salary workers (*trabajadores asalariados*), excluding the self-employed, employers, unpaid family workers, and domestic workers.
3. Require positive reported monthly earnings.
4. Restrict to workers at establishments with $\leq$50 employees for the main analysis (small and medium firms). The large-firm comparison (>50 employees) is used in robustness checks.
5. Require non-missing responses to all four benefit receipt questions (vacation, *prima*, *cesantías*, pension).

These restrictions yield a final sample of 208,316 worker-period observations: 131,423 at small firms ($\leq$10) and 76,893 at medium firms (11–50).

A.3 Variable Construction

Benefit completeness index. The index equals the sum of four binary indicators, each coded 1 if the worker reports receiving the benefit and 0 otherwise: (i) paid vacation (*vacaciones con sueldo*), (ii) *prima de navidad* (*prima de servicios*), (iii) *cesantías*, and (iv) pension fund contributions (*cotizante a fondo de pensiones*). The index ranges from 0 to 4.

Written contract. Coded 1 if the worker reports having a written employment contract (*contrato escrito*), 0 if the contract is verbal or absent.

Firm size. The GEIH asks workers to report the number of employees at their establishment in categorical brackets. I map these brackets to three groups: small ($\leq$10), medium (11–50), and large (>50).

Thin formality indicator. Coded 1 if the worker contributes to a pension fund but has a benefit index strictly less than 4, and 0 otherwise.

B. Identification Appendix

B.1 Pre-Trend Assessment

The event-study estimates in Table 4 provide the primary test of the parallel trends assumption. The pre-reform coefficient at $t = -1$ is -0.017 (SE = 0.044) for the benefit index and 0.011 (SE = 0.009) for pension contributions. Both are close to zero and statistically insignificant, supporting the assumption that small and medium firms followed parallel trajectories in the pre-reform period.

B.2 Placebo Test

The placebo test in Table 5, Panel B, uses only pre-reform data (2011–2012) and assigns a fake treatment date at 2012. The estimated DiD coefficient is 0.013 (SE = 0.043), confirming no spurious treatment effect in the pre-period.

C. Robustness Appendix

C.1 Alternative Firm-Size Cutoffs

Table 5 (Panel A) reports results using alternative definitions of the treatment group. Restricting the treatment group to very small firms ($\leq$5 employees) yields a benefit index DiD of 0.020 (SE = 0.052), positive but smaller and less precise, consistent with the smallest firms facing the most binding constraints on benefit delivery even after the tax cut. The small-versus-large comparison (>50 employees) produces the strongest result at 0.141 (SE = 0.037, $p < 0.01$), reflecting the cleaner treatment-control contrast when the control group is essentially untreated.

C.2 Sector Fixed Effects

Adding two-digit sector fixed effects increases the baseline estimate from 0.057 to 0.069, suggesting modest negative selection of small firms into sectors with lower benefit provision. The qualitative conclusions are unchanged.

D. Standardized Effect Sizes

Table 6: Standardized Effect Sizes: Benefit Completeness

Outcome	$\hat{\beta}$	SE	SD(Y)	SDE	SE(SDE)	Classification
Panel A: Pooled						
Benefit Index	0.0568	0.0447	1.5862	0.036	0.028	Small positive
Paid Vacation	-0.0030	0.0124	0.4917	-0.006	0.025	Small negative
Prima de Navidad	0.0526	0.0310	0.3842	0.137	0.081	Moderate positive
Cesantías	-0.0013	0.0113	0.4971	-0.003	0.023	Null
Panel B: Heterogeneous (Sample Splits by Sex)						
Male workers	0.0546	0.0528	1.5768	0.035	0.033	Small positive
Female workers	0.0613	0.0432	1.5983	0.038	0.027	Small positive

Notes: **Country:** Colombia. **Research question:** Did the 2012 payroll tax cut (Law 1607, 13.5 percentage-point reduction in employer contributions) improve non-wage benefit delivery at small firms, or did formalization remain "thin"—formal registration without delivery of legally mandated benefits? **Policy mechanism:** Law 1607 replaced employer payroll contributions for SENA (2%), ICBF (3%), and employee health (8.5%) with a corporate equity tax (CREE), reducing formal employment costs by 13.5 percentage points while leaving benefit mandates (paid vacation, prima de servicios, cesantías, pension contributions) unchanged. **Outcome definition:** Benefit completeness index (0–4) summing self-reported entitlement to paid vacation, prima de navidad, cesantías, and pension fund contributions among wage/salary workers. **Treatment:** Binary—workers at small firms ($\leq$10 employees) vs. medium firms (11–50), before vs. after the January 2013 reform. **Data:** DANE Gran Encuesta Integrada de Hogares (GEIH), 2011–2016, covering wage/salary workers ages 18–65 across 13 metropolitan areas; unit of observation: worker-month; $N \approx 208{,}000$. **Method:** Difference-in-differences (Small Firm $\times$ Post) with city and year-quarter fixed effects, individual controls (age, education, sex, hours); standard errors clustered at city level. **Sample:** Wage/salary workers ages 18–65 at firms with $\leq$50 employees, with positive earnings and non-missing benefit data. SDE $= \hat{\beta}/\text{SD}(Y)$ where SD(Y) is the pre-treatment standard deviation. Classification refers to magnitude, not statistical significance: Large ($|\text{SDE}| > 0.15$), Moderate (0.05–0.15), Small (0.005–0.05), Null (< 0.005).