Heterogeneous Responses in Payments Under the Table: Experimental Evidence from the Dominican Republic *

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Abstract

This pre-analysis plan outlines a randomized controlled trial (RCT) in the Dominican Republic, designed to evaluate the impact of various deterrence messages on wage misreporting, referred to as "Payments Under the Table" (PUT), and informal employment among the universe of registered firms. The experiment is conducted jointly with the Dominican Republic Tax Authority (DGII). Our messages target firms with information on the role and consequences of Labor Courts, the key institution protecting employees from PUTs and informality. The treatment arms are designed to test different hypotheses regarding firms' reported payroll, employment, and profits. Additionally, we examine worker-level responses to understand the relationship between PUTs, minimum wage, and tax thresholds. Finally, we aim to shed light on the relationship between the treatment responses and relative bargaining powers.

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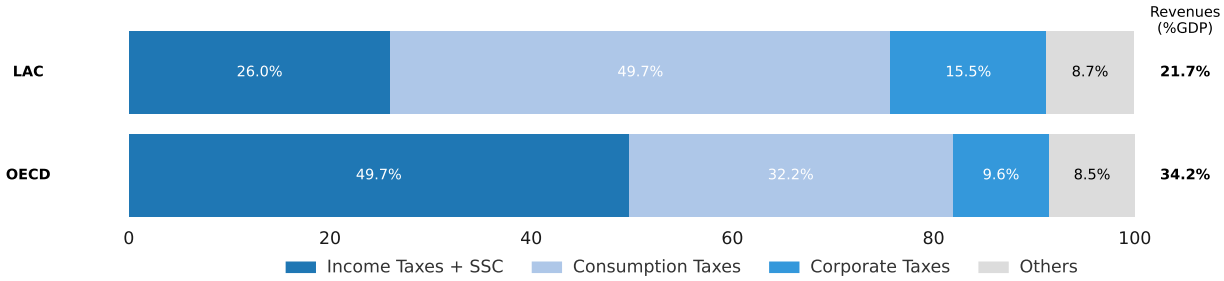
1 Introduction

Developing countries face formidable challenges in establishing efficient and progressive tax systems. This translates not only into low revenue collection but also into a tax system more dependent on indirect taxation. Latin American and Caribbean (LAC) governments collect, on average, revenues for 21.1% of the GDP compared to 34.2% in OECD countries. Among the collected revenues, OECD countries double direct taxes such as income taxes and social security contributions (SSC) compared to LAC countries. Most of the tax collection in LAC countries comes from indirect taxes, such as VAT. The existing evidence suggests that the gap in tax collection between developed and developing countries is caused less by the choice of low tax rates and more by the challenges associated with informality and misreporting by both workers and firms (Besley and Persson 2009, Bachas et al. 2024).

Figure 1: Tax Collection in 2021: Latin American and Caribbean vs. OECD countries



Source: OECD "Revenue Statistics in Latin America and the Caribbean", through Tax Foundation

When it comes to policies aimed at reducing tax evasion, it is important to distinguish between different definitions of informal employment. We focus on employer-employee relationships and ignore self-employment. However, even among employer-employee relationships, there are different layers of informality. First, non-registered establishments hire all their workers informally. Second, even registered establishments hire some workers *off-the-books* (Ulyssea 2018). Third, even formal employees in registered establishments can receive part of their wages paid *off-the-books*, which we referred to as "Payments Under the Table" (PUTs), following Feinmann et al. (2022).

Several papers have studied how to reduce the first margin of informality: Labor market policies, such as adjusting payroll tax rates and implementing universal social security benefits, can decrease informality while incentivizing education and increasing productivity (Bobba et al. 2018). In addition, interventions involving official warnings from tax authorities to unregistered firms have successfully increased registration rates, particularly among larger revenue firms (Giorgi et al. 2018). Enforcement strategies targeting the extensive margin of informality are found to be more effective than reducing formalization costs, potentially generating substantial gains in

aggregate total factor productivity and output (Ulyssea 2020).

However, little is known about addressing layers of informality within registered establishments: informal employees in registered establishments and formal employees receiving PUTs. This is unfortunate because these forms of informality have some connection with administrative records, which has two key advantages. First, government institutions have records on these establishments, allowing for direct intervention from the tax authority. Second, we can use administrative data on social security and tax records to evaluate interventions reliably.

This paper contributes to the literature by experimentally testing interventions designed to reduce PUTs and informality in registered firms. Specifically, we explore how deterrence messages from the tax authority, incorporating information on labor lawsuits, affect firms' behavior regarding underreported wages. The experiment includes two types of messages: an "awareness" intervention, which highlights the recent rise in labor lawsuits and reminds firms of the risks employees might report them to labor courts, and a "propagation" intervention, which adds that the tax authority may use labor lawsuits to trigger tax audits. Both messages urge firms to cease informal practices.

To further isolate the effects of our deterrence interventions, we include an additional treatment arm that tests whether firms respond to these messages specifically regarding PUTs, or if they merely react to general deterrence. This treatment also references labor lawsuits, but it concerns profit sharing, which is mandatory in the Dominican Republic. Compared to our main treatment arms, this intervention has different predictions regarding payroll, employment, and profit reporting, allowing us to discern if firms are responding to the targeted message content or simply to any message perceived as a general threat of audit.

The literature on tax enforcement deterrence messages has primarily focused on the use of audit threats and moral appeasement. In Doerrenberg et al. (2022), firms in Bulgaria were randomly sent messages from the Tax Authorities, which could include varying probabilities of audit, ranging from 1% to 60%, or elements of moral suasion, such as images of tax-funded projects or examples of public goods reliant on firms' tax contributions. The results indicated that messages with high audit probabilities had an impact on reported payroll taxes and Social Security contributions that was 50% greater than those appealing to moral considerations. Similarly, Bergolo et al. (2023) used statistics of both audits and public goods to increase firms' VAT tax compliance in Uruguay, and Brockmeyer et al. (2019) employed a series of threats, including the possibility of an audit, shop closure, or online publication of evaders, in Costa Rica to increase firms' income tax filings and payments.

Moreover, Holz et al. (2020) has already studied the use of deterrence messages in the Dominican Republic. In this study, firms were randomly presented with the threat of being publicly portrayed as tax evaders or the threat of incarceration under money laundering and terrorism financing laws, which categorize tax evasion as a prison-punishable offense. The result was an increase of over US$100 million in income tax revenue, primarily driven by the salience of potential

incarceration.

2 Context

The Dominican Republic has one of the lowest revenue-to-GDP ratios among Latin America and the Caribbean (LAC) countries. According to OECD estimates, the Dominican Republic's tax-to-GDP ratio in 2022 was 13.9%. In contrast, the LAC average was 21.5% and the OECD average was 34.0%. Specifically, Income Tax accounted for 26% of total tax revenues in the Dominican Republic, whereas the corresponding shares for LAC and OECD countries were 28% and 34%, respectively.

The low levels of revenue collection translate into challenges to fund the social security system. The Central Bank of the Dominican Republic reports that 56% of the country's workforce is considered informal and does not pay social security contributions. Moreover, a significant portion of the formal workforce receives part of its salary *off-the-books*, which we referred to as "Payments Under the Table" (PUTs), following Feinmann et al. (2022).

2.1 Incentives for PUTs and Informality

Different from other developing countries, the Dominican Republic taxes all firms on profits rather than on revenues. This means that firms can deduct reported wages from the profit tax base. Indeed, the profit tax rate is larger than the total contributions made by employers and employees.

Table 1: Social security contributions

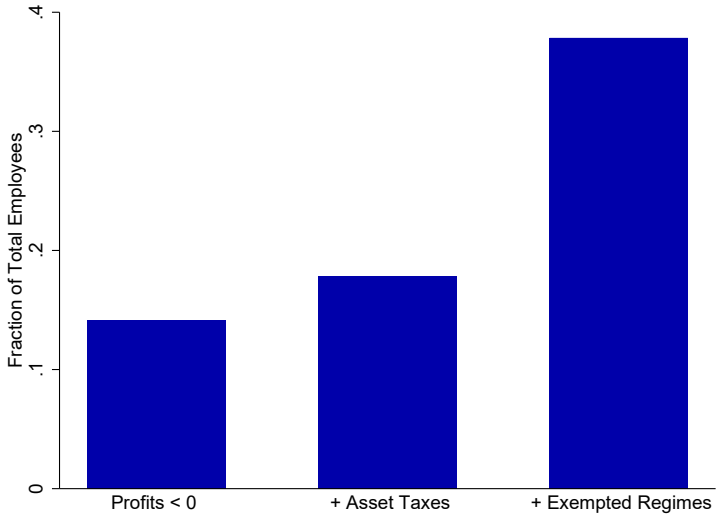
Seguro	% Salario Bruto	Empleador	Empleado
Vejez, discapacidad y sobrevivencia	9.97%	7.10%	2.87%
Familiar de salud	10.13%	7.09%	3.04%
Riesgos Laborales	1.20%	1.20%	0%
Total	21.03%	15.39%	5.91%

However, several factors affect this simple calculation. First, there are some additional costs related to reported wages, such as severance payments and INFOTEP insurance.[1] Second, the profit tax deductions are realized during the corporate tax filing, which typically occurs annually. Contributions, on the other hand, are immediate cash outflows. Small cash-constrained firms may prioritize short-term cash flow over long-term tax savings. Third, many firms make zero or negative profits, while deductibility only applies to positive profits. Fourth, the Dominican Republic implemented an asset tax to complement and guarantee every firm pays a minimum corporate tax. If profit taxes are lower than 1% of the assets, then the firm must pay the second, making the profit tax deductions irrelevant even when having positive profits. Finally, some firms

[1] It's 1% of the reported payroll paid by the employer used to support vocational and technical training programs.

are in special tax regimes with no profit taxes but are paying contributions on behalf of their employees. Figure 2 shows the share of employees that work in firms with positive gains from paying under the table.

Figure 2: Fraction of Employees in Firms with Monetary Gains from PUTs



On top of social security contributions, about 20% of the employees pay income taxes (ISR) with a progressive scale from 15% to 25%. When adding this tax rate, there are clear monetary gains from receiving PUTs.

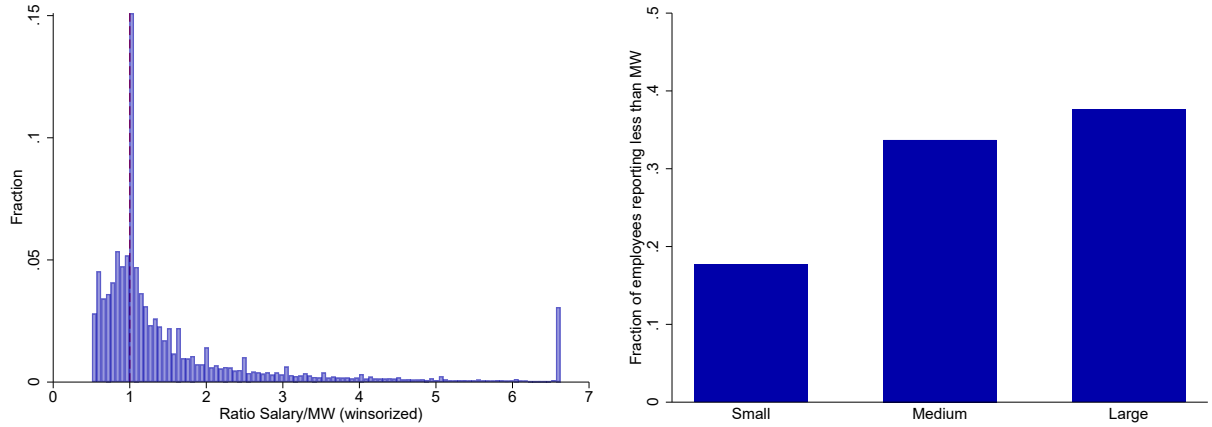
Table 2: Marginal income tax rate for individuals

Tramo	% MTR
0 - 416,220	0%
416,221 - 624,329	15%
624,330 - 867,123	20%
$>$ 867,124	25%

Another interesting finding suggesting prevalent PUTs is the low compliance with the minimum wage, especially in large firms. The Dominican Republic sets different minimum wages depending on firms' revenues and number of employees. The minimum wage in large firms is relatively high, and we observe more than 30% of the employees reporting wages below it.[2]

[2]Informal conversation with the DGII suggests that this is mainly driven by PUTs, where these employees want to report the lowest value possible to access health insurance, and the rest pay *off the books*.

Figure 3: Compliance with the Minimum Wage



(a) All Firms

(b) By Firm Size

Notes: Figure (a) shows the distribution of wages over minimum wage in 2012 (the year with worker-level data available at the moment). The minimum wage varies with firm size and assets, forming three groups. We calculated the corresponding group for each firm and applied the corresponding minimum wage. Panel (b) shows the fraction of employees in each firm size category who report below the corresponding minimum wage.

Regarding the benefits of hiring informal employees for a registered firm, we find complying with the minimum wage, administrative costs such as registration and record-keeping, compliance with labor laws, high turnover and temporary work. Therefore, this setting is particularly interesting for studying methods to increase payroll tax compliance and reduce informality.

2.2 Legal Framework

In the Dominican Republic, labor laws are governed by the Labor Code (Law 16-92). Under Articles 720 and 721, any omission of payments to Social Security Contributions is considered a severe offense. Employers who commit this violation are subject to a fine of up to 12 minimum wages and even sanctions under the Penal Code. Additionally, the Social Security Law (Law 87-01) specifies that any omission or falsification in the declaration of actual earnings subject to the calculation of contributable salary, or delays in the employer's own contributions owed to the Social Security System, constitutes a failure to meet their obligations.

Thus, employees can initiate labor lawsuits, which will be addressed in specialized labor courts, against their employers for failing to pay their share of the employee's Social Security Contributions. We will denote this as the *Awareness Effect*.

In addition, lawsuits are not the only consequence firms might face when engaging in various forms of tax evasion. As noted by Holz et al. (2020), the Dominican Republic's Judiciary can target audits at suspicious firms. Thus, labor lawsuits might trigger audits, serving as signals of tax evasion. We will refer to this as a *Propagation Effect*, which, when included in some of the

treatments, is expected to increase payroll tax compliance.

Profit tax compliance is another significant issue for both the Tax Authorities and employees. Since 1972, the Dominican Republic has enacted a law, currently encompassed in Articles 223 to 227 of the Labor Code, which mandates most enterprises to provide a profit-sharing bonus to employees, amounting to 10% of their profits. Consequently, firms have an incentive to misreport their profits to avoid this additional payment to employees. However, the Labor Code stipulates that if employees suspect that their employers are not accurately reporting their profits, they can notify the Tax Authorities, thereby triggering an audit. Therefore, we will investigate whether firms alter the profits they report and the income tax they pay when they receive messages informing them of the costs associated with misreporting benefits.

Thus, these treatments will provide variations in the information regarding the effects of employees reporting their employers and the consequences of initiating a lawsuit. Additionally, the study will emphasize how the risk of audits affects firms. Furthermore, given that firms have heterogeneous incentives to evade taxes, the study will also examine variations in compliance within the same treatment group.

3 Experimental Design

In this Randomized Controlled Trial (RCT) we study which interventions the government can implement to reduce informality and PUTs. The experiment consists of a series of messages sent to firms, designed to highlight the potential risks associated with engaging in tax evasion schemes. It is conducted in collaboration with the *Dirección Nacional de Impuestos Internos* (DGII), the tax authority of the Dominican Republic. The study will be performed during the second semester of 2024 and will include 67,570 firms representing the entire universe of formal enterprises in the Dominican Republic's private sector.

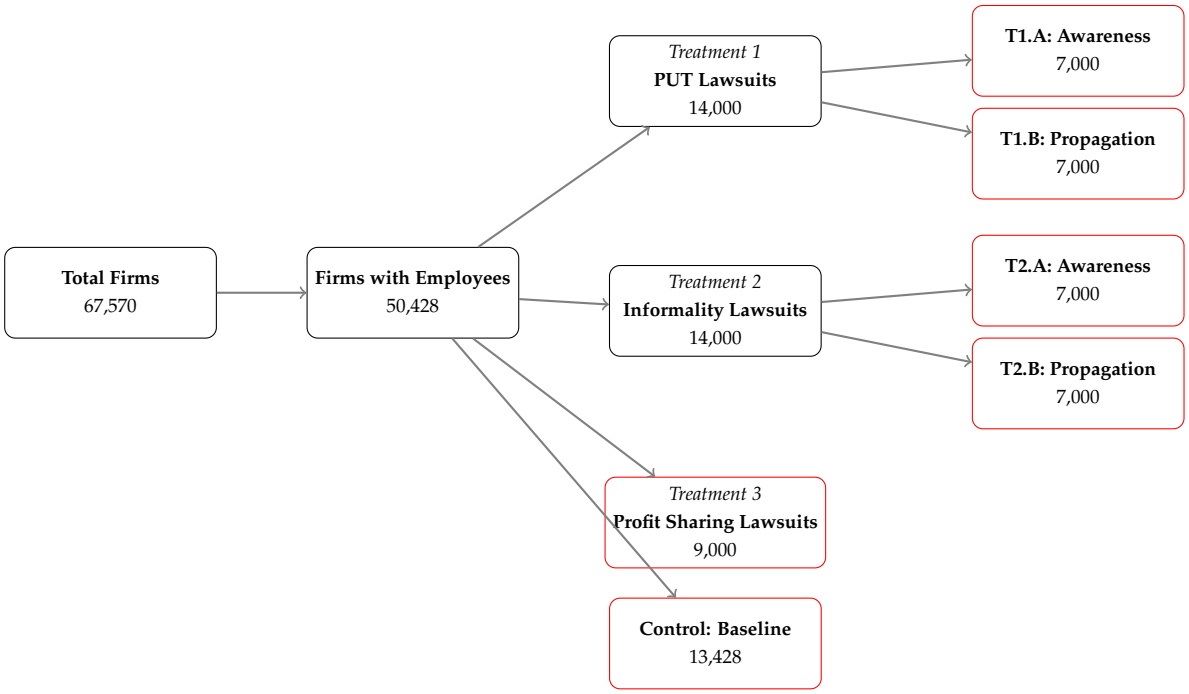
In particular, the paper exploits the fact that labor lawsuits are one of the employers' main risks when paying under the table to their employees or hiring them off the books. Labor lawsuits can prevent PUTs to a given employee if the likelihood of reporting or the cost is too high. Moreover, labor lawsuits can prevent PUTs with other employees if there are *propagation effects*. If one labor lawsuit triggers a tax audit that unmasks all PUTs in the firm, the employer may not have incentives to pay under the table to any employee (Kleven et al. 2016). This example requires two existing institutions to work together: labor courts, where employees unilaterally report their employers breaking that individual collusion down, and the tax authority, which uses labor lawsuits to audit establishments breaking other collusions down.

Therefore, each of our main treatments, PUTs, and informality, will have an *awareness* treatment arm and a *propagation* treatment arm. The first one only states that the number of labor lawsuits is growing, and the government is committed to informing employees about the possibility of reporting employers in labor courts to protect their labor rights. The second treatment

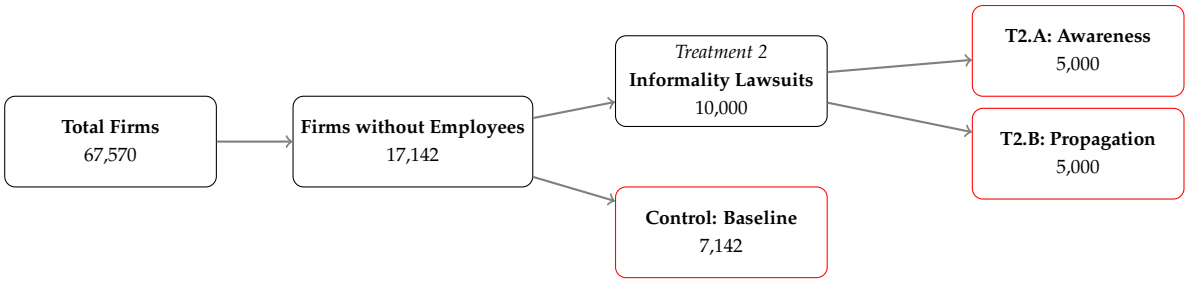
adds a paragraph stating that the tax authority is authorized to use labor lawsuit information to trigger a tax audit in the firm.

Finally, we define a *profit sharing* treatment arm. In this case, the deterrence message states that employees can report employers in labor courts for not reporting profits accurately. Underreporting of profits affects employees because they are entitled to 10% of them by law. Therefore, the labor law also protects this right. At the same time, this will help us interpret the results. This treatment should not affect payroll reporting or employment. Having different predictions allows us to test whether firms respond to any deterrence message by reducing all forms of tax evasion or whether they take into consideration the specific threat.

We end up with five treatments and one control group. In the appendix, we include the treatment mailings to the firms in English. The original messages have been written in Spanish and approved by tax authorities. Upon request, emails in Spanish are available. We divide our experiment into two groups: firms that reported employees in 2023 and those that reported no workers during the same period. For the latter group, we do not have treatment arms for PUTs.



The PUTs treatment does not make sense for firms with no employees. However, they may hire workers informally. Therefore, we stratify the sample based on firms with and without employees. The latter group can only receive the informality treatment.



In order to have a control group to compare our findings, firms in the *Control: Baseline* group will receive a basic email that notifies them of their income tax submission date and provides a link to the DGII's website for additional details regarding their tax filings.

The main effects of the experiment will be studied in both the *Treatment 1* and *Treatment 2* groups. In the *Treatment 1* group, firms will receive information about the potential lawsuits and audits they might face when engaging in PUT collusions, whereas in the *Treatment 2* group, firms will be made aware of the same potential risks associated with hiring informal workers.

In particular, firms included in these treatments will be further divided into two subgroups. In the *Awareness* subgroup, we will examine the responses of employers who are informed solely about the risks of being sued by their employees due to Payments Under-the-Table (PUTs) or off-the-books hiring, depending on the treatment. In the *Propagation* subgroup, companies will additionally be informed that the tax authorities may use information about labor lawsuits to target audits, as both forms of informality violate the Tax Code.

Finally, while we anticipate that the direct effects of the previous treatments will be an increase in payroll tax compliance and a reduction in informality without necessarily affecting the reported profits or potentially reducing them (as discussed in the following section), we also aim to include a treatment that does not have a direct expected effect on these variables.

Instead, *Treatment 3* will address profit tax compliance and is expected to increase the reported profits. Since the Labor Code requires firms to provide an annual profit-sharing bonus to their employees, employers have an incentive to under-report profits. However, employees can report suspected profit misreporting, potentially leading to a full company audit. This treatment will emphasize this potential risk to firms, and we will compare the effects of this message with those of *Treatment 1* and *Treatment 2*.

3.1 Analysis of Pre-Treatment Variables

Table 3: Balance Table for Firms with Employees

	Control	PUT-Soft	PUT-Strong	Formality-Soft	Formality-Strong	Profits
Panel A: Employment and Wages						
Employees	16.68	17.11	16.98	16.67	16.15	16.99
	(0.34)	(0.48)	(0.48)	(0.46)	(0.45)	(0.42)
Log Av. Wages	12.27	12.27	12.28	12.27	12.26	12.26
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Log Total Payroll	14.06	14.08	14.06	14.06	14.05	14.08
	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Panel B: Firms' Balance Sheet						
Log Revenues	16.10	16.09	16.09	16.10	16.06	16.08
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)
Log Costs	15.85	15.85	15.84	15.85	15.83	15.84
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Log Assets	15.82	15.87	15.83	15.82	15.79	15.82
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Assets > 0	0.11	0.11	0.11	0.11	0.11	0.11
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Panel C: Region and Industry						
Special Tax Regime	0.03	0.03	0.03	0.03	0.03	0.03
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Distrito Nacional	0.43	0.44	0.44	0.44	0.44	0.43
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Santo Domingo	0.18	0.18	0.19	0.18	0.18	0.19
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Retail	0.37	0.38	0.37	0.37	0.37	0.38
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Construction	0.09	0.09	0.09	0.09	0.09	0.09
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Hotels	0.04	0.04	0.04	0.04	0.05	0.04
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Observations	13,428	7,000	7,000	7,000	7,000	9,000

Table 4: Balance Table for Firms without Employees

	Control	Formality-Soft	Formality-Strong
Panel B: Firms' Balance Sheet			
Log Revenues	14.14	14.15	14.13
	(0.03)	(0.03)	(0.03)
Log Costs	14.09	14.13	14.11
	(0.03)	(0.04)	(0.04)
Log Assets	14.61	14.56	14.58
	(0.04)	(0.04)	(0.04)
Assets > 0	0.27	0.26	0.26
	(0.01)	(0.01)	(0.01)
Panel C: Region and Industry			
Special Tax Regime	0.01	0.01	0.01
	(0.00)	(0.00)	(0.00)
Distrito Nacional	0.55	0.54	0.53
	(0.01)	(0.01)	(0.01)
Santo Domingo	0.19	0.19	0.20
	(0.00)	(0.01)	(0.01)
Retail	0.29	0.28	0.29
	(0.01)	(0.01)	(0.01)
Construction	0.12	0.13	0.13
	(0.00)	(0.00)	(0.00)
Hotels	0.02	0.03	0.02
	(0.00)	(0.00)	(0.00)
Observations	7,142	5,000	5,000

3.2 Outcome Variables

In this study we examine a range of outcome variables categorized by their levels of importance. These variables are analyzed in the context of an experimental framework designed to assess the impact of various treatments. Tax authorities have already provided pre-treatment data for both firms and employees. Post-treatment data will be collected and provided by the authorities as soon as feasible. Specifically, employee-level data is collected monthly, while firm-level data is aggregated annually. This means that results on the firm's side will be obtained no sooner than December 2024.

4 Empirical Strategy and Expected Results

As our main specification for the subgroup of firms with reported employees, we will use a difference-in-differences model in the following form:

$$Y_{i,t} = \alpha + \gamma_t 1\left[POSTR\right]_t + \sum_{m \in M} \beta_m 1\left[m = M\right]_i + \sum_{m \in M} \delta_m 1\left[POSTR, m = M\right]_{i,t} + \varphi X_i + \varepsilon_{i,t}$$

We will examine the outcomes denoted by $Y_{i,t}$ for each firm i at time t, where the time unit may vary between months and years depending on the available data. The variable $1\left[\text{POSTR}\right]_t$ is a dummy variable set to 1 if the outcome is measured post-treatment. The term $\sum_{m \in M} 1\left[m = M\right]_i$

represents a set of dummy variables indicating the specific treatment received by firm i, with $m \in M = \{$*Treatment 1: Awareness; Treatment 1: Awareness & Propagation; Treatment 2: Awareness; Treatment 2: Awareness & Propagation; Treatment 3*$\}$. The effect of receiving one of these treatments will be contrasted against the baseline, which includes firms that received a neutral message. We will incorporate control variables to enhance estimation precision, and the interaction between the treatment dummies and the post-treatment indicator will estimate the causal effect δ_m for each treatment group. Finally, $\varepsilon_{i,t}$ will be the error term.

In addition, the following difference-in-differences model will be used for the subgroup of firms without reported employees:

$$Y_{i,t} = \alpha + \gamma_t 1\left[POSTR\right]_t + \sum_{n \in N} \beta_n 1\left[n = N\right]_i + \sum_{n \in N} \delta_n 1\left[POSTR, n = N\right]_{i,t} + \varphi X_i + \varepsilon_{i,t}$$

The only difference with the previous model is that we will send fewer treatments, as the number of firms without employees is lower than the ones with workers. In this case, $n \in N =$ $\{$*Baseline; Treatment 2: Awareness; Treatment 2: Awareness & Propagation*$\}$.

We include pre-treatment information from 2012 and cluster the standard errors at the firm level.

4.1 Hypotheses

Initially, we expect that the coefficients β_m and δ_m are not significantly different from 0 for all pre-treatment outcomes. This would provide evidence supporting the identifying assumption required to establish δ_m as the causal effect of the treatment. If these coefficients were significantly different from 0, it would indicate that the randomization of the treatments was not correctly implemented and the treatments are not well-balanced.

Then, for the post-treatment outcomes of those firms with reported employees, we hypothesize the following changes:

We expect that both *Treatment 1* and *Treatment 2* will generate a statistically significant increase in reported wages and payroll taxes paid by both firms and employees relative to the baseline group. Furthermore, with the inclusion of the *Propagation Effect*, this result is anticipated to be even more pronounced. This expectation arises because both treatments directly address the potential under-reporting of payrolls for tax evasion purposes, and when firms are informed of the costs associated with engaging in informal schemes, they will have an incentive to regularize their off-payroll payments.

In contrast, *Treatment 3*, which focuses on the risks of under-reporting profits, is expected to influence firms' reporting strategies differently. Firms will have two options: first, to increase their reported revenue, and second, to decrease their reported costs, including wages. Consequently, if firms opt for the first strategy, we expect no significant change in wages compared to the baseline

treatment; however, if they choose the second strategy, we may observe a decline in reported wages and payroll taxes.

A key aspect of our analysis will be to study how firms decide to implement changes in wages when treated. Specifically, firms have two possibilities: they can regularize off-the-books payments for employees already hired, or they can begin complying with the law for newly hired workers. We hypothesize that since it is more challenging to alter or terminate existing evasion schemes with current employees—who could potentially sue their employers if the collusion breaks down—than to start with fully legal new contracts, the effects of increased wages will be more noticeable among new employees.

Regarding employment, we do not expect significant differences in the number of new hires or dismissals between *Treatment 1*, *Treatment 3* and the control group. In a similar experiment, Doerrenberg et al. (2022) find that firms in Bulgaria do not alter their incentives to hire or fire employees when presented with messages from tax authorities regarding the probability of being audited or appeals to moral considerations. As the nature of our experiment is similar, we expect the same results. In the case of *Treatment 2*, we predict a surge in the number of employees reported by firms in this group. This increase is expected to be a direct result of these employers receiving a message urging them to formalize their previously off-the-books workers. Thus, this rise in reported employee numbers does not necessarily indicate that these firms have hired new employees, but rather that workers who were previously under informal conditions are now being reported officially.

Although we anticipate that *Treatment 1* and *Treatment 2* will produce similar effects, we posit that the termination of a PUT regime is less complex than formalizing an informal worker. Consequently, we expect the impact of *Treatment 1* to be greater than that of *Treatment 2*. This expectation arises from the fact that employees under PUT regimes are already classified as formal workers.

Specifically, the cost of fully addressing informality is substantially higher, as it involves registering the employee with the company and ensuring compliance with social security contributions and other employee benefits, such as health insurance. Conversely, terminating a PUT regime involves only the adjustment of previously unreported payroll amounts. Therefore, increasing the reported payroll for these employees entails significantly lower costs compared to the expenses associated with formalizing previously off-the-books employees and paying their full salaries in compliance with legal requirements.

In terms of the secondary variables, we also predict differences between treatments. In *Treatment 1* and *Treatment 2*, as we expect firms to increase their reported payroll, we anticipate a corresponding rise in reported costs. This would, in turn, lead to a decrease in profits and Profit Tax payments. However, it is also possible that, prior to the treatment, companies under-reporting payroll could have attempted to avoid higher profit taxes by over-reporting other costs or under-reporting income. Consequently, increasing the reported payroll might generate different changes in reported costs or revenues than initially expected. If the first method is true, firms will no

longer need to continue over-reporting other costs, and total costs will increase less sharply than the payroll. If the second method is employed, then, with an increase in reported payroll, their reported gross income will also rise. In both scenarios, the profits tax paid by companies receiving these messages may decrease on average, as firms now have fewer incentives to misreport their revenues and costs. These results will be magnified when including the *Propagation Effect*.

On the contrary, *Treatment 3* informs companies that under-reporting profits might incite both lawsuits and audits. Hence, we anticipate that the direct result of this treatment will be an increase in reported profits. This could be achieved by increasing the revenues that were previously under-reported, which could generate a similar effect to those seen in *Treatments 1* and *2* if firms also increase their revenues, or by decreasing costs, including the reported payroll. Thus, these two mechanisms may counteract each other in terms of overall tax compliance.

In terms of the remaining variables, we anticipate changes in the amount of Asset Taxes firms pay. In the Dominican Republic, firms are obligated to pay either 27% of their profits (Profit Tax) or 1% of their assets (Asset Tax), whichever amount is higher. Therefore, if *Treatment 1* and *Treatment 2* lead to a decrease in reported profits, we expect a greater proportion of firms to be subject to Asset Taxes. Conversely, *Treatment 3* is expected to increase reported profits, which should result in a lower proportion of firms paying Asset Taxes. In practice, firms that report that 1% of their assets exceeds 27% of their net revenues must pay the difference between the two taxes in two separate payments. This provides an incentive for firms to report their assets in such a way that the ratio $\frac{1\% \text{ Assets}}{27\% \text{ Profits}}$ is less than or equal to 1. Consequently, if *Treatment 1* and *Treatment 2* lead to a reduction in reported profits, we expect a corresponding decrease in reported assets. Conversely, if *Treatment 3* results in increased reported profits, firms are likely to report higher asset values to maintain a favorable tax ratio.

In terms of the rest of the taxes firms pay, such as VAT Tax, we do not anticipate significant changes between the treatments and the control group, as their report is not directly nor indirectly addressed by the messages.

Finally, as firms are anticipated to address payroll informalities in *Treatment 1* and *Treatment 2*, employees are likely to receive higher formal salaries. As a result, some of these employees may exceed the income threshold required to be subject to Income Tax, leading to an increase in the amount of Income Tax collected by the tax authorities. In the case of *Treatment 3*, where firms are required to report higher profits, one possible outcome is a reduction in costs. This reduction could result in a decrease in reported payroll, and there is a possibility that employers may initiate PUT regimes with their employees.

In the case of firms without employees, our main hypothesis is the following: Registered firms with no reported employees are either a) solely run by the owner or b) employing someone off-the-books. As no formal employees are engaging in PUT regimes, there is no point in sending these firms the *Treatment 1*. A similar argument can be made against utilizing *Treatment 3*, as potentially no employees should receive a profit-sharing bonus. However, *Treatment 2* could

potentially nudge employers to formalize their employees, as it directly emphasizes the potential costs of hiring informal workers.

Hence, the main expected outcome is to observe an increase in employment in firms that receive *Treatment 2* compared to the baseline message. In addition, including the *Propagation Effect* in the message sent to these firms will have an increased effect on employment, as employers will also receive information about the risks of being audited.

In terms of the rest of the variable outcomes, we expect that firms with no employees expect similarly as enterprises with reported employees when receiving *Treatment 2*.

4.2 Heterogeneity Analysis

We will start with the heterogeneities we anticipate encountering among those firms that reported employees. Firms exhibit heterogeneous incentives based on various characteristics, such as tax exemptions, the type of tax they pay, and the composition of their workforce. Approximately 2.5% of firms are exempt from Income Tax for different reasons, which means they have no incentives to accurately report wages to minimize profit taxes. Consequently, these firms have a higher likelihood of engaging in PUT schemes and under-reporting wages.

As a result, *Treatment 1* is expected to have a greater impact on these firms, leading to a sharper increase in reported payroll and payroll tax payments. However, many of these tax-exempt companies operate in Free Zones and tend to be larger in terms of workforce and income. Due to this, *Treatment 2* may be less effective among all outcomes as these firms are less likely to employ informal workers. In the case of *Treatment 3*, as these firms do not pay profit taxes, the incentive to accurately report profits is diminished, potentially leading to a higher increase in reported profits compared to other companies when faced with the possibility of being sued.

The remaining 97.5% of firms are subject to either the Profit tax or the Asset tax, depending on whether 1% of their assets exceed 27% of their profits. Firms with a higher asset-to-profit ratio will behave similarly to income-tax-exempt firms in response to *Treatment 1* and *Treatment 3*. However, these firms may be less inclined to increase their reported income, as doing so could shift them from paying the Asset tax to the Profit tax. Firms reporting negative profits, who only pay Asset taxes, are likely to exhibit similar behavior. In terms of *Treatment 2*, we do not anticipate significant differences between these firms and the rest.

Firms with a high percentage of their workforce near the minimum wage are more likely to evade taxes by making under-the-table payments, reporting only the legal minimum wage while compensating employees off-the-books. We predict that these firms will respond more strongly to *Treatment 1*, as the potential for lawsuits and audits is higher when engaging in PUT schemes. However, this same factor might lead to weaker results in *Treatment 2*, as firms may view under-the-table payments as an alternative to informality.

Firm size, industry, and employee tenure are also expected to influence responses to the treat-

ments, while the gender of employees is not anticipated to have a significant impact. Smaller firms are generally more likely to employ informal workers and under-report profits, which could result in a higher responsiveness to all three treatments. However, contrary evidence from the Dominican Republic, as studied by Holz et al. (2020), suggests that larger firms, which contribute more to tax revenue, may have stronger incentives to evade taxes.

Industry effects are expected to be significant primarily in *Treatment 2*, with labor-intensive or low-skilled industries being more prone to informal employment and thus potentially more responsive to the treatment. Employee tenure is likely to create heterogeneities in response, particularly within firms in the *Treatment 1* group, as Feinmann et al. (2022) shows that PUT regimes are more likely to occur with employees who have high tenure and positions close to the managerial roles. In addition, we do not expect gender to influence the outcomes, as the incentives for informal employment or profit under-reporting do not vary by gender. This notion is backed by previous work done in Brazil.

Finally, in *Treatment 1*, we anticipate higher effects among employees earning wages near the minimum wage or the income tax threshold. Employees engaged in PUT schemes benefit by evading both social security contributions and income tax, making it more likely for their reported salaries to hover around these thresholds. Therefore, larger responses are expected in these wage ranges. A potential double penalty exists for employees who exit a PUT scheme: If their reported income was near the income tax threshold, an increase in their declared wage might not only require them to pay previously evaded social security contributions but also push them into a higher income tax bracket. However, as the income tax is progressive and only applies to income above the threshold, the marginal impact may not be perceived as significant by the worker. This heterogeneity is not expected to be observed in *Treatment 2* and *Treatment 3*.

We will now continue with the expected heterogeneities within firms with no employees. We suspect that it is more plausible that firms with a higher amount of reported assets and profits are more likely to be hiring at least one employee off-the-books. We expect that these firms require more than one person—the employer—to operate effectively. Thus, larger results in firms with large amounts of reported assets and revenue are expected.

A firm's industry might also provide additional heterogeneous responses. We hypothesize that employers in firms registered as restaurants, bars, or hotels are more likely to not report their employees rather than operating the business by themselves. It is also possible that firms in the services and construction sectors are also likely to be hiring workers without registering them.

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A Messages

Control: Baseline

We remind you that the tax payment must be made before the XXX day of the current year. On the DGII website (dgii.gov.do), you can find all the necessary information to complete the tax payment process.

Treatment 1: PUT Lawsuits
DID YOU KNOW THAT YOUR EMPLOYEES CAN REPORT YOU TO THE AUTHORITIES?

Payments not reported in the payroll constitute a violation of Articles 62 and 202 of Law 87-01 on Social Security and Articles 253 and 254 of the Tax Code. These laws protect workers in legal proceedings, implying severe penalties and significant monetary sums for the employer.

Labor justice has reported an increase in labor cases by 56.2% between 2022 and 2023, showing that more workers are aware of their rights and willing to pursue a lawsuit. **This trend indicates a clear change: today it is much more likely that employees use labor courts if their employers pay them under the table. The government is committed to strength this labor protection tool.**

To avoid labor lawsuits: register all off-payroll payments carried out in your company, regardless of their nature.

[Propagation Effect] The DGII is fully authorized to use information from labor lawsuits to initiate a **TAX AUDIT** of your company, as off-the-books payments constitute a violation of your role as a Withholding Agent. This is considered tax fraud, framed within the Tax Code and Law 155-17 against money laundering and terrorism financing.

We remind you that the tax payment must be made before the XXX day of the current year. On the DGII website (*dgii.gov.do*), you can find all the necessary information to complete the tax payment process.

Treatment 2: Informality Lawsuits
DID YOU KNOW THAT YOUR EMPLOYEES CAN REPORT YOU TO THE AUTHORITIES?

Having unregistered employees in your company constitutes a violation of Articles 62 and 202 of Law 87-01 on Social Security, and Articles 253 and 254 of the Tax Code. These laws protect workers in legal proceedings, implying severe penalties and significant monetary sums for the employer.

Labor justice has reported an increase in labor cases by 56.2% between 2022 and 2023, showing that more workers are aware of their rights and willing to pursue a lawsuit. **This trend indicates a clear change: today it is much more likely that employees use labor courts if they are hired informally. The government is committed to strength this labor protection tool.**

To avoid labor lawsuits: formalize all employees who are not properly registered on the payroll.

[Propagation Effect] The DGII is fully authorized to use information from labor lawsuits to initiate a **TAX AUDIT** of your company, as failing to register employees constitutes a violation of its role as a Withholding Agent. This is considered tax fraud, framed within the Tax Code and Law 155-17 against money laundering and terrorism financing.

We remind you that the tax payment must be made before the XXX day of the current year. On the DGII website (*dgii.gov.do*), you can find all the necessary information to complete the tax payment process.

Treatment 3: Profit Sharing Lawsuits
DID YOU KNOW THAT YOUR EMPLOYEES CAN REPORT YOU TO THE AUTHORITIES?

Employers are obligated to distribute 10% of the company's net income among all employees with more than three years of continuous service *(Article 223 of the Labor Code).*

Underreporting firms' profits undermines employees' right to receive the corresponding bonus. To this end, **Article 225 of the Labor Code allows employees to REPORT employers to the Ministry of Labor in cases of suspected income underreporting.**

Labor justice has reported an increase in labor cases by 56.2% between 2022 and 2023, showing that more workers are aware of their rights and willing to pursue a lawsuit. **This trend indicates a clear change: today, it is much more likely that employees use labor courts if they are aware of their employers underreporting profits, affecting their bonus. The government is committed to strength this labor protection tool.**

To avoid labor lawsuits: report firms' profits accurately and fulfill the obligation to share 10% with the employees.

The same Article 225 establishes that the Ministry of Labor can request **the DGII to conduct a TAX AUDIT to verify the complaint and determine the corresponding penalties**. These penalties are not only for the unpaid bonus to employees; underreporting income also constitutes a violation of the Tax Code and Law 155-17 against money laundering and terrorism financing.

We remind you that the tax payment must be made before the XXX day of the current year. On the DGII website (*dgii.gov.do*), you can find all the necessary information to complete the tax payment process.

A.1 Power Tests:

Power Test: Firms with Employees - Year: 2023 Additional Specifications	$\Delta = 3\%$	$\Delta = 4\%$	$\Delta = 5\%$
FE: Industry and Region	47,963	24,629	16,254
FE: Industry, Region and Previous Employees	12,318	6,888	4,433
FE: Previous Employees Additional Regressors: Previous Payroll	5,072	2,709	1,819
FE: Industry, Region and Previous Employees Additional Regressors: Previous Assets, Income and Payroll	4,135	2,166	1,423

Table 5: Sample needed to obtain an effect of $\Delta = 3\%$, 4% & 5% with an IC of 95% with different specifications regarding additional regressors and fixed effects. Outcome Variable: Total payroll reported by firms in 2023, measured in logarithms.