# Outsourcing, Labor Regulations and Profit-Sharing: Evidence from Mexico

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February 20, 2025

**Abstract**

This paper studies the use of domestic outsourcing to circumvent labor benefits and its consequences for firms and workers. Drawing on longitudinal establishment data and employer-employee data from Mexico, we provide novel evidence on a phenomenon wherein many firms were outsourcing their entire workforce to avoid mandatory profit-sharing. We argue that the incentives to circumvent this benefit are not evident when firms have the option of offering lower wages. We develop a stylized model to show that this incentive for outsourcing arises when firms face a labor supply curve that is less elastic to profit-sharing than to wages. Self-collected survey evidence suggests that this inelasticity is partly explained by information frictions among workers regarding profit-sharing. We then leverage a reform that restricted the use of outsourcing to assess the model and understand the consequences of restricting this avoidance practice. The reform caused previously outsourcing establishments to insource their workers and comply with profit-sharing payments, with no effect on total employment. Treated plants partially offset the profit-sharing increase through lower wage growth, yet total worker compensation (wages + profit-sharing) increased by approximately 3%. Workers' insensitivity to profit-sharing can explain both the prevalence of outsourcing to circumvent this benefit, and the imperfect substitution between profit-sharing and wages post-reform. Overall, our findings provide insights into firms' incentives to circumvent non-wage benefits and the consequences of policies that restrict such avoidance practices.

**JEL Codes:** J08, J41, O12, O14

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# 1 Introduction

Domestic outsourcing has seen a significant rise worldwide over the past two decades (ILO, 2016; OECD, 2021).[1] This practice can lead to increased productivity by lowering matching frictions (Bilal and Lhuillier, 2021) and adjustment costs (Bertrand et al., 2021; Macaluso et al., 2023). However, domestic outsourcing also been shown to deteriorate working conditions for workers (Goldschmidt and Schmieder, 2017; Drenik et al., 2020).

Additionally, domestic outsourcing has been frequently criticized for allowing employers to disguise working relationships and avoid labor regulations and liabilities (ILO, 2011; European Parliament, 2017). Prior work on this issue has frequently suggested that firms use this arrangement to bypass non-wage labor obligations, such as health insurance and pension contributions (Weil, 2014; Goos et al., 2022), firing costs (Bertrand et al., 2021), and profit-sharing (Infobae, 2019). However, systematic empirical evidence on such firm practices is scarce, and several key questions remain open. What motivates certain firms to use outsourcing to circumvent labor benefits? Moreover, what are the consequences of restricting these avoidance practices? Do such restrictions negatively impact employment? And does enforcing non-wage benefits improve worker compensation, or do firms offset these costs by reducing wages?

In this paper, we study the connection between domestic outsourcing and the circumvention of a particular non-wage benefit in Mexico - mandatory profit-sharing. Our analysis draws on panel data on manufacturing plants, census data on business establishments, and employer-employee data covering the universe of formal workers in Mexico. We document and newly characterize a phenomenon wherein establishments were outsourcing their entire workforce, and provide evidence that the main aim of this practice was to avoid profit-sharing obligations. Furthermore, we develop a theoretical model to understand why certain firms had incentives to avoid profit-sharing, rather than offer lower wages. We then leverage an outsourcing restriction to show that enforcing profit-sharing led to an increase in worker compensation with no effects on employment. Using our theoretical framework, we show these results are consistent with firms facing a labor supply curve that is less elastic to profit-sharing than to wages. Through primary survey data, we show that insensitivity to profit-sharing is partly driven by information frictions among workers related to this benefit.

Our analysis proceeds in three steps. First, we unveil a stark pattern in outsourcing practices: many establishments in Mexico outsourced almost their entire workforce.[2] In a large scale survey of over 8000 manufacturing establishments, we find that 20% of the sample, representing 66% of plants with positive outsourcing, outsourced practically *all* of their workers. These establishments, which we refer to as *full outsourcing establishments* reported positive revenues and costs but no legally hired workers.[3] The remaining one-third of plants using outsourcing, referred to as *conventional*

[1] Throughout this paper, we refer to domestic outsourcing as a practice where a lead firm contracts out a labor need to a contracting firm, and the workers are supervised by and work at the premises of the lead firm, while being officially hired by the contracting firm (OECD, 2021).

[2] The existence of firms outsourcing all their workforce was revealed during inspections conducted by Mexico's Secretary of Labor (STPS, 2021). However, these inspections did not provide information on the prevalence of this practice, as the firms selected were not randomly selected. Additionally, the government did not provide information on the characteristics of the firms engaging in this practice.

[3] We show in Section 4.1 that the vast majority of outsourcing establishments were either single-establishment firms

*outsourcing* establishments, had a much lower proportion of outsourced workers (averaging around 20%). Throughout this study, our primary focus lies on the *full outsourcing* establishments, as this allows us to focus the motivation to circumvent of labor benefits.

We present evidence supporting the notion that full outsourcing establishments were outsourcing most of their workers to avoid mandatory profit-sharing obligations.[4] Establishments carrying out this extreme form of outsourcing effectively did not pay any profit-sharing, which is mandated by law at 10% of profits for most Mexican firms. By declaring a workforce of zero employees, and outsourcing their workers to firms with zero or lower profits, they effectively circumvented the obligation to provide the mandatory level of this benefit.[5] We show that alternative reasons for outsourcing such as within-firm wage compression (Goldschmidt and Schmieder, 2017) and volatility in labor demand (Macaluso et al., 2023) are inconsistent with full outsourcing or lack empirical support, suggesting that circumventing profit-sharing was the primary aim of this practice. Additionally, our evidence indicates that profit-sharing avoidance was not a motivation for outsourcing among conventional outsourcing establishments.

Second, we set up a simple model to understand the incentives behind firms' decision to fully outsource. While it might seem evident at first that profit-sharing avoidance allows firms to reduce labor costs, firms could alternatively be substituting profit-sharing with higher wages, consistent with presence of compensating differentials. Additionally, if full outsourcing did enable firms to lower overall compensation, another key question that arises is why firms would choose to avoid profit-sharing rather than simply offer lower wages.[6] In our model, firms are subject to mandatory profit-sharing payments, which they can avoid by paying a cost and outsourcing all workers. Firms offer workers a compensation bundle of wages and profit-sharing, and face a firm-specific labor supply curve, which depends on both forms of compensation. The key insight is that for full-outsourcing to enable a reduction in worker compensation, the elasticity of labor supply with respect to profit-sharing must be lower than that to wages. This difference in elasticities enables firms that avoid profit-sharing to not fully compensate for it with higher wages, thereby reducing total compensation. In this scenario, highly productive firms will opt to bear the cost of full outsourcing to bypass profit-sharing, consistent with our empirical patterns. We derive three predictions on the effects of restricting this avoidance practice: (i) Total firm employment should not decrease. (ii) Total compensation will rise when labor supply is indeed less elastic with respect to profit sharing than to wages, as firms do not fully compensate the increased profit sharing with lower wages. (iii) The effect on the value of total compensation for workers will depend on the factors driving these elasticity differences.

We empirically explore two reasons behind workers' inelasticity to profit sharing. First, it can be

or belonged to firms where all establishments were fully outsourcing. Therefore, one should think of full outsourcing establishments as mostly belonging to full outsourcing firms.

[4]We use the term 'avoid' rather than 'evade' because this practice was legal prior to the outsourcing reform.

[5]We show evidence that the few workers that these establishments did hire in-house were likely to be managers or directors, who are not entitled to profit-sharing benefits. More detail on this is provided in Section 4.2. We also present evidence that contracting firms (i.e. firms legally hiring the workers) in this relationship had zero profits, or profits lower than the parent firm.

[6]Unlike the results in Nimier-David et al. (2023), downwards wage rigidity is unlikely to explain why firms can't simply offer lower wages to compensate for profit-sharing payments. Full outsourcing establishments were not constrained by a minimum wage, and the share of workers collective bargaining in Mexico is low.

partly be attributed to the fact that workers are more risk averse than firms, and value the stable income of wages relatively more than profit-sharing (Nimier-David et al., 2023). If risk aversion alone explained this inelasticity, enforcing profit sharing would not necessarily raise their total value of compensation. In this scenario, an increase in compensation would merely compensate workers for the added risk in their earnings. We propose that another important reason contributing this reduced elasticity are information frictions regarding profit-sharing. Recent research has shown that misinformation on job opportunities can decrease the labor supply elasticity (Jäger et al., 2023), and that individuals are more inelastic to economic fundamentals when decisions are complex (Enke et al., 2024; Gabaix and Graeber, 2024). Building on these findings, we collect primary survey data to show that awareness of profit-sharing among workers in Mexico is low, and that there exist information processing frictions related to the complexity of calculating this benefit. We show that these frictions further reduce workers' sensitivity to profit-sharing.

Third, we leverage the effect of a strict restriction on outsourcing implemented in 2021 to evaluate our model predictions. We perform a difference-in-differences analysis with longitudinal establishment data where we exploit heterogeneity in exposure to the reform depending on whether an establishment was using outsourcing prior to the policy to identify treated and control establishments. The reform caused most full-outsourcing establishments to insource their workers in-house and start incurring profit-sharing payments. We find no effect on total employment (outsourced + in-house workers), in line with our model predictions. Moreover, using wage information from social security data, we find that treated establishments offset the increase in profit-sharing by a small decrease in wage growth relative to the control group. We then estimate the effect of the reform on total labor compensation, i.e. wages + profit-sharing per worker. We find that average total worker compensation increased by around 3% post reform, indicating that employers were not able to fully offset the increase in profit-sharing costs through lower wages. Finally, we estimate the impact on the value of total compensation for workers, accounting for the increased risk, under different assumptions on workers' risk-aversion. We find positive impacts on this value even under very conservative risk-aversion assumptions, indicating that previously outsourced workers benefited from the reform. Returning to our model, these results suggest that labor supply is indeed more inelastic to profit-sharing than to wages, and that this inelasticity is partially explained by information frictions. This explains why (i) certain establishments found it optimal to engage in full outsourcing to reduce profit-sharing obligations rather than simply offering lower wages, and (ii) the restriction on outsourcing led to an increase in both profit-sharing and total worker compensation without negatively impacting employment.

Finally, we provide evidence on outsourcing use among conventional outsourcing establishments. For this group, an important reason for outsourcing seemed to be to reduce adjustment costs during temporary changes in activity, a motivation emphasized in the outsourcing literature (Bertrand et al., 2021; Macaluso et al., 2023). Following the reform, these firms experienced a decline in their overall employment levels and a reduction in employment dynamism.

Our paper contributes to the growing literature studying the consequences and the motivations behind outsourcing. Recent research in this area has mostly focused on three main motivations introduced in a seminal work by Abraham and Taylor (1996). First, outsourcing can help firms adjust to changes in labor demand by reducing adjustment costs (Bertrand et al., 2021; Macaluso et al.,

2023). Second, outsourcing can help increase efficiency by helping firms concentrate on their core tasks, allowing for firm specialization and economies of scale (Bilal and Lhuillier, 2021; Abraham and Taylor, 1996). Third, outsourcing can allow firms to reduce worker wages (Dube and Kaplan, 2010; Goldschmidt and Schmieder, 2017; Drenik et al., 2020; Felix and Wong, 2021), due to the presence of within-firm fairness considerations or rent-sharing. In addition to these motivations, outsourcing has been frequently criticized for enabling firms to bypass liabilities and non-wage benefits such as pension contributions, health coverage and health and safety standards (Epstein et al., 2020; ILO, 2011).[7] Most of these claims rely on qualitative evidence or policy discussions[8] (Weil, 2014; OECD, 2021; HM Treasury UK, 2023; European Parliament, 2017) but systematic empirical evidence on this motive for outsourcing is scarce, and little is known on the factors driving firms to engage in such avoidance practices.[9] We contribute to this literature by providing novel evidence on the circumvention of a labor benefit - profit-sharing - as the main motive for outsourcing among many firms in Mexico. Beyond documenting this phenomenon, we combine empirical evidence with a theoretical model to understand why firms decide to avoid a labor benefit, showing that the incentives are not straightforward to understand when firms have the option of offering lower wages. We further examine the effects of restricting this avoidance practice on both firms and workers.

We also contribute to the outsourcing literature by addressing measurement challenges. Outsourcing is inherently difficult to measure. As workers are legally hired by a certain firm, but working under the supervision of another firm, it is challenging to identify which workers are outsourced and which firms are using outsourcing. Most recent work in this area has relied on the identification of outsourcing events (Goldschmidt and Schmieder, 2017; Felix and Wong, 2021; Daruich et al., 2023; Bilal and Lhuillier, 2021) by measuring the flow of workers from one firm to another. The sizable effect of the outsourcing reform allows us to better identify flows related to outsourcing, without having to impose many restrictions on the outsourcing events, as is usually done in the literature (we further develop this point in Section 3.2). In addition, we leverage detailed establishment data, which measures the number of outsourced and in-house workers at the plant level. While a few studies can also measure outsourcing using establishment data (Bertrand et al., 2021; Micco and Muñoz, 2024; Estefan et al., 2024),[10] none exploit both comprehensive firm-level and individual-level data as we do in this study. Among these studies, a contemporaneous study to ours by Estefan et al. (2024) studies the same Mexican outsourcing reform as this paper. The authors show that the outsourcing reform

[7] In Appendix D we provide more evidence on the use of outsourcing to avoid worker benefits in different countries.

[8] In the book *The Fissured Workplace*, Weil (2014) notes: "Subordinate businesses may provide fewer—or no—benefits in the area of insurance or retirement, lowering the costs to the lead businesses that may draw on them." and provides several examples of these avoidance practices. In a descriptive report on outsourcing in Brazil, Druck (2016) notes "In all occupational categories analyzed, outsourced workers receive either no profit share at all or a fixed, quasi-symbolic share, receive no transportation, daycare, or educational benefits (...)"

[9] A few academic studies have have touched upon this motive descriptively, but they do not disentangle it from other outsourcing rationales nor investigate the underlying incentives driving firms to avoid labor benefits. Dube and Kaplan (2010) show that outsourced workers are less likely to have employer-provided health coverage. Goldschmidt and Schmieder (2017) show that establishments covered by collective bargaining agreements are more likely to outsource. Daruich et al. (2023) provide suggestive evidence that firms in Italy may use outsourcing to circumvent firing costs, but are not able to isolate this reason from other motivations.

[10] Bertrand et al. (2021), Micco and Muñoz (2024), and Estefan et al. (2024) observe the number of workers outsourced using firm survey data from India, Chile, and Mexico. Drenik et al. (2020) identifies the parent company using social security data from Argentina.

reduced wage markdowns and, as in our paper, find that restricting outsourcing increased worker compensation without negative effects on employment. Our analysis differs from theirs in three main ways. First, we emphasize and delve into the distinctions between full outsourcing and conventional outsourcing practices. We show that this distinction is crucial to understand the motives behind outsourcing and the consequences of its regulation. Second, an important part of our empirical and theoretical analysis focuses on understanding *why* firms use outsourcing to avoid a mandatory labor benefit (profit-sharing), rather than offer lower wages. Our focus on this wage-benefit trade-off allows us to understand the conditions under which firms engage in this avoidance practice and improve our understanding of the results when assessing the impact of outsourcing restriction. Moreover, our approach offers broader insights into why firms seek to avoid specific labor benefits, particularly when they can adjust total worker compensation through both wages and non-wage benefits. Third, Estefan et al. (2024) rely solely on establishment-level manufacturing data to estimate the effect of the reform on total compensation. As discussed in Section 6.1.2, this approach presents significant measurement challenges. Thus, we leverage social security data to identify workers who were insourced during the reform and estimate the reform's impact on worker earnings, offering a more accurate measurement of this outcome.[11]

In emphasizing the role of outsourcing to circumvent profit-sharing obligations, this project also contributes to the work on profit-sharing (Cahuc and Dormont, 1997; Nimier-David et al., 2023). While mandatory profit-sharing is present in France, Peru and Ecuador, several countries such as Canada, Germany and the USA encourage this practice through tax incentives. Nimier-David et al. (2023) study the effect of mandatory profit-sharing in France on firms and workers. They find profit-sharing is compensated by lower wages for high-skilled workers, but increased total worker compensation for low-skilled workers due to a binding minimum wage. We complement their findings by providing evidence of a practice used by firms to avoid paying profit-sharing contributions to workers, namely outsourcing. Moreover, we show that imperfect substitution between profit-sharing and wages can still exist even if the minimum wage is not binding, if the elasticity of labor supply with respect to each of these components differs. Furthermore, our identification strategy allows us to estimate the effect of increasing profit-sharing payments on total employment, which cannot be estimated in Nimier-David et al. (2023), as their identification compares firms around size thresholds.

Finally, this study contributes to the literature on monopsony power in labor markets (Manning, 2004), in particular on how monopsonistic firms set non-wage compensation (Boudreau, 2021; Lagos, 2022; Dube et al., 2022) and the role of worker misinformation in giving firms monopsony power (Roussille, 2024; Jäger et al., 2023). We contribute to this literature by integrating the mechanisms outlined in these two strands research. We suggest that differences in information frictions about non-wage components relative to wages can make workers less responsive to changes in the former when deciding where to work. This can lead firms to decrease total compensation by disproportionately adjusting on these non-wage benefits. In this setting, enforcement of these benefits can increase total

[11] Juquois et al. (2023) also examine the outsourcing restriction using social security data. However, unlike our approach, they do not incorporate establishment-level surveys, and thus cannot measure profit sharing. Thus, their analysis does not explore the relationship between outsourcing and the avoidance of profit-sharing, a central focus of our paper. Additionally, this limits their ability to estimate the reform's impact on employment. They also do not distinguish between full-outsourcing and conventional outsourcing.

worker compensation, as firms do not perfectly substitute them with lower wages. While our focus is on profit-sharing, several amenities such as health insurance or pension benefits hold similarities in the sense that they are less salient (Ouimet and Tate, 2023) or more complex to understand (Chetty et al., 2014; Handel and Kolstad, 2015) than wages.

The rest of the paper is structured as follows. Section 2 describes institutional context. Section 3 presents the data and details on measurement. Section 4 presents evidence on the use of outsourcing to avoid profit-sharing. In Section 5 we present a theoretical framework. Section 6 describes the effects of the outsourcing reform. Section 7 focuses on conventional outsourcing establishments. Section 8 concludes.

# 2 Institutional Setting

## 2.1 Profit-sharing in Mexico

Profit-sharing (or PTU for its name in Spanish: *Participación de los trabajadores en las utilidades*) in Mexico is mandated by the Mexican Constitution and Federal Labor Law (*Ley Federal del Trabajo*) (LFT, 2021). Almost all firms with annual profits over 15.000 USD (300.000 Mexican pesos) are obliged to distribute 10% of pre-tax profits with all their permanent employees except directors and managers, and with temporary employees who have worked over 60 days of the fiscal year. Firms above the profit threshold excepted from profit-sharing are newly created firms, in their first year of activities[12], newly created firms in the extractive industry, during the exploration period, NGOs, and public institutions (Gobierno de México, 2023).

Within the firm, the total amount of profit-sharing to be distributed is divided into two parts. 50% is allocated equally across all eligible workers, and 50% is distributed proportionally to the workers' annual wage (Gobierno de México, 2023).[13] Thus, low-paying workers receive lower profit-sharing in total, but a higher amount as a proportion of their baseline salaries. Profit-sharing contributions can be deducted from declared profits for corporate tax payments. Additionally, profit-sharing income up to 15 days of the minimum wage is exempted from income taxes for workers, and in most states it is exempted from payroll tax (AMCPDH, 2023).

Similar mandatory profit-sharing schemes exist in France (Nimier-David et al., 2023), Peru (Gob Peru, 2023) and Ecuador (EcuadorLegal, 2023), though with different eligibility rules and amounts.[14] Additionally, many countries including Canada, Germany and the USA have tax incentives to encourage profit-sharing with workers.

[12] Up to second year of activity for firms dedicated to the production of a new product.

[13] Profit-sharing is distributed at the firm level, not the establishment level.

[14] In France, for instance firms with over 50 employees must share 50% of excess profits with workers. In Peru, firms above a certain profit threshold, and with over 20 workers must distribute a certain fraction of profits. The proportion varies according to the firms' economic sector. In Ecuador all firms with positive profits must distribute 15% of profits with employees.

### 2.2 Outsourcing and the reform

Mexico had seen a significant rise in domestic outsourcing in the past 20 years, from 6% of the labor force in 2004 to over 15% in 2019 (Banco de Mexico, 2021). This rise came in hand with increasing concerns that outsourcing had been used as a means for firms to avoid labor regulations and decrease worker benefits (López-Chávez and Velázquez-Orihuela, 2021).

The first proposal for an outsourcing reform was presented in November 2020 by the López Obrador administration in Mexico. An important motivation for this initiative stated by the Secretary of Labor (STPS) was to stop the 'abusive schemes' facilitated by outsourcing. (STPS, 2021).[15] The final version of reform was approved in April 2021. Firms had until July 2021 to adapt to the main changes.[16] The main changes implemented were (LFT, 2021):

- The outsourcing of workers for core activities[17] of the firm was prohibited.
- All employment agencies must register in a new registry of the Ministry of Labor (REPSE), for which they must comply with certain labor regulations.
- Three times per year, employment agencies must send detailed information to the Ministry of Labor on all the outsourcing contracts which took place during that period.
- Strong punishments consisting of high fines and up to three years in prison were introduced for firms not abiding by the new law.

The reform was quite controversially received, particularly due to its potential effect on unemployment and informality, and on its effect on on small firms who relied on the flexibility given by this type of labor arrangement.[18]

## 3 Data and Measurement

### 3.1 Main datasets

The main datasets used in this project can be divided into two data blocks. Each data block allows us to measure different outcomes and the method to measure outsourcing differs in each block. Importantly, the datasets in each block are accessed through different institutions in Mexico and they cannot be linked using firm nor worker identifiers. Thus, we complement the information available in each type of dataset for our analysis.

[15] When justifying the outsourcing reform, Mexico's president Andrés Manuel López Obrador stated that there are many responsible entrepreneurs, but 'there are others, and they aren't even entrepreneurs; they are middlemen, influencers who exploit all these mechanisms of hiring workers, and it adversely affects the workers.' (El Economista, 2020)

[16] Some fiscal measures came into effect on September 2021.

[17] The core activity of a firm was defined as the activities included in the company's objects clause (*objeto social*) (LFT (2021), art. 13)

[18] See: Infobae (2020) , Forbes Mexico (2022) , El Economista (2021), El Economista (2021).

**Establishment level data.** The first block includes two establishment level datasets which were accessed on-site at INEGI's installations in Mexico City. These datasets can be linked together at the establishment level.

*Monthly manufacturing establishment survey (EMIM):* Our main dataset to measure establishment-level outcomes over time is the monthly survey of manufacturing establishments (Encuesta Mensual de la Industria Manufacturera, or EMIM). This is a monthly plant-level panel dataset from 2017 to beginning of 2023. The data is collected and accessed through Mexico's statistical office (INEGI). It covers monthly information on employment, wage bills, production, revenues, and variable costs. The survey design is primarily deterministic. The same sample of establishments are surveyed each month, so this is a panel dataset. For most sectors, the sampling proceeds by first ranking establishments within each 6-digit industry nationally by revenue. Establishments are then included in order until some threshold level of national revenue—from 60 to 85%, depending on the industry—is captured by the survey. Thus, in practice the survey is similar to a census of large Mexican plants.

Importantly, this surveys includes information on the number of employees hired in-house and the number of employees hired through other firms (*personal suministrado por otra razón social*), allowing us to measure outsourcing at the establishment level. Additionally, establishments report monthly information on wages, social security contributions and profits sharing expenses.

We work with a balanced panel of 8065 establishments, as we cannot distinguish between establishments that exit the survey because they went out of business, and those that exit because they are no longer part of the sample.[19] We show in Appendix B.3 that the exit patterns do not change around the time of the reform.

*Economic Census 2019:* This is a plant level dataset covering the universe of business establishments in Mexico in 2018[20] which is also provided by INEGI. It provides more detailed information on establishments than the manufacturing survey, including sales, value added, profits, investment, capital, number of workers, salaried workers, social security, firm identifier and other outcomes. This census is carried out every five years starting in 1994.

Both these datasets combined allow us to identify and characterize parent firms in an outsourcing relationship (see Figure 1). However, they do not provide any information on the contracting firm and they do not provide many details on workers, especially outsourced workers. In particular, it is challenging to accurately measure wages of outsourced workers in these datasets, which is a key outcome variable in our analysis (more details on this issue are provided in Section 6.1.2). Thus, to identify and characterize these other actors in outsourcing relationships we rely on our other main data block.

**Employer - employee data.** Our second data block consists of an administrative social security data from the Mexican Social Security Institute (Instituto Mexicano de Seguridad Social, IMSS). This dataset is accessed through the Econlab at Banco de México. This is an employer-employee dataset containing information on all formal employment relationships in Mexico. For each employer-employee

[19] Unfortunately, the data office in charge of the EMIM was not able to give us information on the reasons why each establishment exited the sample.

[20] The Census is published in 2019 but the data collection is carried out in 2018.

pair, we have information on the establishment, firm, industry and municipality of the employer, and earnings, contract type and gender of the employee.

The information on earnings in this dataset is given by the worker's daily taxable income (*salario base de cotización*). This can include various forms of compensation such as extra hours, bonuses and commissions. It also includes the 13th salary (*aguinaldo*) and the mandatory vacation bonus (*prima vacacional*). Importantly for our analysis, it does *not* include earnings received from profit-sharing benefits.[21] Earnings are bottom coded at the minimum wage, and top coded 25 UMA's (unit of measure and update).[22] This dataset does not provide information on the number of hours or days worked per month.

In addition to the datasets described above, we incorporate three supplementary data sources to address specific aspects of our analysis. First, to investigate the role of information frictions in explaining workers' insensitivity to profit sharing, we collected original survey data among Mexican workers. The first survey focused on assessing workers' awareness of profit-sharing regulations, and the second survey aimed to identify information processing frictions in calculating profit sharing income. We provide more details on these surveys in Section 6.3. Additionally, we use firms' tax records data from 2010-2015 to produce part of the descriptive evidence shown in Section 4.2. This dataset has been anonimized and made publicly available by the national tax office in Mexico (Servicio de Administración tributaria). The data provides information on each juridical person's (*persona moral*) declared income, costs, profits and profit-sharing, deductible costs, and other items in the tax declaration. They can be accessed through the national tax office website.[23] Finally, to improve our understanding of our quantitative findings, we have carried out 10 structured interviews with relevant stakeholders such as experts working in the outsourcing industry in Mexico, lawyers and HR Managers from companies affected by the reform.

### 3.2 Measuring outsourcing pre-reform

In this section, we provide details on how we measure outsourcing relationships. Throughout this paper, we refer to three actors in an outsourcing relationship. The *lead firm* (or parent firm) is the firm which contracts out a labor need to a *contracting firm*, which is a different legal entity. The workers are supervised by and work at the premises of the lead firm, while being officially hired by the contracting firm (OECD, 2021). Figure 1 shows a schematic graph on these three actors and the relationships between them.

For our analysis it is important to identify (1) firms using outsourcing before the reform (lead firms) (2) workers who had been outsourced (were legally hired by a contracting firm) and were insourced (by the lead firm) after the reform. The method used to identify these differs in each dataset.

[21] This was clarified in July 2023 by the Social Security institute, who stated: *'employee profit-sharing (PTU) is not part of the base salary, since according to article 124 of the Federal Labor Law (LFT) it is not part of the integrated salary as stated in article 84 of the LFT'* (Diario Oficial de la Federación, 2023; Deloitte México, 2023). Only the PTU exceeding the legal maximum of 3 months salary is included in the base salary.

[22] https://en.www.inegi.org.mx/temas/uma/

[23] http://omawww.sat.gob.mx/cifras_sat/Paginas/inicio.html. More details on the anonimization process and information available in this dataset can be found in the following link http://omawww.sat.gob.mx/cifras_sat/Documents/Lineamientos_artículo19LIF.pdf

In the case of establishment surveys, identifying establishments that outsourced is relatively straightforward. These surveys inquire about the number of in-house workers and the number of outsourced workers per establishment during the reference month.[24] The outsourcing question specifically pertains to individuals who worked for the establishment but were contractually affiliated with a separate company,[25] while performing tasks related to production, marketing, administration, or accounting. Thus, we have access to monthly data that quantifies the number and proportion of outsourced workers per establishment in our sample. However, this dataset lacks worker-level information, and thus, to measure element (2), we rely on social security data.

Identifying lead firms that utilized outsourcing, contracting firms, and outsourced workers in the social security data poses a greater challenge. By nature, when a worker is outsourced, they appear in the social security data as employees of the contracting firm, with no indication of whether they are truly working for any other firm (i.e., the parent firm in an outsourcing arrangement). Nevertheless, the substantial flux of workers caused by the reform the reform allows us to pinpoint insourcing events, where a lead firm absorbed a worker from a contracting firm following the reform. This also enables us to identify all the players involved in the outsourcing relationship.

We classify a movement of workers from establishment A to establishment B as an insourcing event if it meets the following requirements: (i) the flow occurred between June and September 2021 (ii) the flow consisted of 20 employees or more *or* establishment A lost more than 40% of it's workers that month (iii) establishment A and B do not belong to the same firm. This methodology allows us to identify the workers insourced post-reform, the establishments insourcing these workers, and the contracting agencies who were previously holding these workers. Figure 4 shows the number of workers satisfying conditions (ii) and (iii) in each month of 2021. The shaded area are the worker movements classified as insourcing events with additional condition (i). The figure illustrates a relatively low number of worker movements that met the first two conditions outside of this specified time frame. 70% of these insourced workers in the shaded area were insourced in July 2021, meaning that most workers were insourced during the last month in which firms had the opportunity to adapt to the reform. Additionally, the majority of worker transitions during the reform occurred in blocks: 96% of workers involved in an insourcing event were insourced in a block of more than 20 workers.

The following sections show descriptive results on the three actors in the outsourcing relationship.

# 4 Uncovering and explaining full outsourcing

## 4.1 Patterns in the use of outsourcing pre-reform

In this section we provide evidence on the use of outsourcing prior to the reform. 30% of establishments in EMIM reported having positive outsourcing in the year before the reform. Figure 2 displays the distribution of the average proportion of workers outsourced by each establishment in the year

[24] The original question in Spanish is: *Anote el número promedio de personas que dependieron de esta razón social durante el mes de referencia* and *Anote el número promedio de personas que no dependieron de esta razón social que trabajaron en este establecimiento durante el mes de referencia.*

[25] Importantly, the contracting company is a separate legal entity. It does not include workers in different establishments of the same firm.

preceding the reform. Notably, there is a mass of observations with *all* workers outsourced, while there is a smaller mass at lower levels of outsourcing. In particular, we see that 2/3 of establishments using outsourcing were outsourcing more than 95% of their employees.[26] This group covered 89% of outsourced workers pre-reform. In the Economics Census data, which covers all firms in Mexico, we observe that 78% of establishments using outsourcing, accounting for almost 2% of all Mexican establishments were outsourcing over 95% of their workforce.

Similarly, in the social security data, we classify an establishment as full outsourcing if it insourced at least 5 workers around the reform (according to the conditions stated in Section 3.2) *and* if the establishment was not previously identified in the social security data before the reform,[27] or if the firm size increased more than 20-fold following the insourcing event. All other establishments insourcing over 5 workers are classified as conventional outsourcing establishments.[28] 66% of the insourcing plants are classified as full outsourcing. Most of these establishments had *never* appeared in the social security data since 2004 (the earliest year where we have data). These statistics are very much in line with those found with the EMIM data. Figure B.1 in the Appendix shows the sectoral distribution of full outsourcing establishments identified in EMIM and IMSS data. Reassuringly, the results look very similar in each dataset.[29]

Given these distinctive patterns in the use of outsourcing, we divide the treated establishments into two groups:

1. *Full outsourcing establishments:* These are establishments that outsourced more than 95% of their workers for at least one month in the year before the reform.

2. *Conventional outsourcing establishments:* These are establishments that had positive outsourcing for at least one month in the year before the reform, but outsourced less than 95% of their workers.

As shown in Table 1, 1629 establishments are classified as *full outsourcing*, 855 as *conventional outsourcing* and 5581 did not use outsourcing, and are classified as control. In the subsequent sections, we will present evidence that the motivations for outsourcing differed between these two groups. Given the distinctive patterns of full outsourcing establishments and the significant number of establishments and outsourced workers it represents, we will focus the empirical analysis on this group. We will provide evidence that the institutional context in Mexico provides incentives for firms to outsource all employees to avoid paying certain worker benefits.

We choose the 95% cutoff, rather than 100% because there is a non-negligible mass of firms outsourcing a very high proportion (but not all) of their workers. In addition, we show in Figure

[26] While Figure 2 is computed for observations between 2020 and 2021, there is considerable persistence in the outsourcing patterns across time. Table A.1 shows a transition matrix for the use of outsourcing between 2017 and 2020, where we aggregate the data at the yearly level. We can see that if an establishment was outsourcing more than 95% of it's workers in a given year, the likelihood that it was doing so in the following year was 97%.

[27] Firms with no employees obviously do not appear in the social security data because they have no workers to report.

[28] We restrict the analysis to the manufacturing sector and to firms with more than 20 employees to improve alignment with the EMIM data.

[29] There are no clear incentives to misreport outsourcing in EMIM data, as INEGI has very strict confidentiality regulations

3 that for establishments outsourcing between 95% and 100% of their employees , the relative wages of in-house workers vs outsourced workers are much higher than for the rest of the establishments. This indicates that this group outsourcing above 95% was hiring relatively very high wage workers in-house, which are probably the owners or high-level managers of the company. We show below that the motivations behind this extreme use of outsourcing apply to firms holding only managers and directors.[30]

We focus on establishment level outcomes in this paper because in the manufacturing survey we cannot observe outcomes at the firm level. In the social security data, we can identity multi-establishment firms, which we define as establishments which share the same tax-id (*Registro Federal de Contribuyentes, RFC*). 59% of outsourcing establishments belong to single-establishment firms. Moreover, only 6% of firms where one establishment outsourced all workers had an establishment that was not outsourcing all workers before the reform.[31] Therefore, for the vast majority of the cases, one should think of full outsourcing establishments as belonging to full outsourcing firms.

### 4.2 Profit-sharing and full outsourcing

In this section, we provide evidence consistent with the fact that the main reason behind full-outsourcing practices is the circumvention of mandatory profit sharing. As outlined in Section 2.1, the Mexican Constitution and Federal Labor Law (*Ley Federal del Trabajo*) (LFT, 2021) require that nearly all companies with profits above 15.000 USD share 10% of their profits annually with almost all of their employees, excluding directors and managers. This profit-sharing benefit is typically disbursed once a year, usually in May. The 10% to be shared is fixed. Hence, firms can only avoid this obligation by either having no registered employees (or only managers), while outsourcing their workforce to an entity with either no profits or lower profits than the main establishment. Therefore, the circumvention of profit-sharing is likely to explain why establishments had incentives to outsource all of their workforce. It also clarifies why entities with only 5% of their workers employed in-house had high-wage workers who likely held managerial positions and were exempt from the profit-sharing law. Below, we present various lines of evidence indicating that establishments engaged in full outsourcing to avoid profit-sharing contributions they would have to pay under conventional employment relationship.

Figure 5 shows average monthly profit-sharing per worker (profit-sharing / total workers) in 1000s of Mexican Pesos recorded in EMIM for each group of establishments. In May of each year, the month when profit-sharing should be distributed by law, both control and conventional outsourcing establishments feature positive profit-sharing, while full outsourcing establishments do not pay this contribution. This graph underscores the necessity for outsourcing *all* workers to circumvent profit-sharing contributions, as conventional outsourcing establishments display similar profit-sharing patterns to the control group.[32]

[30] Slightly changing the value this cutoff does not affect our results.

[31] In 17% of these firms, the establishment not outsourcing had less than 20 employees with exceptionally high wages, likely indicating managerial roles. Among the remaining 83%, non-outsourcing establishments tended to have a notably high proportion of temporary workers (16% on average, compared to the sample average of 5%), who are not eligible for profit-sharing.

[32] Importantly, we have consulted with the area at INEGI in charge of carrying out the surveys, and full outsourcing establishments are asked on their profit-sharing contributions, and technically can report a positive value even if they

Figure A.1 presents additional evidence supporting this hypothesis using official firm tax declaration data from 2010 to 2015. We categorize firms into 10 groups based on their average declared profits over the 5-year period. The blue line in the figure illustrates the proportion of firms in each profit size group that reported zero profit-sharing contributions for *some* periods (though not all). As expected, low-profit firms are more likely to report zero profit-sharing in some years, as they may fall below the profit threshold for positive profit-sharing during those years. The patterns for firms that reported zero profit-sharing contributions *every* year between 2010 and 2015 (in red) differ notably. The red line in the figure reveals a U-shaped relationship, where both low-profit and high-profit firms are more likely to have consistently reported zero profit-sharing. While we cannot directly measure outsourcing using tax data, it is highly likely that these high-profit firms are avoiding profit-sharing through the outsourcing practices described earlier.

Demonstrating that contracting firms exhibited zero or low profits is more challenging because we lack linked firm-to-firm data to establish this directly. Nevertheless, we present evidence to support this notion. In the 2019 Economic Census, firms are asked whether they outsource to a firm in their same corporate group. We find that, 64% of full outsourcing establishments were outsourcing to a firm that was a subsidiary of the leading establishment (albeit a different legal entity). Additionally, social security data indicates that more than 60% of contracting firms in a full outsourcing relationship exclusively employed workers from a single parent firm[33] and 77% subsequently ceased operations following the implementation of outsourcing reform. Hence, the profits of contracting firms were often determined by the parent company, which had incentives to keep them null or low. Furthermore, any profits accrued by the contracting firms would be included in the outsourcing costs reported in EMIM by the full outsourcing establishments. In Appendix B.4, we use this information to argue that it is highly unlikely that the profits of the contracting firm were nearly as high as those of the parent firm.

Finally, this motive for outsourcing was mentioned frequently in media outlets[34] and was mentioned in all of the interviews we carried out with experts who worked in the outsourcing industry, and HR managers from firms who used outsourcing before the reform.

### 4.3 Alternative reasons for full outsourcing

In this section we explore alternative explanations, apart from profit-sharing avoidance, that could potentially justify full outsourcing. We provide empirical evidence and assess the incentives created by the institutional context to show that these alternative reasons are unlikely to be significant drivers behind firms' decisions to entirely outsource their workforce.

**Volatility.** Firms could potentially outsource all workers to reduce adjustment costs when facing temporary changes in employment demand. We show that this explanation is not in line with empirical evidence. Table 2 presents the results of a regression of establishment-level employment volatility for the pre-reform period on a binary indicator for full outsourcing. The results suggest that these establishments do not exhibit higher volatility in the employment within the year during the pre-

have all workers outsourced.

[33]This number was only 39% for contracting firms hiring workers for conventional outsourcing establishments.

[34]Examples of articles where this was mentioned are Infobae (2019); Comunicado STPS (2021).

reform period.[35] Similarly, Table A.2 shows that full outsourcing establishments are not more likely to belong to sectors with high seasonality.[36]

**Within-firm wage compression.** As mentioned above, outsourcing may enable firms to offer lower wages, especially when internal equality concerns exist. However, this motivation would typically justify the outsourcing of only a specific segment of a firm's workforce, rather than all workers.

**Specialization.** We posit that full outsourcing is unlikely to be driven by an increase in firm specialization and economies of scale. While outsourcing can enable firms to focus on core tasks by delegating non-core activities to external providers, this motive assumes that firms retain direct employment of workers for their core operations which they specialize in (Abraham and Taylor, 1996). In contrast, fully outsourced firms do not hire *any* workers in-house. Thus, while specialization would justify outsourcing non-core tasks such as IT, human resources, cleaning or security, it falls short in rationalizing the outsourcing of an entire plant's workforce.

**Avoidance of other mandatory contributions.** In the media and policy discussions, it has been suggested that outsourcing allowed firms to decrease other mandatory contributions apart from profit-sharing (STPS, 2021). One such contribution is the mandatory labor risk premium in Mexico (INFOAVIT, 2022). Firms in Mexico are required to pay a risk contribution to social security which depends on the risk classification of the firm's economic sector, and on past firm accidents. Thus, it was suggested that firms belonging to sectors with a high risk classification outsourced workers to avoid paying high risk premiums. For this to be a valid reason, it should be the case that high risk firms should outsource their workers to a firm with a lower risk classification than the parent firm. We do find that firms in an activity with a high risk classification are more likely to fully outsource. However, we do not find a consistent trend of outsourcing to lower risk classification firms. Specifically, 67% of fully outsourcing establishments outsourced to entities within the same risk classification as the parent establishment, while 19% outsourced to lower-risk entities, and 13% outsourced to higher-risk ones. Hence, although outsourcing to lower-risk establishments was slightly more common, this doesn't appear to be a prevalent motive in our setting.

Additionally, outsourcing was claimed to help firms underreport wages and avoid 13th salary payments. If these were significant reasons for full outsourcing, we would expect an increase in declared earnings in social security records post-reform when workers are hired in-house. However, as detailed below, we do not find evidence of such an increase in declared earnings for workers insourced by fully outsourcing establishments.[37]

Thus, while we cannot definitively reject all alternative explanations for full outsourcing, our evidence suggests that some of the main alternative motivations for this phenomenon were not playing

[35] Employment volatility is calculated as the within-year coefficient of variation of de-trended employment. To de-trend variables we carry out an additive time-series decomposition using moving averages, where each variable is decomposed into a trend component, a seasonal component and an irregular component at the establishment level (using the *stats* package in R). De-trended variables are constructed as the original variable minus the trend component.

[36] To compute sector seasonality, we carry out an additive time-series decomposition using moving averages (the same decomposition used for de-trending, but at the sectoral level) and extract the seasonal component of this decomposition. The seasonality for the variable x is calculated as the average absolute value of the seasonal component, divided by the average of x for 2017-19.

[37] This could still be a reason for outsourcing in conventional outsourcing establishments.

an important role in our setting. Furthermore, in the following section we show evidence consistent with the notion that firms carrying out full outsourcing were those which benefited the most from avoiding profit-sharing obligations.

### 4.4 Characteristics of full outsourcing establishments

The most defining features of full outsourcing establishments are that they are large, productive, with high profits. Table 1 presents descriptive statistics for 2018 for each group of establishments. Full outsourcing establishments tend to have more workers, and are more likely to belong to foreign owned firms. On average full outsourcing establishments have higher profits, higher revenue per worker and value added per worker. Figure 6 displays the relationship between full outsourcing and different size and productivity measures. The graphs show that larger, more productive establishments (measured as either value added over worker or value added per unit of capital) were more likely to incur full outsourcing. These results align with the notion that more productive establishments were likely to have higher profits (and potential profit-sharing) and benefited relatively more from the cost reduction of evading profit-sharing obligations. This is discussed in more detail in Section 5. Figure B.1 shows the distribution of full outsourcing practices across sectors. Sectors where the practice was particularly frequent include Petroleum and coal product manufacturing, Chemical manufacturing, and Beverage and tobacco product manufacturing.

Table 6 shows summary statistics on the workers outsourced by full outsourcing establishments for the period 2017-2020. Notably, these workers earned higher salaries than those that were not in an outsourcing relationship. This wage differential can be attributed to the nature of outsourcing firms, which tend to be larger and more productive, consequently offering higher wage structures on average. Indeed, this wage differential significantly diminishes when we compare treated workers with non-outsourced workers in firms employing outsourcing practices. This characteristic of outsourced workers contrasts with the predominant focus in the outsourcing literature on the outsourcing of workers positioned at the lower end of the wage distribution. In our case, where highly productive firms outsource their entire workforce, this phenomenon primarily affects higher-earning workers, on average.

### 4.5 Does full-outsourcing decrease worker compensation?

While Section 4.2 provides evidence that full outsourcing allows firms to avoid or reduce profit sharing contributions, it is a priori not evident that this practice allows to decrease total worker compensation (wages + profit sharing). If wages and profit sharing were perfectly substitutable for workers and firms, full outsourcing would only change the composition of total compensation, without changing its total value. This would align with the presence of compensating differentials between wages and profit-sharing (Rosen, 1986). Moreover, even if full outsourcing did allow firms to reduce total compensation, it is unclear why firms would choose this approach instead of simply offering lower wages.

Full outsourcing would allow firms to reduce total compensation if profit sharing and wages are not perfectly substitutable. One reason for this imperfect substitutability put forward in Nimier-David

et al. (2023) is a binding minimum wage, which sets a limit to how much firms can reduce total compensation via wages. However, this does not seem to be the case in our setting. As can be seen in Table 6 full outsourcing firms paid relatively high wages. Less than 4% of workers at these firms were earning less than 1.2 times the minimum wage, and in more than half of full outsourcing establishments all workers were earning more than 1.2 times the minimum wage. The average Kaitz index (minimum wage over median wage) at these establishments was only 0.4 in 2020.[38] This indicates that downward wage rigidity does not seem to be the main cause for this practice.[39]

In the next section, we build a theoretical framework where we state that the imperfect substitutability between wages and profit sharing stems from the labor supply function. In particular, if workers are less sensitive to differences in profit-sharing than differences in wages when making labor supply decisions, firms can reduce total worker compensation by avoiding profit-sharing. In Section 6, we leverage the effect of the outsourcing restriction to demonstrate that this mechanism is consistent with our empirical results.

# 5 Theoretical framework

In this section, we introduce a simple theoretical framework to help explain the motivations behind full outsourcing practices. Our framework follows a static partial equilibrium posting model in the spirit of Card et al. (2018) where monopsonistic firms offer workers bundles of wages and profit-sharing and face a labor supply curve that depends on both forms of compensation. Firms can use full outsourcing to avoid mandatory profit-sharing. We focus on the decision of firms to either fully outsource or not outsource at all, excluding conventional outsourcing, as this is the main practice we aim to understand. We set up the model and solve for firms' choice to fully outsource (and avoid profit-sharing) or not, jointly with what wage to offer. The full solution to the model is presented in Appendix C. We derive four predictions regarding the effects of restricting outsourcing, which guide our empirical analysis of the outsourcing reform in the next section.

## 5.1 Model setup

We consider a firm with productivity $z_j$ that produces a final good in a perfectly competitive product market with a linear technology function in labor $n_j$.[40] Productivity is given by $z_j = \hat{z}_j + \xi_j$ where $\xi_j$ is a random variable with $\mathbb{E}(\xi_j) = 0$ and firms are risk-neutral. Labor supply and demand decisions are made before the productivity realization. Thus, expected output for firm $j$ is:

$$\mathbb{E}(y_j) = \mathbb{E}(z_j n_j) = \hat{z}_j n_j \tag{1}$$

[38] The average Kaitz index post-reform was only 0.5, indicating that even post reform, on average the median worker in these firms earned two times the minimum wage.

[39] Only approximately 10% of formal workers in Mexico are coverage by a collective bargaining agreement (in France is is around 98%) (OECD Statistics, 2022), suggesting that wage floors set in CBAs are unlikely to create significant downwards wage rigidity.

[40] We normalize the price of the final good to one.

There exists a level of mandatory total profit sharing which is a proportion $\rho$ of pre-profit sharing payments profits, $\tilde{\Pi}_j$.

$$mandatory\ profit\ sharing_j = \rho\tilde{\Pi}_j = \rho(z_j n_j - w_j n_j) \tag{2}$$

Firms can pay a fixed cost $k$ and a variable cost $c$ to outsource their workers to a separate entity[41] and avoid mandatory profit sharing. Total worker compensation is composed of wages and profit sharing per worker, $w_j + ps_j$, where $ps_j = \frac{\rho(z_j n_j - w_j n_j)}{n_j} = \rho(z_j - w_j)$ when the firm complies with mandatory profit sharing, and $ps_j = 0$ when it avoids it by full outsourcing. For simplicity, we abstract from wage uncertainty and assume wages are set at the beginning of the period, before the realization of $\xi_j$, while $ps_j$ is set after $\xi_j$ is realized. Therefore, when hiring workers (before $\xi_j$ is realized), firms offer a bundle of wages and expected profit sharing per worker. Firms face a labor supply curve which is increasing in both forms of compensation:

$$n_j^s = (w_j + \mu \cdot \alpha \cdot \mathbb{E}[ps_j])^\theta \tag{3}$$

We micro-found this labor supply function in Section C.1. $\theta > 0$ defines the absolute elasticity faced by the firm with respect to the value of the expression inside parenthesis.[42] $\alpha \leq 1$ and $\mu \leq 1$ determine the *relative* elasticity of workers with respect to wages vs profit sharing offered by the firm.[43] The parameter $\alpha$ represents the discount workers apply to profit-sharing due to risk aversion, as profit-sharing is more uncertain than wages (Nimier-David et al., 2023).[44] In Section C.1 we show that $\alpha$ can be expressed as $\frac{CE_{ps}}{\mathbb{E}[ps_j]}$ where $CE_{ps}$ is the certainty equivalent of profit sharing. The parameter $\mu$ captures the reduced responsiveness of workers to profit-sharing as a result of information frictions. In Section 6.3, we explain and present self-collected survey evidence on two types of information frictions related to profit-sharing which reduce the labor supply elasticity with respect to this benefit. The first is a lack of awareness of profit-sharing which likely prevents workers from considering profit-sharing into their decision-making when comparing job offers (Jäger et al., 2023). The second are information processing frictions of understanding and calculating profit-sharing, which is a more complex form of compensation than wages (Enke et al., 2024; Oprea, 2024). In other words, even if workers are aware of the existence of profit-sharing, the complexity involved in calculating it makes them less sensitive to this benefit when evaluating job offers Gabaix and Graeber (2024). Following the literature, we assume that while the information frictions reflected in $\mu$ impact labor supply decisions, they are not related to workers' preferences for profit-sharing but rather to constraints that prevent them from valuing it

[41] These costs can include the search costs of contacting a contracting firm, the costs of performing an extra firm-to-firm transaction, and any markups charged by the contracting firm. They also include extra administrative costs of setting up a different entity to outsource the workers to and filing an extra tax declaration each year if the contracting firm is set up by the parent firm.

[42] We assume that the firm faces a finite elasticity of labor supply, an assumption supported by a growing body of literature on firm wage-setting power (Manning, 2004), particularly in the context of developing countries (Felix, 2023; Estefan et al., 2024).

[43] $\eta_{n,w} = \frac{\theta w_j}{(w_j + \mu \cdot \alpha \cdot ps_j)}$ and $\eta_{n,ps} = \frac{\mu \cdot \alpha \cdot \theta ps_j}{(w_j + \mu \cdot \alpha \cdot ps_j)}$ . Thus $\frac{\eta_w}{\eta_{ps}} = \frac{w_j}{\mu \cdot \alpha \cdot ps_j}$.

[44] In our data, profit-sharing is more volatile than wages. Among control firms with a longer series of profit-sharing payments, the average within-firm, across-time coefficient of variation of profit-sharing is approximately 5 times that of wages.

properly when comparing job offers (Enke et al., 2024; Handel and Kolstad, 2015).[45] Conceptually, this differentiates $\mu$ from $\alpha$. The former affects worker choices but not worker welfare once the labor supply decision has been made, while the latter does influence worker welfare once labor supply decisions have been made due to the uncertainty of profit-sharing income. The importance of this distinction will become clear in Prediction 3.

When firms do not fully outsource, they comply with mandatory profit sharing and post wages to maximize expected post-profit-sharing profits:

$$\mathbb{E}\left(\Pi_j^{not\ full\ outs}\right) = \max_{w_j} \{(1-\rho)(\hat{z}_j - w_j)n_j\} \tag{4}$$

subject to

$$\mathbb{E}[ps_j] = \rho(\hat{z}_j - w_j) \qquad \text{and} \qquad n_j = (w_j + \mu \cdot \alpha \cdot \mathbb{E}[ps_j])^\theta$$

When firms fully outsource, they pay the costs of doing so and avoid the mandatory level of profit sharing. Thus, in this scenario they maximize:

$$\mathbb{E}\left(\Pi_j^{full\ outs}\right) = \max_{w_j}\{(z_j - w_j - c)n_j - k\} \tag{5}$$

subject to

$$n_j = (w_j + \mu \cdot \alpha \cdot \mathbb{E}[ps_j])^\theta$$

Firms will fully outsource if $\mathbb{E}\left(\Pi_j^{full\ outs}\right) > \mathbb{E}\left(\Pi_j^{not\ full\ outs}\right)$. In the following subsection we show how this decision depends on model parameters. We then derive three predictions on the effects of restricting outsourcing. The full model solution is provided in Appendix C.

### 5.2 The decision to fully outsource

In this section we show that if $\mu \cdot \alpha < 1$ (risk aversion and/or information frictions are present), more productive firms find it optimal to pay the costs of full outsourcing and avoid mandatory profit sharing. In Appendix C we show that a firms will decide to fully outsource only if the following condition is met:

$$k \leq \theta^\theta \left(\frac{\hat{z}_j}{\theta+1}\right)^{\theta+1} \left[\left(1 - \frac{c}{\hat{z}_j}\right)^{1+\theta} - \left(\frac{1-\rho}{1-\alpha\mu\rho}\right)\right] \tag{6}$$

First, note that that if $\alpha \cdot \mu = 1$ the expression collapses to $k \leq D$ with $D \leq 0$. When labor supply is equally elastic with respect to wages and profit sharing, workers would have to be perfectly compensated by the absence of profit sharing with higher wages. In this case, full outsourcing would only occur if there are no costs associated with this practice. Additionally, Equation 6 shows that the

[45] If information frictions are stronger for profit-sharing for wages, the mix between wages and profit-sharing may not be chosen optimally. This result contrasts that in Dube et al. (2022) and Lagos (2022) who model a monopsonistic firm's decision to set wages and amenities and show that conditional on the value of the job, the mix of wages and amenities is chosen optimally. This is because in their model, differences in the elasticity with respect to wages and amenities stem from worker preferences, not frictions.

number of firms fully outsourcing is increasing in the level of information frictions and risk aversion (decreasing in $\mu \cdot \alpha$). This occurs because the less elastic labor supply is with respect to profit sharing, the less firms need to compensate workers with higher wages when they choose to avoid this benefit.

The second point to note is that the right-hand side of Equation 6 is increasing in $\hat{z}_j$, as the cost per worker of profit sharing is increasing in $\hat{z}_j$, while the cost per worker to avoid it is decreasing in $z$.[46]. This prediction aligns with Figure 6, which presents bin scatter plots showing that larger, more productive establishments are more likely to fully outsource.

### 5.3 The impact of a restriction on full outsourcing

In this section we use our model to assess the impacts of an increase in $k$, interpreted as a restriction to outsourcing practices.[47] As shown in Equation 6, this raises the left-hand side of the inequality, leading to a decrease in the number of firms avoiding profit sharing. We derive three predictions regarding the impact of this restriction on firms that newly comply with profit-sharing requirements. We test these predictions empirically in the next section.

**Prediction 1.** *The effect on total firm employment is increasing in c.*

In Appendix C.4 we show that the change in firm employment can be expressed as:

$$\Delta n_j = c \cdot \left( \frac{\theta}{\theta + 1} \right)^{\theta} \tag{7}$$

Which is positive whenever $c > 0$. Notably, if outsourcing involves only a fixed cost ($c = 0$), the effect on employment becomes zero, implying that enforcing profit sharing will not create a distortion in employment levels. This result is a notable aspect of profit-sharing and follows from the fact that, for a class of labor supply functions of the form $n_j = (w_j + Aps_j)^{\eta}$, profit-sharing does not affect the marginal cost of employment at the point where marginal profit is zero. The marginal cost of employment when the firm complies with profit sharing is given by:

$$MC_n^{comply} = \underbrace{\left(1 + \frac{1}{\eta}\right) n_j^{\frac{1}{\eta}}}_{MC_n^{avoid}} - A \left( ps_j - n_j \frac{\partial ps_j}{\partial n} \right)$$

The first term corresponds to the marginal cost of employment when the firm avoids profit-sharing. When the firm maximizes profits ($\Pi' = 0$), $\frac{\partial ps_j}{\partial n} = \frac{ps_j}{n}$, making the second term in parenthesis zero. Thus, a scenario with profit-sharing and a scenario without it have the same marginal cost of employment *at the optimum*, leading to equal employment levels in both cases. This result is not restricted to the case of constant returns to scale and hold for any revenue function. We provide a detailed explanation in Section C.4 and a graphical illustration of this result in our setting in Figure C.2.[48]

[46] Cost per worker of avoiding $= c + \frac{k}{n_j}$ which is decreasing in $\hat{z}$.

[47] One can interpret this increase as the getting caught and punished for performing outsourcing even when it is banned.

[48] If we assume that there is a fixed cost of staying in business each period, then if mandatory profit sharing, $\rho$, is sufficiently high, the firm will exit the market. This occurs because the post-profit sharing profits of the firm will not be high enough to compensate for the cost of staying in business.

**Prediction 2.** *If $\mu \cdot \alpha < 1$ expected total compensation $w_j + ps_j$ will increase. The effect will be decreasing in $\mu \cdot \alpha$.*

In Appendix C.4 we show that the change in expected total compensation can be expressed as:

$$\Delta\, \mathbb{E}[\textit{total compensation}] = \frac{\hat{z}_j \rho}{1+\theta} \left(1 - \frac{1-\rho}{\frac{1}{\mu\alpha} - \rho}\right) + c\frac{\theta}{\theta+1} \tag{8}$$

The effect is positive if $\mu \cdot \alpha < 1$, and depends negatively on this term. The intuition for this result is that when workers are more reactive to a wage decrease than to a profit sharing increase ($\mu \cdot \alpha$ is low), offsetting increases in $ps_j$ via lower wages is relatively costly for the firm, as it has a relatively large negative effect on its labor supply. This decreases firms' incentives to reduce to offset increases in profit sharing (Equation 47 in Section C.4), leading to an overall rise in total compensation.

**Prediction 3.** *If $\mu < 1$ the expected risk-adjusted value of total compensation $w_j + \alpha\, \mathbb{E}[ps_j]$ will increase. The effect is decreasing in $\mu$ and increasing in $\alpha$.*

We define the risk-adjusted value of total compensation as $w_j$ plus the amount of profit sharing workers would accept to avoid uncertainty, i.e. the certainty equivalent of profit-sharing $CE_{ps}$. In Section C.1.1 we show that this can be expressed as $w_j + \alpha\, \mathbb{E}[ps_j]$, where $\alpha = \frac{CE_{ps}}{E[ps_j]}$ is one minus the relative risk premium.[49] In Appendix C.4, we demonstrate that:

$$\Delta\, \mathbb{E}[\textit{value total compensation}] = \frac{\hat{z}_j \rho \alpha}{1+\theta} \left(1 - \frac{1-\alpha\rho}{\frac{1}{\mu} - \alpha\rho}\right) + c\frac{\theta}{\theta+1} \tag{9}$$

This result implies that if the inelasticity of profit-sharing is solely attributed to risk aversion ($\mu = 1$), the value of total compensation for workers may not increase even in the presence of an overall increase in total compensation. In this scenario, an increase in total compensation would solely compensate workers for higher risk without leaving them better off. Conversely if information frictions regarding profit-sharing partly explain this inelasticity, the value of total compensation for workers should increase. This is because $\mu < 1$ reflects a reduced responsiveness to profit-sharing, not due to workers' true preferences, but because of information-related constraints - either a lack of awareness or difficulties in processing the complexity of profit-sharing benefits - which limit their ability to fully respond to this benefit.

In the following section we study the effect of the outsourcing reform, focusing on three outcomes that emerge from these predictions: compliance with profit sharing, total employment, total worker compensation, and the risk-adjusted value of total compensation. In Section 6.3 we present empirical evidence on the role of risk aversion and information frictions in explaining the imperfect substituability between profit sharing and wages for workers.

[49] The relative risk premium is defined as $1 - \frac{CE_{ps}}{E[ps_j]}$

# 6 The causal impact of restricting outsourcing

The purpose of this section is to quantify the causal impacts of constraining outsourcing on both establishment and worker level outcomes. For this purpose, we leverage the effect of the outsourcing reform in Mexico which induced a change in outsourcing use.

## 6.1 Establishment-level effects

### 6.1.1 Methodology

In order to evaluate the effects of the reform using establishment survey data, we rely on heterogeneous exposure to reform across different units. The main assumption behind this identification is that, conditional on controls, the outcome variables of establishments using outsourcing and those not using outsourcing would have followed similar trends in the absence of the reform (Saez et al., 2019; Carry, 2022). We perform the following dynamic difference in differences regression:

$$Y_{jsgt} = \sum_{k=Q12017}^{Q12023} \beta_k \mathbb{1}_{t \in k} O_j + \lambda_j + \gamma_{st} + \phi_g t + \xi_{jsgt} \tag{10}$$

Where $Y_{jstg}$ = outcome of establishment $j$, in sector $s$, size group $g$ (we divide establishments into 6 groups according to their size pre-reform) at time (month-year) $t$ and $O_j = 1$ if establishment used outsourcing in any month in the year prior to the reform.[50] $\mathbb{1}_{t \in k}$ is a variable equal to one is month $t$ falls into quarter $k$. We include size-group specific fixed effects, as large firms are more likely to outsource, and in Mexico large firms present a higher growth rate. We also include 4 digit NAICS sector x time specific fixed effects to account for sector-specific seasonality patterns and idiosyncratic shocks. We normalize the coefficient for the last quarter of 2020 to zero.

The control group includes establishments which had not used outsourcing in the year prior to the reform. Standard errors are clustered at the establishment level.

### 6.1.2 Results

**Effect on outsourcing use.** Figure 7 shows the results of estimating Equation 10 on proportion of outsourced employees and the number of in-house workers. It is apparent that the reform had a strong negative effect on the proportion of outsourced, and an increase in the number of in-house workers. Nearly 90% of full outsourcing establishments stopped outsourcing over 95% of their workforce post reform, and 80% stopped outsourcing altogether. Figure A.2 shows that these effect are also visible when plotting the raw share of establishments using outsourcing (panel a) and outsourcing over 95% of workers (panel b) for each group of establishments.

Our analysis with the social security data also enables us to identify contracting firms, i.e. es-

[50] We prefer to use a dummy, rather than a continuous exposure variable, as continuous exposure measures can be problematic in the presence of heterogeneous treatment effects and non-linearities (Sun and Shapiro, 2022).

tablishments from which workers moved out of during and insourcing event.[51] We find that 77% of contracting establishments associated with full outsourcing establishments exited within one year after the reform. Those that did not exit experienced a strong decrease in size, and remained very small (Figure A.3). These surviving contracting firms possibly held workers which were not part of the parent firms' core activities, and thus still allowed to be outsourced. This evidence suggests that these contracting firms did not engage in any economic activity beyond providing workers to lead firms.

**Effect of on profit-sharing.** Panel (a) of Figure 8 shows monthly profit-sharing contributions per worker for control and full outsourcing firms. Panel (b) shows the results of a difference in differences regression similar to 10 but estimated at the yearly level, where the outcome variable is yearly profit-sharing over total workers.[52] It can clearly be seen from both figures that the reform had a positive effect on profit-sharing for the full outsourcing firms. Note that the first year that treated firms paid profit-sharing contributions was 2022, not 2021, despite the insourcing events occurring in 2021. This is because profit-sharing contributions corresponding to a certain fiscal year are distributed on the following year in May.[53]

Table A.3 shows the average total profit-sharing, profit sharing per worker, and profit sharing per worker as a share of the monthly wage, paid by full-outsourcing and control firms in 2022. Full outsourcing firms had higher total profit-sharing contributions than control firms in both absolute and per worker terms. On average, profit-sharing per worker amounted to approximately half of the monthly wage for both groups.

**Effect on employment.** We now evaluate Prediction 1 of the model by estimating the effect on total firm employment (total outsourced workers + total in-house workers). Figure 9 shows the results on the natural logarithm of total employment for full outsourcing establishments. We do not find differential pre-trends, indicating that, conditional con the controls mentioned above, treatment and control groups had similar trends in employment pre-reform. We find that the reform had no significant effect on total employment for these establishments.[54] The results hold when looking at total and average hours worked at the establishment (columns 5 and 6 of Table 4), indicating that establishments did not adjust by offering workers lower hours of work. As noted above, the impact on outsourced workers was significant. Thus, on average, full outsourcing establishments insourced all workers after the reform (see Figure 7b), and did not alter their hiring and firing practices post-reform. Through the lens of our model, the lack of significant effects on employment is indicative of a low marginal cost of outsourcing $c$ as seen in Prediction 1.

Table A.5 shows that the results are robust to alternative specifications of Equation 10. In particu-

[51] We classify an establishment as a contracting agency if at least 5 of its workers were involved in an insourcing event from that establishment (to another one).

[52] Results also shown in Table 5.

[53] Figure A.6 shows no significant effects on either the levels of investment or value added per worker following the reform. This suggests that the increase in profit-sharing did not disincentivize firms from investing, nor did it lead to an improvement in firm productivity. These results are consistent with the findings of Nimier-David et al. (2023).

[54] It can be noted in that standard errors get smaller for coefficients closer to the left out time period. This is because our outcome variable is measured at the quarterly level and exhibits high serial correlation within establishments. As the coefficients are expressed in *relative* terms with respect to period -1, the residual variation in the outcome variable is lower for periods close to -1, resulting in lower standard errors. We have carried out simulations and a written proof of this result, which are available upon request.

lar, they are robust to computing the treatment variable using a 2-year time-frame pre reform instead of 1 year (column 1) [55] and estimating the regression using an unbalanced sample of establishments (column 2) and estimating the regression only with single-establishment firms (column 3).

**Effect on total labor costs.** Estimating the reform's impact on total labor costs presents challenges when working with the establishment-level data. Firms that outsource employees typically report the total amount paid to the external establishment providing these workers as labor costs. Post-reform, treated firms experience a sharp decline in the reported amount paid to the contracting firm and an increase in reported wages. However, since the payments to the contracting firm likely encompasses expenses beyond just wages, it's challenging to precisely estimate the cost per employee before the reform for firms utilizing outsourcing.[56] Unfortunately, the EMIM dataset does not offer precise information on these costs, making it impossible for us to control for these components post-reform. Furthermore, it's plausible that the contracting firm providing workers earned a minor profit (albeit lower than the parent firm's profit to reduce profit-sharing contributions, see Section B.4), which would also be incorporated into this sum.

In practice, when we compute the effect of the reform on total and average labor costs, we observe negative coefficients post-reform. Nevertheless, we attribute this to the measurement issue outlined above. Acknowledging these limitations in measuring the reform's impact on labor costs using EMIM data, we turn to the comprehensive information on wages in social security data to estimate the reform's effects on wages. Subsequently, we combine these results with profit-sharing data from EMIM to estimate the overall impact on total compensation.

## 6.2 Worker-level effects

### 6.2.1 Methodology

In this section we examine the effect of the insourcing brought about by the reform on worker wages and total compensation, including wages plus profit-sharing contributions. We estimate the following specification.

$$Y_{isgt} = \sum_{k=2017}^{2023} \theta_k \mathbb{1}_{t=k} Insourced_i + \phi_i + \gamma_{st} + \lambda_{gt} + \xi_{isgt} \tag{11}$$

Where, $Y_{isrt}$ denotes the outcome of worker $i$, sector $s$, in a firm of size group $g$, at year $t$. $Insourced_i$ is an indicator variable that takes a value of 1 if the worker was insourced between April and September 2021. We normalize the coefficient of the pre-reform year (2020) to zero. $\gamma_{st}$ denotes sector x year fixed-effects, and $\lambda_{gt}$ denotes firm size group fixed effects. We perform the regressions at the yearly level because not all treated workers were insourced on the same month, and to abstract from seasonal changes in earnings. Standard errors are clustered at the establishment level.

[55] The number of observations decreases relative to estimates in Table 4 because with a 2-year pre reform time frame, more establishments are classified as conventional outsourcing, and thus excluded from the estimation sample.

[56] Additional costs potentially included in this figure include expenses related to worker training (mandated by law in Mexico), worker uniforms or equipment, and workers' travel expenses.

We consider the control group as all workers who were not insourced during the reform and were working for firms with no insourcing events during the reform. We do not include workers that were not insourced, but were working for firms that insourced other workers, as these workers were indirectly affected by the reform due to an increase in the number of workers amongst which profit-sharing was distributed. This group may have also been affected by the reform due to other forms of within-firm rent sharing (Deibler, 2021). However, we show that our results on the impact of the reform on wages are robust to including all workers in the control group. Furthermore, we restrict our analysis to workers who remained with the same employer in the 3 years prior to the reform and throughout the post-insourcing period. Below we show that results are robust to including workers with different levels of firm tenure pre-reform and to including workers who changed firms after the reform. Finally, to decrease computational we work with a 10% random sample workers who were working in 2021 (the year of the reform).

### 6.2.2 Results

**Effect of the reform on wages.** We first study the impact of the reform on worker wages, without including profit-sharing income. The red lines in Figure 10 plots $\theta_k$ from estimating Equation 11 where the outcome variable is the annual average of employees' daily wages and their 95% confidence intervals. We do not find evidence of significant pre-trends before the reform. Starting in 2022, which the first full year post-reform and coincides with the initial disbursement of profit-sharing to treated workers, we observe a decrease in the real wages of treated workers relative to the control group. Treated worker's average daily real wages decreased by 7 Mexican Pesos in 2022 and 11 Mexican Pesos in 2023 relative to control workers. These changes represent a 1.1% and 1.8% of the average (inflation adjusted) daily wage of treated workers in the year prior to reform. This negative effect is driven by a slower rate of wage growth, rather than nominal wage reductions. Indeed, the average nominal wage among treated workers increased approximately 12% per year in the post reform period.[57]

The plotted results can also be seen in Column 1 of Table 7. Column 2 shows that the results are very similar when restricting the sample to workers with a pre-reform tenure at the firm of least 1 year tenure Column 3 shows that we obtain similar results when using utilizing log wages as the outcome in estimating Equation 11.[58] Columns 1 to 4 of Table 8 show that these wage results are robust to alternative specifications. In particular, the results are robust to including workers that did not stay in the same firm after 2021 (Column 1), to an unbalanced panel of workers (Columns 2) and to extending the control group to include non-insourced workers working in firms that insourced other workers (Column 3). In Column 4 we exclude workers earning less than 1.5 times the average minimum wage in the pre-reform year, to isolate the effect of the strong increases in the Minimum wage between 2019 and 2023 in Mexico, which could impact our results if treated and control workers are differentially exposed to the minimum wage. Results are also robust to this specification.

Thus, our findings suggest that treated firms adjusted wage growth in response to the new profit-

[57] 2022 and 2023 witnessed relatively high average nominal wage growth driven by elevated inflation rates and substantial increases in the minimum wage.

[58] The larger coefficients in percentage terms in these specifications suggest a comparatively lower impact on wages for high-wage workers.

sharing obligations they had to meet. Wage measures in social security data encompass additional income components, such as commissions and performance-based bonuses. Consequently, it is possible that firms made adjustments through these aspects of compensation, rather than altering fixed monthly wages.[59] This finding is in contrast to the results from Nimier-David et al. (2023) who find that increases in profit-sharing contribution in France are not compensated via lower wages. This is possibly due to the fact that the minimum wage is more binding in France than in Mexico for treated firms. Additionally, 2021 and 2022 were years of high inflation, giving firms more flexibility to allow for real wage decreases. Thus, in our setting, firms may have had more margin to adjust wages downwards.

**Effect on total worker compensation.** In this section we evaluate Prediction 2 by estimating the effect of the reform on total compensation, which encompasses both wages and profit-sharing income. Given that after the reform profit-sharing increased, but wages decreased for treated workers, the implications of the reform for total labor compensation are a priori ambiguous. Total compensation would increase if wage compensation was less than perfect. As stated in Prediction 2, an increase in total compensation would be consistent with firms facing a labor supply that is less elastic to profit sharing than to wages.

As mentioned in Section 3.1, social security data does not contain information on profit-sharing income for workers.[60] While the establishment survey data contains information on profit sharing, as mentioned in Section 6.1.2, information on wages of outsourced workers pre-reform is inaccurate. To circumvent these data limitations, we combine information on profit-sharing reported in the establishment survey data with wage information from the social security data to build a measure of total compensation (wages + profit-sharing). Because we cannot match these two datasets at the firm level, we do not have a measure of profit-sharing income for each worker, nor for each firm in the social security data. Thus, we combine these two datasets on broader outsourcing status x sector x state x firm size cells. More specifically, we proceed in three steps.

1. First, we categorize establishments from EMIM into groups based on their size (divided into four size categories), economic sector (using NAICS 3-digit codes), state (across 32 states), and their utilization of outsourcing (conventional outsourcing, full outsourcing, and control).[61] Subsequently, using information from the establishment survey, we compute average profit-sharing income for workers in each group for each year.[62]

2. Second, we categorize workers in the social security data into groups based on the same variables (firm size, economic sector, state, and treatment status) and we construct a dataset aggregated at the group x year level. This includes a measure of the average wage across workers in each group $g$ at year $t$.

[59] Anecdotal evidence suggests that post-reform firms made adjustments to different components of compensation (El Economista, 2022).

[60] This is because profit-sharing does not form part of the base salary (*salario base de cotización)* (Diario Oficial de la Federación, 2023; Deloitte México, 2023).

[61] For instance one establishment may belong to the group including establishments in Ciudad de Mexico, in sector 343, which did not use outsourcing pre reform and had between 250 and 750 workers.

[62] Weighted of average profit-sharing per worker for establishments in EMIM in group $g$ in year $t$, where each firm is weighted by the number of workers it hires in that period.

3. Third, we merge both these aggregated datasets by group x year, obtaining a dataset with information on average wages and profit-sharing in each group in each year. We then construct a measure of total compensation in a particular cell $c$ corresponding to group $g$ at time $t$ by adding the average wage in cell measured in step 2. plus the average profit-sharing per worker, using the measurement described in in step 1:

$$total\ compensation_{gt} = \overline{wage^{imss}}_{gt} + \overline{profit\ sharing\ per\ worker}^{emim}_{gt}$$

For this procedure to be valid, it is important that the sample of workers covered in the social security data is similar to the sample covered in the establishment data. In Appendix B.1, we demonstrate that the composition of the samples in both datasets are closely aligned. Additionally, we show that the measured average wages across sectors and regions in both datasets align closely, adding validity to our procedure.

When the dependent variable is expressed in levels, Equation 11 holds the following useful property: estimating it with either worker-level data or data aggregated at the group level, employing $wage_t$ as the outcome variable (with each cell weighted by the number of workers) and controlling for group fixed effects (rather than worker fixed effects), yields identical results. Therefore, the coefficients obtained from the cell-level regression can be interpreted in the same manner as those from the worker-level regressions when each cell is appropriately weighted. Since we have wage information at the worker level *and* at the group level, we can estimate both regressions. The comparison can be seen in Columns (4) and (5) of Table 7 where we see that the coefficients are indeed identical.[63] However, we lack profit-sharing data, and consequently total compensation data at the worker level. Thus, we estimate Equation 11 for total compensation exclusively at the cell level, using our estimate of average total compensation described above.[64]

Figure 10 depicts the estimated effect on total compensation, under the assumption that treated workers were receiving zero profit-sharing payments pre-reform. The results can also be seen in column 6 of Table 7. Despite the negative effect on worker wages, average daily total compensation increased for treated workers by 20 pesos in 2022 (3% of treated workers' average daily compensation in the year pre-reform) and 16.5 pesos in 2023 (2.6% of treated workers' average daily compensation in the year pre-reform) on average.

Table 8 shows that the results are robust to alternative ways of measuring profit-sharing per worker in each cell $c$. In column 5, instead of calculating profit-sharing per worker in EMIM data as profit-sharing / firm size, we separately estimate profit-sharing per worker for white-collar workers and blue-collar workers using the formula within firm profit-sharing distribution, and then take the average profit-sharing income across these two worker types. Results are almost identical to those in Table A.5. In column 6, we use information from EMIM on the weighted average of total profit-sharing[65] (instead of profit-sharing per worker). We then calculate average profit-sharing per worker for each cell as the average total profit-sharing divided by the average firm size measure with IMSS data. As

[63] Standard errors change due to the higher number of observations and additional within-cell variation in worker level data.

[64] We weight each observation in the regression by the number of workers in that cell.

[65] Weights equal to firm size.

mentioned in Section 4.2, it is unlikely that contracting firms provided workers with profit-sharing contributions before the reform, justifying our assumption of zero profit-sharing payments for treated workers pre-reform. Nonetheless, in Figure A.4, we show that the results are robust to less stringent assumptions, namely that treated workers' profit-sharing income pre-reform was a fraction $p$ of their post reform profit-sharing for $p = \{0.2, 0.33, 0.5\}$.

Referring back to Prediction 2, these findings align with the presence of risk aversion and/or information frictions, that make workers less sensitive to profit-sharing than to wages. As a consequence, firms affected by the reform did not fully offset the rise in profit-sharing payments through decreased wage growth. We next examine the impact on the risk-adjusted value of total compensation to further assess the contribution of these two factors to this observed inelasticity.

**Effect on risk-adjusted value of worker compensation.** We now evaluate Prediction 3 and estimate the impact of the reform on the risk-adjusted value of worker compensation, defined as $w_j + \alpha\,\mathbb{E}[ps_j]$. As mentioned in Prediction 3, if the rise in total compensation shown in Figure 10 were solely to compensate workers for higher risk, the effect of the reform on the value of total compensation, once accounting for risk, would be significantly lower, or zero in the case of a low marginal cost of outsourcing $c$.[66]

In order to estimate the effect on the risk-adjusted value of total compensation, we empirically estimate the average $\alpha$ across workers for different levels of risk aversion following a procedure similar that in Nimier-David et al. (2023). We then use this estimated $\alpha$ to calculate the impact of the reform on the risk-adjusted value of compensation. We describe this procedure in detail in Appendix B.2, and provide a summary here. In particular, we first note that $\alpha$ can be expressed as $\frac{CE_{ps}}{\mathbb{E}[ps_j]}$ where $CE_{ps}$ is the certainty equivalent of profit sharing. Thus, $\alpha$ can be interpreted as the average value of each uncertain peso of profit-sharing, in terms of a certain peso. We use the definition of certainty equivalent and information on the volatility of profit sharing to estimate $CE_{ps}$ and $\frac{CE_{ps}}{\mathbb{E}[ps_j]}$ for each worker under different assumptions risk aversion. We then estimate the average $\alpha$ across workers for these different values of risk aversion. For instance, for a risk aversion of 4,[67] one peso of profit-sharing is worth approximately 87 cents to workers on average. We then use these estimated values $\alpha$ to calculate the risk-adjusted value of total compensation under different risk aversion parameters. The results, shown in Figure 11, indicate a positive effect even for high values of risk aversion. For a high risk aversion of 6, our results indicate that the average risk-adjusted value of daily compensation increased by a significant 13 pesos in 2023, 2% relative to the pre-reform mean. Thus, the reform had a positive impact on the risk-adjusted value of total compensation, which is robust to very conservative measures of risk aversion. This evidence suggests that at most one-third of the increase in total compensation post reform can be explained by a compensation of workers for the higher risk involved in profit-sharing. Returning to Prediction 3, this suggests that information frictions related to profit sharing contribute to workers' inelasticity to this benefit. In the following section be provide empirical evidence on these information frictions.

[66] As indicated in section 6.1.2 the null effect on employment is suggestive of a low $c$.

[67] Brown et al. (2019), using data from the Mexican Family Life Survey, nationally representative of the Mexican population, estimate that the median relative risk aversion in their sample is below 3.8.

### 6.3 Empirical evidence on information frictions in profit-sharing

In this section we present empirical evidence on the presence of information frictions related to the awareness and understanding of profit sharing. We also present evidence that these frictions further contributed to workers' inelasticity to profit sharing ($\mu < 1$). We categorize these information frictions into two types. First, we show that many workers lack awareness of profit-sharing. Second, we show evidence of information processing frictions related to complexity of profit-sharing calculations can reduce workers' responsiveness to this benefit.

**Low awareness of profit-sharing.** Previous literature has highlighted the role of misinformation and inattention in shaping workers' decisions to switch employers (Robinson, 1933; Jäger et al., 2023; Roussille, 2024), health insurance plan selection (Handel and Kolstad, 2015), and savings choices (Chetty et al., 2014). These studies show how such information frictions can make workers less responsive to changes in these options due to their lack of awareness or attention. We argue that these types of frictions are present in our setting. We argue that similar frictions are present in our context. Specifically, we provide evidence of low awareness and salience of profit-sharing among workers in Mexico.

As a first set of suggestive evidence, Figure A.5 shows information from Google trends on searches related to profit-sharing and other benefits across time. Two patterns stand out: searches for profit-sharing are much lower than searches for other benefits, and after the reform, searches for 'right to profit-sharing' and 'I receive profit-sharing'[68] significantly increase. We further explored workers' knowledge about profit-sharing through a survey of 78 workers in Mexico. Table 10 shows that nearly 25% of respondents reported not knowing what profit-sharing is. Among low-income workers, this figure exceeds 40%, indicating that information frictions are more severe for this group. This complete lack of awareness is likely to affect workers' labor supply decisions, as it is highly unlikely that workers consider profit-sharing when making these decisions if they do not know what this benefit is. We additionally provide evidence of information frictions among workers who were aware of the existence of profit-sharing. Workers were more likely to answer incorrectly when asked about profit-sharing regulations than when asked about the rules for the minimum wage, vacation, or the 13th-month salary (aguinaldo).[69] Furthermore, when asked which job attributes were taken into consideration when choosing their current employer, profit-sharing was chosen with the lowest frequency, especially among workers who had incorrectly answered about profit-sharing regulations. This evidence suggests that workers do not place much weight on profit-sharing when making labor supply decisions, and that this attitude is associated with their lack of understanding of the benefit.

A natural question that arises is why workers in Mexico are often misinformed about profit-sharing. One likely explanation is that only a minority of workers in Mexico are employed at firms that pay this benefit. According to data from the Economic Census, 69% of workers in Mexico are employed at firms that do not provide profit-sharing. Moreover, the average full-outsourcing establishment is located in a local labor market where 77% of workers are employed at firms that also do not pay

[68] The searches are originally in Spanish: 'me corresponde utilidades' and 'recibo utilidades'

[69] The survey asked workers about: the size of the aguinaldo, the number of mandatory vacation days, the minimum wage in Mexico, the proportion of firm profits distributed as profit-sharing, and which firms are required to distribute profit-sharing.

profit-sharing.[70] The high share of workers excluded from profit-sharing likely contributes to a general lack of awareness about this benefit.

**Information processing frictions.** Second, we show evidence consistent with the presence of information processing frictions. Recent work in Behavioral Economics by Enke et al. (2024) has shown that people's decisions are less sensitive to changes relevant parameters when these decisions involve some level of complexity. In line with these findings, we argue that the complexity in the calculation of profit-sharing causes workers to assign less weight to this compensation when evaluating job offers. We carried out a separate survey on Prolific (N = 45), where we tested this by presenting workers with four different job offers, each specifying wages and profit-sharing amounts.[71] Workers were asked to rank these job offers from the best to the worst offer. Importantly, at the beginning of this exercise, we explained how profit-sharing is calculated and instructed workers to consider it when performing this ranking. To assess the impact of complexity, we varied how the information was presented. In the high-complexity scenario, we provided firm profits, the number of workers, and the wage, such that workers had to calculate profit-sharing income and sum it to the wage.[72] In the medium-complexity scenario, we stated the profit-sharing amount and wage directly. In the low-complexity scenario, we provided the total annual income for each job. We repeated this exercise twice for two different sets of four job offers (workers had to perform six rankings in total, three levels of complexity for each set of job offers). For both exercises, we set up the job offers such that options with the first and second highest compensation had a lower wage than the third highest, but higher profit-sharing. This was done to evaluate whether workers resort to offers with higher wages rather than higher total compensation when complexity increases.

Figure 12 shows the share of workers correctly ranking the first-best option, and the first- and second-best options, for each level of complexity. We observe that the share of workers who incorrectly rank the options increases with the level of complexity of the framing. This suggests that when profit-sharing calculations are complex, information processing frictions affect workers' ability to accurately rank job offers based on total compensation. Interestingly, in the high-complexity framing, workers more frequently ranked the offer with a higher wage first, above the first two options with higher total compensation.[73] Thus, Our evidence is also consistent with the fact that under high complexity scenarios, workers seem to be more insensitive to profit-sharing compensation relative to the wage.

Taken together our evidence suggests that there exist frictions in availability and processing of information related to profit-sharing among workers. These frictions seem to affect labor supply decisions, making workers more inelastic to profit-sharing.

[70] Local labor market is defined as a municipality × 2-digit NAICS sector cell. These high proportions are not solely the result of avoidance through full-outsourcing, Most firms that do not pay profit-sharing do not outsource and are likely legally exempt from this requirement (see Section 2 for details).

[71] Before performing this exercise, workers were asked some questions about their employment status and whether they were aware of profit-sharing or not.

[72] Workers were asked to assume no uncertainty in firm profits and that all workers were eligible for profit-sharing.

[73] For instance, in the first exercise, in the high-complexity scenario, among the workers who incorrectly ranked the first option, 58% selected the offer with the highest wage in first place, even though the true ranking of this offer was 3rd. This share decreases to 50% for the medium-complexity scenario.

# 7 Conventional outsourcing establishments

While the focus of this paper is on full outsourcing, from a policy standpoint it is relevant to understand the motivations for outsourcing and the impact of the outsourcing reform on conventional outsourcing establishments. In this section, we provide evidence that these establishments seemed to be using outsourcing to reduce labor adjustment costs, and that negatively impacted their capacity to do so.

## 7.1 Employment volatility

Our empirical evidence suggests that conventional outsourcing establishments were using outsourcing to adjust their labor force to temporary changes in activity. As shown in Table 2 conventional outsourcing establishments tended to have more volatility in employment than non-outsourcing firms. This is partly explained by these establishments belonging to sectors with higher seasonality (Table A.2), but also holds when controlling for sector fixed effects. Table 3 presents further evidence of this motive. Column 1 shows that the elasticity of total workers with respect to short-term changes in revenue was larger for conventional outsourcing establishments prior to the reform. Columns 2-4 show that outsourced employment responded more than in-house employment to changes in revenue, suggesting that outsourcing is more frequently used to adjust to short-term changes in economic activity than in-house employment. Figure A.7 in the appendix shows some examples of sectors where this can be clearly seen. Taken together, these results suggest that a decrease in adjustment costs was an important motivation for these establishments to outsource.

## 7.2 Effects of the reform

We show that the outsourcing reform decreased the use of outsourcing on this group as well, and had negative effects on employment dynamism for these establishments. Figure A.2 shows that the reform had strong effects on outsourcing use among conventional outsourcing establishments. After the reform, the share of conventional outsourcing establishments using outsourcing in a given month fell from around 0.88 to 0.25.

**Total employment.** The results for total employment among conventional outsourcing establishments are depicted in Figures A.8. Establishments with positive outsourcing in the pre-reform period reduced total employment by roughly 3% compared to the control group. Table A.4 in the Appendix indicates that this outcome is caused by a drop in the absolute number of workers among the treatment group relative to the pre-reform period. The likelihood of a decrease in the value of total employment is 5% higher among conventional outsourcing establishments.

**Employment dynamism.** As discussed above, these establishments were using outsourcing to better adjust to temporary fluctuations in labor demand. As the reform restricted these types of outsourcing practices (because these temporary workers were mainly part of the core activities of the firms), it is natural to ask whether adjustment costs, and consequently employment dynamism was affected by the reform.

We evaluate the effect of the reform on employment fluctuations using a similar methodology to

Bertrand et al. (2021). Specifically, we define an 'action' variable which takes the value of one if an establishment changed its total production employment by more than a certain percentage $p$ from one month to the next (in absolute value) and we carry out the following regression:

$$Action_{jt}^{p} = post\_reform_t * FullOuts_j + post\_reform_t * ConvenOuts_j + \lambda_j + \phi_t + u_{it} \quad (12)$$

Where $Action_{jt}^{p}$ is the action variable for percentage $p$, Where $FullOuts_j$ and $ConvenOuts_j$ take the value of 1 if the establishment belonged to each respective group and zero otherwise. We perform this regression for different $p = 2\%, 5\%, 10\%$ and $20\%$. We estimate this equation on the balanced panel of establishments in EMIM. We restrict the post-reform period to the months after October 2021 to avoid the transition period of the reform. The pre-reform period is restricted to January 2017-December 2018 to have a more similar number of periods post and pre-reform.

The results from this estimation are displayed in Table 9. The coefficients for the interaction of Post with $ConvenOuts$ is negative in all specifications, while it is significant for high levels of $p$. In particular, post-reform, the probability that a conventional outsourcing establishment experienced a change in employment levels of more than 10% decreased by 1 percentage point, or 8% relative to the group's pre-reform mean. Thus, this evidence suggests that the outsourcing restriction increased adjustment costs for firms using outsourcing to adjust to temporary changes in demand, which caused them to decrease their employment dynamism. While we do not evaluate the consequences of this effect in this paper, this decrease in employment volatility can potentially lead to increases in misallocation and slower TFP growth (Hopenhayn and Rogerson, 1993; Decker et al., 2018).

# 8 Conclusion

This paper provides novel evidence on an understudied incentive behind the utilization of outsourcing, namely its use as a means to avoid labor regulations. Using rich establishment survey data, social security data, we document and characterize a phenomenon where a significant number of firms were outsourcing almost *all* their workers. We provide evidence that firms carried out this extreme use of outsourcing as a means to avoid mandatory profit-sharing with employees. This practice was predominant amongst large, productive and profitable firms, who largely benefited from avoiding profit-sharing costs. We then exploit the effects of a reform which imposed strict restrictions on outsourcing to understand how firms react when these avoidance practices are restricted. The reform caused most firms to insource their employees in-house with no effects on total employment. Full outsourcing establishments newly incurred profit-sharing payments, which they partially offset by a small decrease in wage growth relative to the control group. However, firms did not fully offset the increase in profit-sharing costs through lower wages after the reform, and total labor compensation, i.e. wages + profit-sharing per worker increased by around 3% post reform.

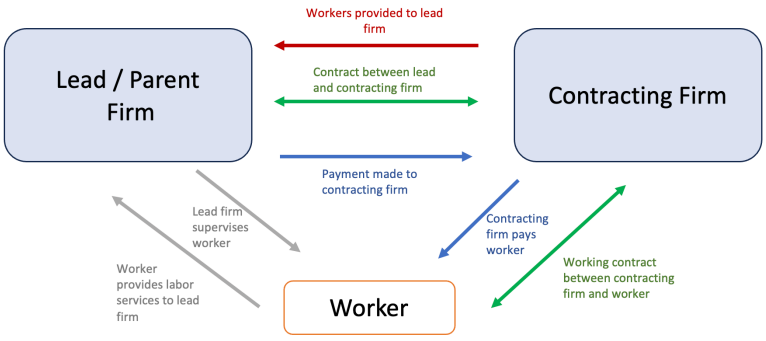
Our results are consistent with a labor market in which profit-sharing and wages are imperfect substitutes. This imperfect substitution stems from the labor supply function: workers are less sensitive to changes in profit-sharing compensation than to wages when making labor supply decisions. This difference in elasticities can explain why certain firms found it optimal to incur full outsourcing practices

to reduce profit-sharing, rather than lowering wages; and why the restriction of outsourcing increased profit-sharing and total worker compensation, without having a negative effect on employment. We argue that an important reason in explaining this inelasticity is the prevalence of information frictions regarding profit-sharing. We build on results from prior literature and show self-collected survey evidence that this mechanism seems to be present.

Finally, our results can also provide new insights on whether policies targeting avoidance of non-wage benefits are beneficial for workers. While we show that this is indeed the case for profit-sharing avoidance in our context, a better understanding of whether these results extend to the avoidance of other benefits such as health insurance or pension contributions (Ouimet and Tate, 2023; Chetty et al., 2014) is an important avenue for future research.

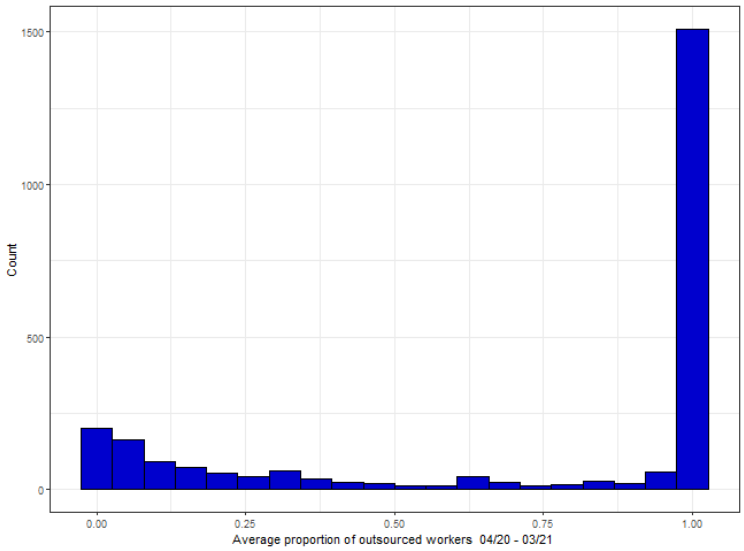
# Figures

Figure 1: Schematic graph illustrating outsourcing relationship



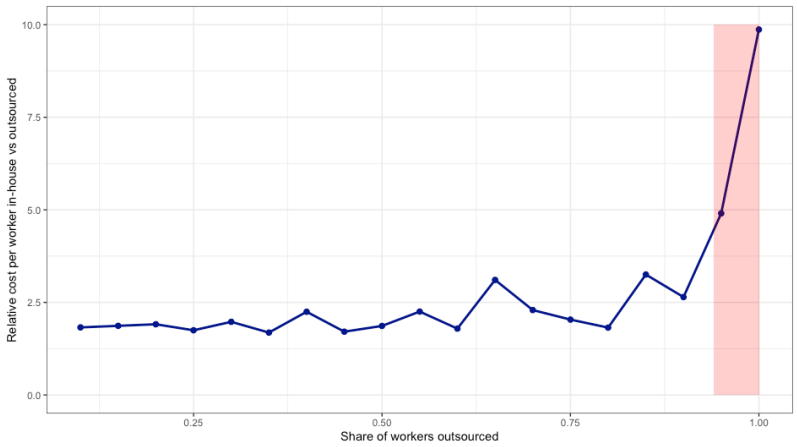

*Notes:* This figure shows a schematic graph on the actors in an outsourcing relationship. Blue lines indicate a payment from one actor to the other. Green lines indicate the existence of a contract between the two actors.

Figure 2: Distribution in the proportion of outsourced workers pre-reform



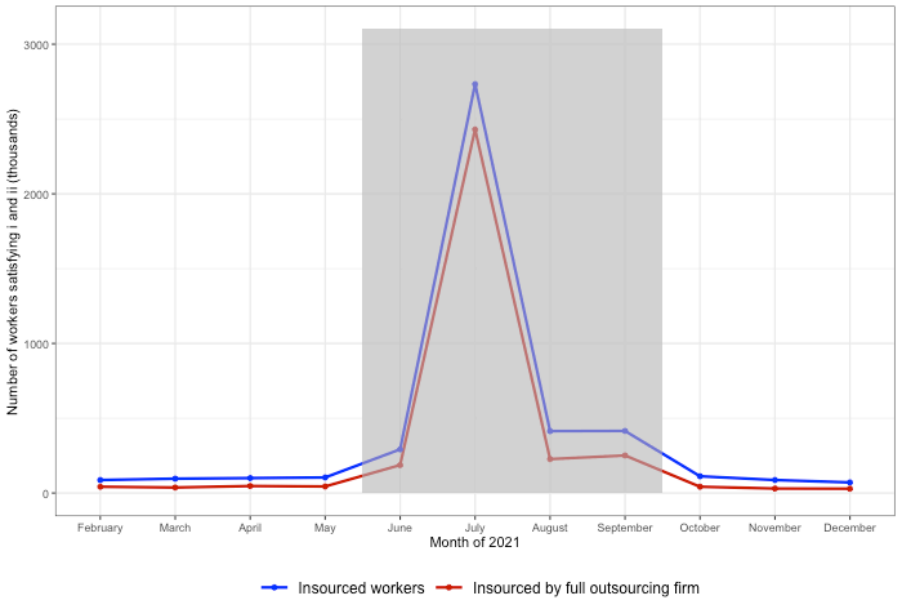

*Notes:* This figure plots a histogram with the average share of workers outsourced between April 2020 and March 2021 (the year before the outsourcing reform was approved) by each establishment in our EMIM dataset which has positive outsourcing in at least one month on the year prior to the reform.

Figure 3: Cost per in-house worker over cost per outsourced worker, by share outsourced



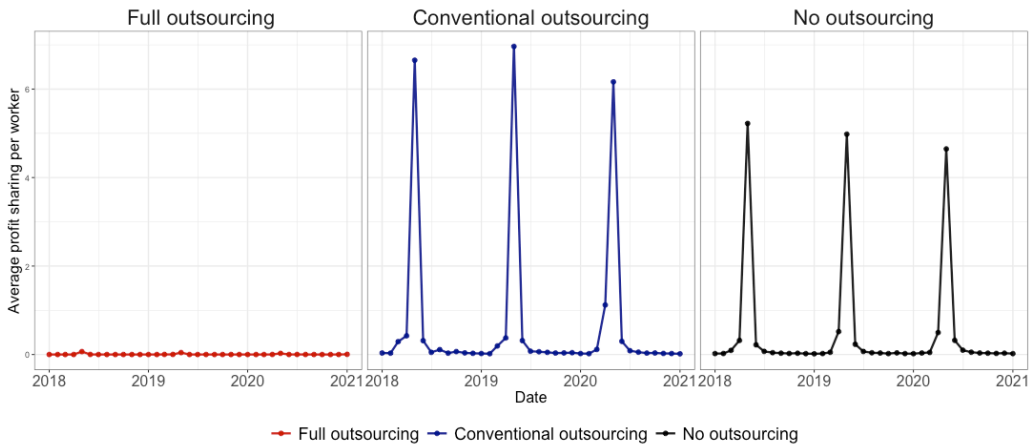

*Notes:* This figure plots the relationships between the relative costs of in-house workers and outsourcing share. For each observation before 2020, we compute the ratio of the average cost per in-house worker over the average cost per outsourced worker we plot the average of this ratio against the proportion of workers outsourced in each observation, rounded to the nearest 0.05. The shaded red area corresponds to establishments outsourcing over 95% of their workers.

Figure 4: Number of workers in an insourcing event (thousands)



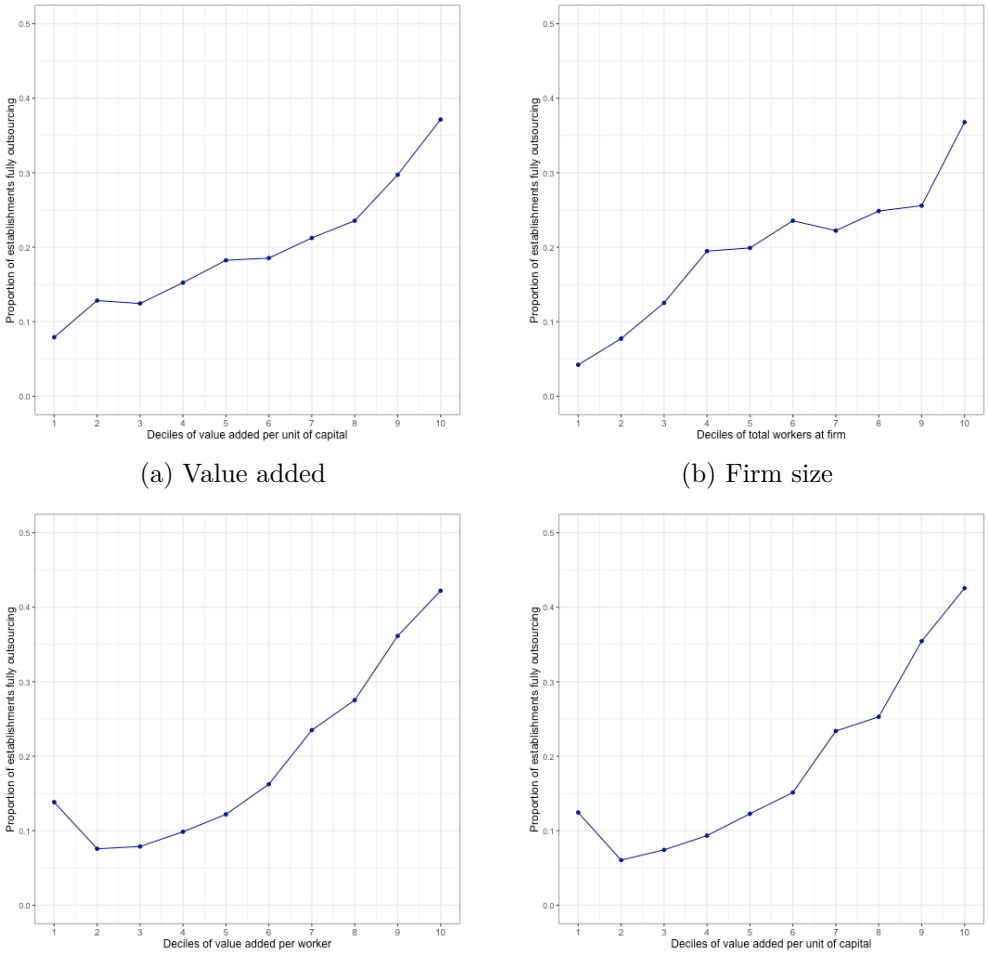

*Notes:* This figure shows the number of workers amongst all workers in IMSS involved in a movement between establishments where the flow consisted of 20 employees or more *or* establishment A lost more than 40% of it's workers that month (condition (ii) in Section 3.2), and establishment A and B do not belong to the same firm (condition (iii) in Section 3.2) on each month between February and December 2021. The shaded area are the worker movements classified as insourcing events with the additional condition that the flow occured between June and September (condition (i) in Section 3.2).

Figure 5: Monthly profit sharing per worker, pre reform




*Notes:* This figure plots the average monthly profit sharing per worker in thousands of Mexican Pesos for each group of establishments. The peaks in each year correspond to May, which is when profit sharing is disbursed in Mexico. The series is built with balanced establishment-level panel dataset from EMIM. No outsourcing establishments are those that did not outsource employees in the year prior to the reform, conventional outsourcing establishments have positive outsourcing but less than 95% of their workforce. Full outsourcing are establishments outsourcing more than 95% of their workforce pre reform.

Figure 6: Full outsourcing and productivity measures




(a) Value added

(b) Firm size

(c) VA per worker

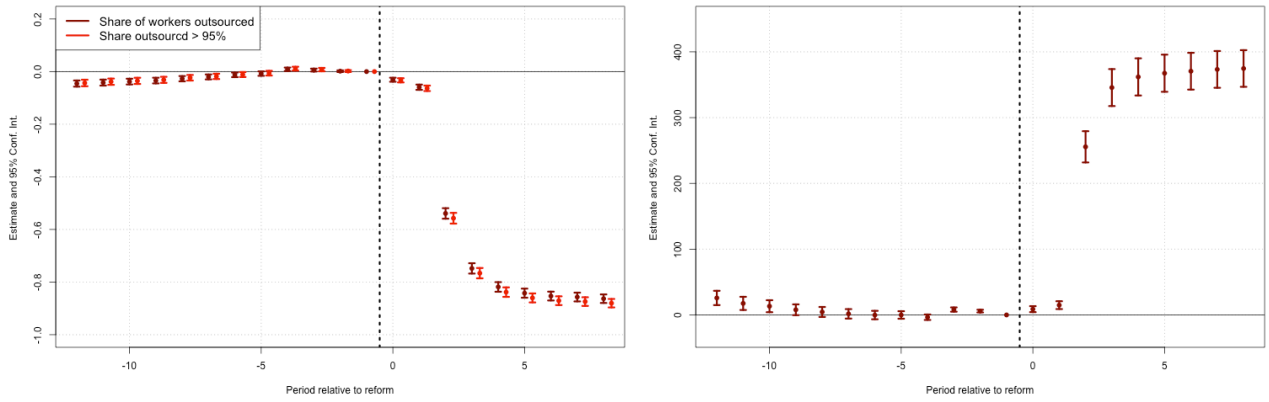
(d) VA per capital

*Notes:* These figures are built using establishment level data from EMIM and the 2018 Economic Census. They plot the proportion of full outsourcing establishments across the deciles of different variables for 2018. The value of the y axis in each graph is the proportion of full outsourcing establishments in a particular decile of the distribution of that variable. Panel (a) plots deciles of value added Panel (b) plots the deciles of firm size, computed as number of workers at the firm (c) plots value added divided by total workers (d) plots value added divided by total machines.

Figure 7: Effect of the reform on outsourcing

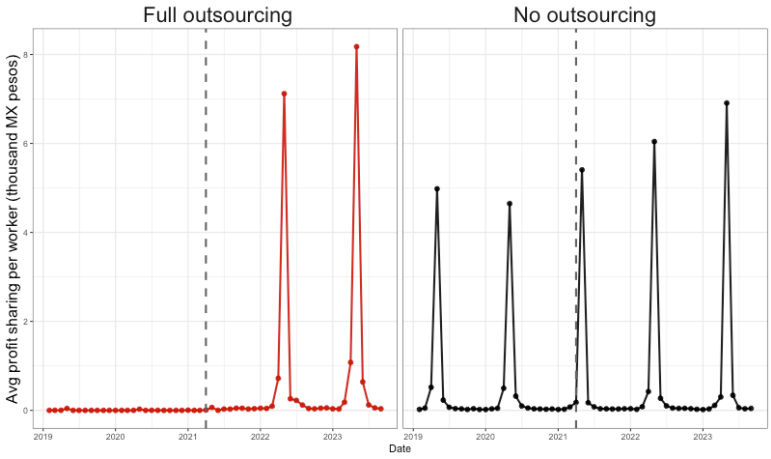
(a) Share of workers outsourced

(b) In-house workers

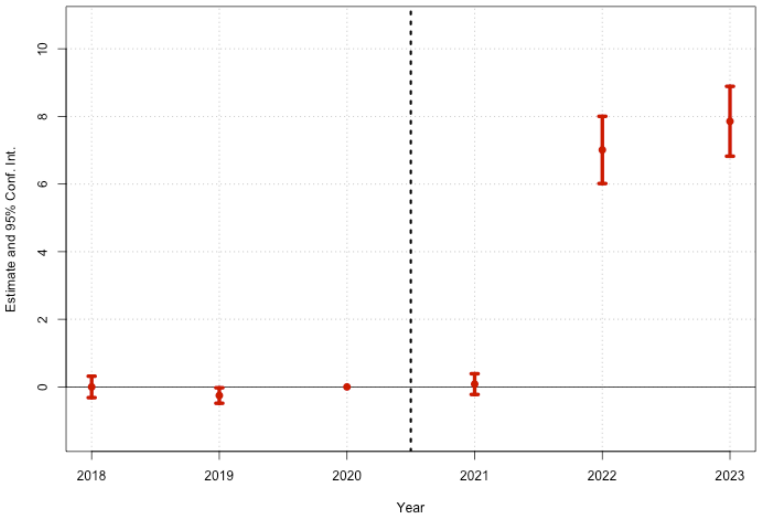



*Notes:* This figure plots the $\beta_k$ from Equation 10 and 95% confidence intervals. The estimation is carried out on a balanced panel of establishments from EMIM between 2018 and 2022. Treatment group includes establishments outsourcing over 95% of workers before the reform (full outsourcing). Control group includes establishments with no outsourcing before the reform Establishments with positive outsourcing before the reform, but lower than 95% (conventional outsourcing) are excluded from the estimation. The outcome variables in panel a are the share of workers outsourced by the establishment, and a binary variable equal to one if the establishment was outsourcing more than 95% of workers. The outcome variable in panel b is the number of inhouse workers of the establishment. $\beta_{Q42020}$ is normalized to 0. Standard errors are clustered at the establishment level.

Figure 8: Effect of the reform on profit sharing



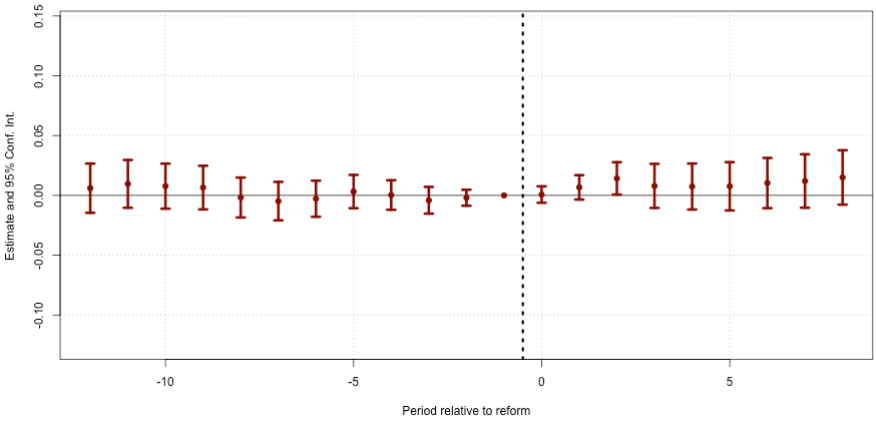

(a) Monthly profit sharing per worker




(b) Diff in diff coeff. - Yearly profit sharing per worker

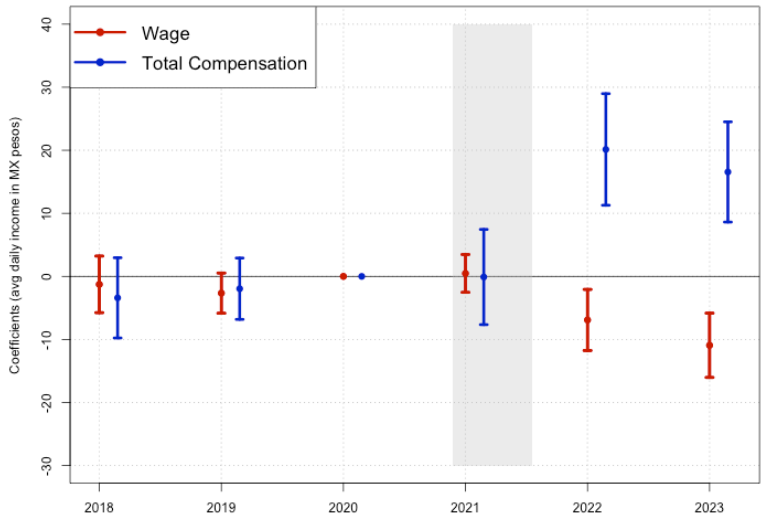
*Notes:* Panel (a) shows average monthly profit sharing per worker in thousands of Mexican pesos for control establishments and full outsourcing establishments. The series is constructed using a balanced sample of establishments from EMIM. The peaks in each year correspond to may, when profit sharing is typically disbursed. Panel (b) shows the difference in differences coefficients and 95% confidence intervals from estimating Equation 10 aggregating establishment data at the yearly level. The treatment group includes establishments outsourcing more than 95% of their workers pre-reform. The control group are establishments not using outsourcing pre-reform. The outcome variable is yearly profit sharing per worker in thousands of mexican pesos. Standard errors are clustered at the establishment level. Conventional outsourcing establishment, i.e. those with positive outsourcing $< 95\%$ pre-reform are excluded from the sample in both figures.

Figure 9: Effect on total number of workers



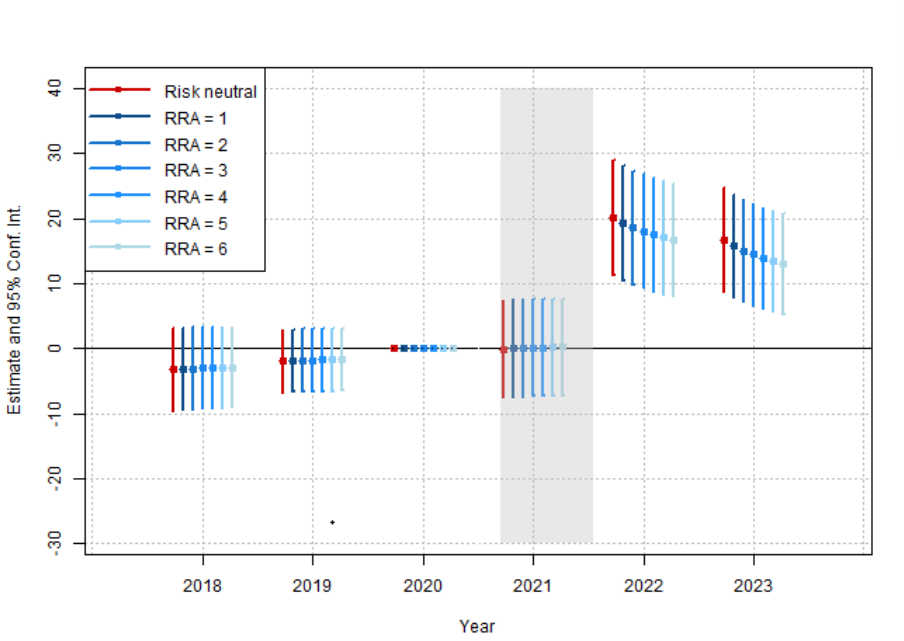

*Notes:* This figure plots the $\beta_k$ from Equation 10 and 95% confidence intervals. The estimation is carried out on a balanced panel of establishments from EMIM between 2018 and 2022. Treatment group includes establishments outsourcing over 95% of workers before the reform (full outsourcing). Control group includes establishments with no outsourcing before the reform Establishments with positive outsourcing before the reform, but lower than 95% (conventional outsourcing) are excluded from the estimation. The outcome variable is the log of the total number of workers (outsourced + in-house). $\beta_{Q42020}$ is normalized to 0. Standard errors are clustered at the establishment level.

Figure 10: Effect of the reform on yearly wage and total compensation



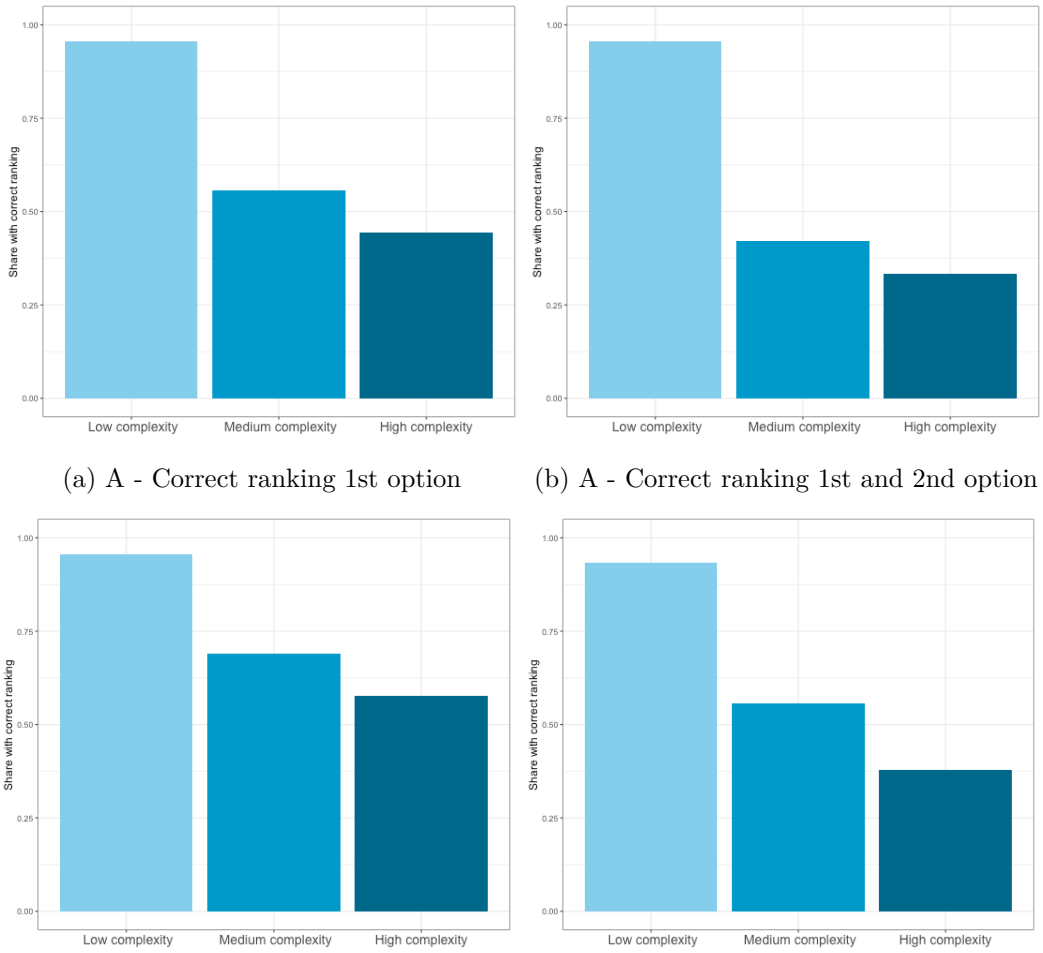

*Notes:* This figure shows the estimates $\theta_k$ and their 95% confidence intervals from estimating Equation 11 on the yearly average of worker daily wages or daily total compensation (wage + profit sharing income). The shaded grey area represents the year in which the outsourcing reform was approved. In red are the estimates for wages when controlling for worker fixed effects, in blue are the estimates for wages when controlling for (sector x state x size-group x outsourcing status) group fixed effects, in blue are the estimates and for total compensation as an outcome variable. In this estimation we assume that profit sharing for treated workers pre-reform was zero. Wage regressions are estimated on a balanced 10% random sample of workers from IMSS and standard errors are clustered at the establishment level. Total compensation regressions are estimated on this sample aggregated at the (sector x state x size-group x outsourcing status) group x year level and standard errors are clustered at the group level.

Figure 11: Effect on value of total compensation under different risk aversion values




*Notes:* This figure shows the estimates $\theta_k$ and their 95% confidence intervals from estimating Equation 11 on the yearly average of the risk-adjusted value of worker daily total compensation, which is defined as $wage + \hat{\alpha} * profit\ sharing\ income$. The red coefficients correspond to no risk discounting, $\hat{\alpha} = 1$. The coefficients in different shades of blue correspond to different values of $\hat{\alpha}$ from Table B.1. The shaded grey area represents the year in which the outsourcing reform was approved. Regressions are estimated on a balanced 10% random sample of workers from IMSS aggregated at the (sector x state x size-group x outsourcing status) group x year level and standard errors are clustered at the group level.

Figure 12: Share of workers choosing correct ranking




(a) A - Correct ranking 1st option

(b) A - Correct ranking 1st and 2nd option

(c) B - Correct ranking 1st option

(d) B - Correct ranking 1st and 2nd option

This figure was constructed with data from a self-conducted survey on Mexican workers using Prolific (N = 45) in October 2024. We ask workers to rank four hypothetical job offers with profit-sharing and wages, for three different levels of complexity. We perform this exercise twice, for two different sets of four job offers (A and B). In the high complexity framing, workers had to calculate the profit-sharing offered in each option, in the medium framing, workers were presented the offered profit-sharing and the offered wages separately and had to sum these two components, in the low complexity framing, workers were presented the offered total compensation of each offer. Panels a) and c) show the share of workers correctly ranking the first option in each exercise, for the different levels of complexity of the offers. Panels b) and d) show the share of workers correctly ranking the first option and the second option in each exercise, for the different level of complexity of the offers.

## Tables

Table 1: Summary Statistics on EMIM establishments by outsourcing use - 2018

| Variable | Full Outsourcing | Conventional Outsourcing | Control | All |
|---|---|---|---|---|
| N | 1629 | 855 | 5581 | 8065 |
| Total workers at establishment | 410 | 547 | 399 | 417 |
| Prop workers outsourced | 0.96 | 0.23 | 0.01 | 0.23 |
| Estab. outsourcing $> 95\%$ | 0.97 | 0.03 | 0.01 | 0.21 |
| Profit | 407 607 | 309 614 | 150 265 | 216 727 |
| Profit per worker | 1099 | 440 | 429 | 566 |
| Value added per worker | 1808 | 861 | 816 | 1021 |
| Investment per worker | 65 | 41 | 23 | 34 |
| Foreign | 0.42 | 0.48 | 0.31 | 0.35 |
| Prop. women | 0.28 | 0.33 | 0.34 | 0.32 |
| Prop white collar | 0.27 | 0.24 | 0.21 | 0.23 |
| Profit sharing | 46 | 3855 | 3036 | 2519 |
| Training costs | 211 | 5136 | 1098 | 1347 |
| Registered in IMSS | 0.27 | 0.93 | 0.9 | 0.78 |

This table displays the average value of different variables across the three different outsourcing groups and for all establishments in EMIM. Figures are computed using 2018 data from EMIM and the Economic Census. Nominal variables are in thousands of Mexican Pesos (2018 value). Full outsourcing establishments are those outsourcing more than 95% of their workers in the year pre-reform (2020). Conventional outsourcing establishments are those with positive outsourcing but less than 95% of their workers in the year pre-reform. Control establishments are those not outsourcing in the year pre-reform.

Table 2: Outsourcing and employment volatility

| | (1) Volatility Total workers | (2) Volatility Total workers | (3) Volatility Blue collar |
|---|---|---|---|
| Full Outsourcing | $-0.008^{***}$ | -0.003 | -0.003 |
| | (0.0019) | (0.0017) | (0.002) |
| Convent. Outsourcing | $0.0069^{**}$ | $0.007^{**}$ | $0.009^{***}$ |
| | (0.003) | (0.003) | (0.003) |
| Sector FE | No | Yes | Yes |
| Observations | 290,340 | 290,340 | 288,408 |

*Notes:* This table shows the results of a regression of establishment-level within-year volatility on a binary variable equal to 1 if the establishment is classified as full outsourcing and another equal to 1 if the establishment belongs to the conventional outsourcing group. The results are constructed using balanced establishment data from EMIM for the 2017-2020 period. Volatility is measured as the within-establishment yearly coefficient of variation of the de-trended employment from 2017 to 2020. Employment is de-trended using an additive time-series decomposition, where we subtract the trend component from the original variable. All specifications control for establishment size. Clustered standard errors at the 4d NAICS sector level are in parenthesis. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Table 3: Elasticity of total workers with respect to revenue

| | (1) log(total workers) | (2) log(total workers) | (3) log(in-house) | (4) log(outsourced) |
|---|---|---|---|---|
| log(revenue) | 0.0044*** | - | - | - |
| | (0.0003) | - | - | - |
| log(revenue) x Conv. Outs. | 0.0019** | 0.0062*** | 0.0039*** | 0.0145*** |
| | (0.0008) | (0.0007) | (0.0012) | (0.0028) |
| log(revenue) x Full Outs. | -0.0007 | - | - | - |
| | (0.0005) | - | - | - |
| Observations | 165,701 | 12,583 | 12,425 | 11,013 |
| Sample | All | Conv. Outs. | Conv. Outs. | Conv. Outs. |

*Notes:* This table shows the results of regressing the logarithm of de-trended values of total workers, total in-house workers or total outsourced workers on de-trended log revenues and establishment fixed-effects. Variables are de-trended using an additive time-series decomposition, where we subtract the trend component from the original variable. Estimation on the balanced sample of establishments in EMIM. All regressions are carried out for years 2017 to 2019 to avoid the pandemic period. Estimation in the first columns includes all establishments in the sample and includes two dummies indicating whether establishments were classified as full outsourcing or conventional outsourcing. Estimation in columns (2) to (4) is carried out on the subsample of only conventional outsourcing establishments. De-trended revenue is standardized at the establishment level to make coefficients comparable across columns. All regressions are carried out for years 2017 to 2019 to avoid the pandemic period. Clustered standard errors at the establishment level are in parenthesis. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Table 4: Difference in Differences estimates for post-reform period

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | First stage | | | Employment effects | | |
| | Share outsourced | Any outsource | Outsource > 95% | log(total workers) | log(tot hw) | log(avg hw) |
| 2021-Q1 | -0.0310*** | -0.0323*** | -0.0332*** | 0.0007 | -0.0005 | -0.0012 |
| | (0.0039) | (0.0040) | (0.0041) | (0.0035) | (0.0040) | (0.0025) |
| 2021-Q2 | -0.0594*** | -0.0584*** | -0.0636*** | 0.0067 | 0.0076 | 0.0006 |
| | (0.0051) | (0.0051) | (0.0053) | (0.0052) | (0.0056) | (0.0031) |
| 2021-Q3 | -0.5392*** | -0.4948*** | -0.5574*** | 0.0142** | 0.0091 | -0.0054 |
| | (0.0102) | (0.0106) | (0.0104) | (0.0069) | (0.0073) | (0.0036) |
| 2021-Q4 | -0.7481*** | -0.6974*** | -0.7662*** | 0.0079 | 0.0131 | 0.0049 |
| | (0.0100) | (0.0111) | (0.0100) | (0.0094) | (0.0096) | (0.0036) |
| 2022-Q1 | -0.8185*** | -0.7658*** | -0.8382*** | 0.0074 | 0.0126 | 0.0049 |
| | (0.0093) | (0.0106) | (0.0092) | (0.0098) | (0.0099) | (0.0038) |
| 2022-Q2 | -0.8422*** | -0.7897*** | -0.8603*** | 0.0076 | 0.0163 | 0.0084** |
| | (0.0088) | (0.0103) | (0.0087) | (0.0103) | (0.0106) | (0.0040) |
| 2022-Q3 | -0.8532*** | -0.7978*** | -0.8708*** | 0.0103 | 0.0170 | 0.0064 |
| | (0.0086) | (0.0101) | (0.0085) | (0.0107) | (0.0109) | (0.0041) |
| 2022-Q4 | -0.8569*** | -0.8007*** | -0.8742*** | 0.0120 | 0.0141 | 0.0017 |
| | (0.0085) | (0.0101) | (0.0084) | (0.0114) | (0.0114) | (0.0041) |
| 2023-Q1 | -0.8632*** | -0.8070*** | -0.8803*** | 0.0150 | 0.0165 | 0.0011 |
| | (0.0083) | (0.0100) | (0.0082) | (0.0116) | (0.0117) | (0.0042) |
| Estab. FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Time x sector FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Size specific time-trends | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 540,633 | 540,633 | 540,633 | 540,633 | 537,387 | 537,387 |

*Note:* This table shows the estimated $\beta_k$ from Equation 10 for the post-reform period. Estimation on the balanced sample of establishments in EMIM from 2018 to 2023. Treatment group includes establishments outsourcing over 95% of workers pre-reform. Control group includes establishments with no outsourcing in the year pre-reform. Outcome for column (1) is share of workers outsourced, for (2) it is a binary variable = 1 if the establishment outsourced (3) is a binary = 1 if the establishment outsourced over 95% of employees (4) is log of total workers (outsourced + in-house) (5) if total hours worked (6) is average hours worked at the establishment. All specifications include establishment fixed effects, sector x date fixed effects and six size-group specific time trends. Standard errors clustered at the establishment level are in parenthesis. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Table 5: Difference in Differences estimates for profit sharing

| | (1) Profit sharing | (2) Profit sharing / L |
|---|---|---|
| 2018 | 37.10 | -0.0003 |
| | (57.98) | (0.163) |
| 2019 | $-103.1^{**}$ | $-0.254^{**}$ |
| | (46.05) | (0.117) |
| 2021 | -74.71 | 0.0834 |
| | (66.40) | (0.157) |
| 2022 | $3051^{***}$ | $7.01^{***}$ |
| | (239.2) | (0.507) |
| 2023 | $3366^{***}$ | $7.86^{***}$ |
| | (264.4) | (0.527) |
| Observations | 42,270 | 42,268 |

*Notes:* This table shows the estimated $\beta_k$ from Equation 10. Estimation on the balanced sample of establishments in EMIM from 2018 to 2023, where we aggregate the data at the yearly level for each establishment. The treatment group includes establishments outsourcing more than 95% of their workers pre-reform. The control group are establishments not using outsourcing pre-reform. The outcome variable is yearly profit sharing in column (1), and yearly profit sharing over total workers in column (2). Both variables are in thousands of mexican pesos. Standard errors clustered at the establishment level are in parenthesis. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Table 6: Summary Statistics on workers from IMSS

| Variable | Insourced by full outsourcing | Not insourced firm not using outsourcing | Not insourced firm using outsourcing |
|---|---|---|---|
| N | 71490 | 226313 | 72242 |
| Log wage (daily) | 6.09 | 5.81 | 6.04 |
| Share women | 0.3 | 0.37 | 0.38 |
| Age | 35.46 | 36.69 | 35.64 |
| Proportion changed employer | 0.19 | 0.16 | 0.17 |
| Proportion experienced block movement | 0.07 | 0.04 | 0.03 |
| Size. current firm | 1453 | 1023 | 3373 |
| Size insourcing firm | 1704 | - | - |

*Notes:* This table shows summary statistics of worker-level characteristics computed using social security data from 2017 to 2020. The statistics are computed on a 10% random sample of workers. The first column represents workers who were insourced by a full outsourcing establishment after the reform. The second column represents workers who were not insourced and were working for firms that were not using outsourcing (control group). The third column represents workers who were not insourced post reform, but were working for firms that did insource other workers, i.e. were using outsourcing pre-reform. Nominal variables are in Mexican pesos (2019 value).

Table 7: Difference in Differences results: wage and total compensation

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Worker - level regressions | | | | Cell - level regressions | |
| *Outcome variable:* | Wage 3-Y Tenure | Wage 1-Y Tenure | Ln Wage | Wage | Wage | Total compensation |
| Treat x Year = 2018 | -1.265 | -2.887 | 0.0109*** | -0.5693 | -0.5693 | -3.405 |
| | (2.289) | (2.218) | (0.003) | (2.675) | (3.044) | (3.246) |
| Treat x Year = 2019 | -2.657 | -3.227** | -0.0016 | -0.4033 | -0.4033 | -1.955 |
| | (1.627) | (1.576) | (0.0030) | (1.951) | (2.482) | (3.853) |
| Treat x Year = 2021 | 0.4709 | 0.9337 | -0.0036 | 2.346 | 2.346 | -0.1003 |
| | (1.530) | (1.501) | (0.0025) | (2.588) | (3.853) | (2.472) |
| Treat x Year = 2022 | -6.912*** | -6.564*** | -0.0257*** | -3.799 | -3.799 | 20.13*** |
| | (2.472) | (2.405) | (0.0041) | (3.249) | (4.265) | (4.514) |
| Treat x Year = 2023 | -10.93*** | -10.40*** | -0.0428*** | -8.811** | -8.811** | 16.56*** |
| | (2.601) | (2.523) | (0.0045) | (3.441) | (4.097) | (4.055) |
| $\theta_{2023}$ as proportion of mean outcome of treated in 2020 | -1.8% | -1.6% | - | -1.4% | -1.4% | 2.6% |
| Year x Econ Sector FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Year x Firm Size FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Worker FE | Yes | Yes | Yes | No | No | No |
| Group FE | No | No | No | Yes | Yes | Yes |
| Observations | 795,423 | 867,377 | 795,423 | 795,423 | 10,249 | 8,988 |

*Note:* This table shows the results of estimating Equation 11 using data on wages from Mexican Social Security (IMSS) and data on profit sharing from the monthly manufacturing survey (EMIM). Treated workers are those insourced after the reform. The columns represent different samples and different outcome variables. Columns (1) to (4) estimate the regression using worker level data. In Columns (1) the outcome is the average real daily wage in year $t$ (in MX pesos) and the sample is limited to workers with 3 years of tenure in the firm before the reform. This is also the baseline sample for the results in Columns 3 to 6. In Column (2) and the sample is limited to workers with 1 year of tenure in the firm before the reform. In Column (3) the outcome is the natural logarithm of $wage_t$. Columns (4) es the same regression as (1), replacing worker FE by group (sector x firms size category x state x treatment status) Columns (5) to (6) estimate Equation 11 using data aggregated at the state x sector x size group x year level. In Column (5) the outcome is $wage_t$. In Column (5) the outcome is $(wage_t + profit\ sharing_t)$ and the sample is restricted to the cells that could be merged with profit sharing data from INEGI. Standard errors for columns (1) to (4) are clustered at the firm level and at the group level for Columns (5) and (6). Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Table 8: Difference in Differences results for wage and total compensation - Robustness

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| *Outcome variable:* | Worker - level regressions *Wage* | | | | Cell - level regressions *Total compensation* | |
| | Extended Sample I | Extended Sample II | Extended control grp | Excluding very low wage | PS Measure Version II | P.S, Measure Version III |
| Treat x Year = 2018 | -2.123 | -1.732 | -1.726 | -0.7866 | -3.439 | -5.916 |
| | (2.183) | (2.159) | (2.403) | (2.321) | (3.244) | (4.241) |
| Treat x Year = 2019 | -2.837* | -2.484 | -2.495 | -2.745* | -1.980 | -3.315 |
| | (1.542) | (1.521) | (1.737) | (1.653) | (2.480) | (3.393) |
| Treat x Year = 2021 | 0.4872 | 0.5596 | 0.2826 | 0.2029 | -0.0873 | -2.247 |
| | (1.468) | (1.393) | (1.586) | (1.562) | (3.853) | (4.002) |
| Treat x Year = 2022 | -7.052*** | -6.380*** | -6.523** | -7.440*** | 20.16*** | 26.83*** |
| | (2.380) | (2.259) | (2.624) | (2.495) | (4.514) | (8.439) |
| Treat x Year = 2023 | -11.59*** | -10.28*** | -8.772*** | -11.53*** | 16.66*** | 20.73*** |
| | (2.545) | (2.417) | (3.129) | (2.637) | (4.051) | (6.253) |
| $\theta_{2023}$ as proportion of mean outcome of treated in 2020 | -1.8% | -1.7% | -1.4% | -1.8% | 2.6% | 3.3% |
| Year x Econ Sector FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Year x Firm Size FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Worker FE | Yes | Yes | Yes | Yes | No | No |
| Group FE | No | No | No | No | Yes | Yes |
| Observations | 833,089 | 843,437 | 969,668 | 755,290 | 8,988 | 8,988 |

*Note:* This table shows the results of estimating Equation 11 on different samples and different outcome variables. Columns (1) to (4) estimate the regression using worker level data and the outcome is $wage_t$. Column (1) and extends the original sample to workers that changed firm in 2022 or 2023 (i.e. post-reform). Column (2) extends the sample in Column 1 to include workers workers not present every year of the sample, conditional on being present in 2021 and 2 more years, i.e. an unbalanced panel. Columns (3) extends the the control group to include both the original control group and workers who were not outsourced but worked in firms that did do outsourcing pre-reform. Column (4) excludes workers which were earning less than 1.5 times the average minimum wage in the pre-reform period. Columns (5) to (6) estimate the regression using data aggregated at the state x sector x firm size group x year level and the outcome is $totalcompensation_t$, with two different methodologies to calculate average profit sharing per worker at the cell level. Standard errors for columns (1) to (4) are clustered at the firm level and at the group level for Columns (5) and (6). Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Table 9: Effect of the reform on employment dynamism

| | (1) p = 2% | (2) p = 5% | (3) p = 10% | (4) p = 20% |
|---|---|---|---|---|
| Post-reform x FullOuts | -0.015 | -0.0095 | 0.0008 | -0.0030 |
| | (0.0103) | (0.0097) | (0.0060) | (0.0034) |
| Post-reform x ConvOuts | -0.014 | -0.013 | -0.012** | -0.007** |
| | (0.01) | (0.009) | (0.005) | (0.003) |
| Observations | 320,261 | 320,261 | 320,261 | 320,261 |
| Full Outs. pre-reform mean | 0.37 | 0.18 | 0.08 | 0.03 |
| Conv. Outs pre-reform mean | 0.45 | 0.25 | 0.12 | 0.04 |

*Notes*: This table shows the results of the estimation of Equation 12. The outcome is a binary variable equal to 1 if total production employment of an establishment changed by more than a certain percentage $p$ from one month to the next. We estimate the regression $p \in \{2, 5, 10, 20\}$. Establishment fixed-effects are included in all columns. The estimation sample is a balanced panel of establishment from EMIM. Pre-reform period is restricted to 01/2017-12/2018. Post-reform period is restricted to 12/2021-11/2022. Clustered standard errors at the 4d NAICS sector level are in parenthesis. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Table 10: Survey results: Worker awareness on profit sharing and other benefits

| | Monthly salary $< 500$ USD | Monthly salary $500 - 1000$ USD | Monthly salary $> 1000$ USD | All |
|---|---|---|---|---|
| Knows about profit sharing today | 0.59 | 0.86 | 0.88 | 0.76 |
| Became aware of profit-sharing after outsourcing reform | 0.5 | 0.36 | 0.21 | 0.34 |
| Correct response: | | | | |
| Total profit sharing as % of profits | 0.19 | 0.32 | 0.5 | 0.31 |
| Minimum wage | 0.93 | 0.62 | 0.81 | 0.78 |
| Mandatory vacation days | 0.52 | 0.66 | 0.75 | 0.63 |
| Aguinaldo | 0.67 | 0.9 | 0.94 | 0.79 |
| When evaluating job offer, considered: | | | | |
| Salary | 0.75 | 0.8 | 1 | 0.83 |
| Vacation | 0.19 | 0.36 | 0.29 | 0.27 |
| Personal growth opportunities | 0.62 | 0.56 | 0.64 | 0.58 |
| Profit sharing | 0.062 | 0.32 | 0.5 | 0.27 |
| Extra performance bonus | 0.44 | 0.36 | 0.5 | 0.41 |
| N | 27 | 29 | 16 | 78 |

*Notes:* This table shows summary statistics from a self-conducted survey on Prolific (N = 78) in September 2024. The first two rows show the share of workers would answered that they knew what profit sharing was, and those that knew since the outsourcing reform was implemented. Rows 3-6 show the share of workers who answered correctly on what share of firm profits are distributed in profit sharing (10%), what the minimum wage is in 2024 (249 pesos, 375 pesos in the north frontier zone), the number of mandatory vacation days (12 days), and value of the *aguinaldo* (15 days). Rows 7-11 how the share of workers who selected each of the labor benefits when asked *'When you chose to accept the job at the company where you currently work, what benefits offered did you take into consideration when assessing whether or not the company's offer was a good one? Please tick all that apply'*. We divide the workers into three groups according to self-reported income. The last column shows the shares for all workers in our sample.

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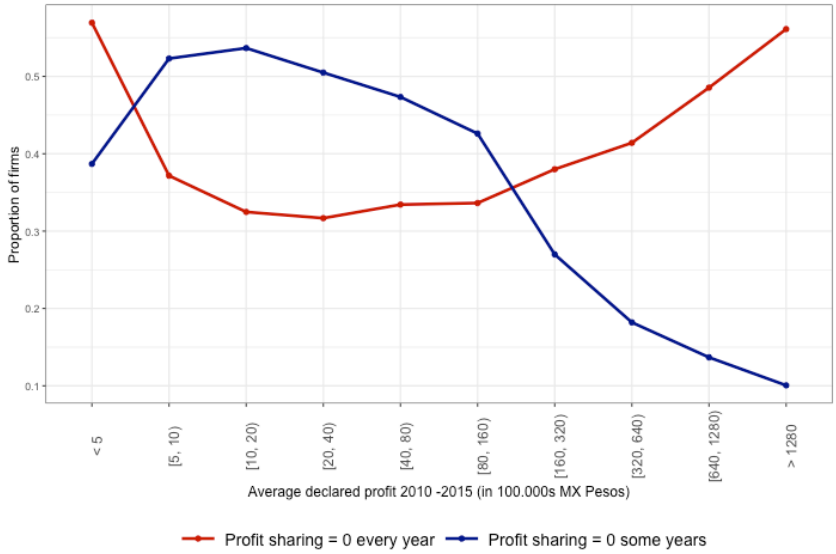
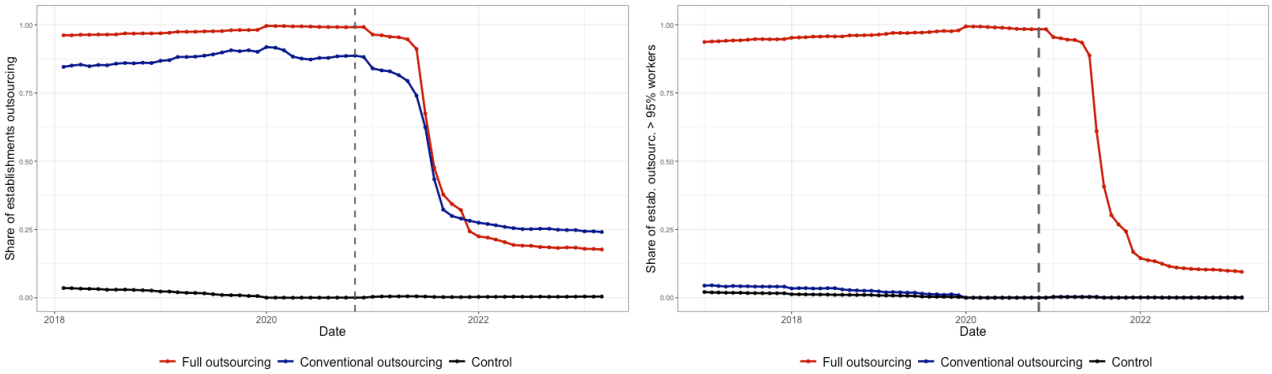
# A Appendix A: Additional Tables and Figures

Figure A.1: Share of firms with no declared profit sharing by profit size groups




*Notes:* This figure plots the proportion of firms that declared zero profit sharing on *every* year from 2010 to 2015 (red line), and the proportion of firms that declared zero profit sharing on *some* year, but not every year (blue line), against average declared profit between 2010 and 2015. The series is constructed with data from official corporate tax declarations from the national tax registry (Servicio de Administracion Tributaria).

Figure A.2: Effect of the reform on outsourcing

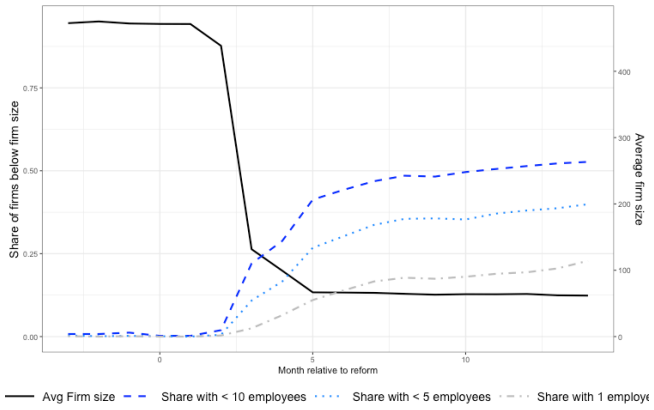



(a) Any outsourcing

(b) Outsourcing more than 95% of workers

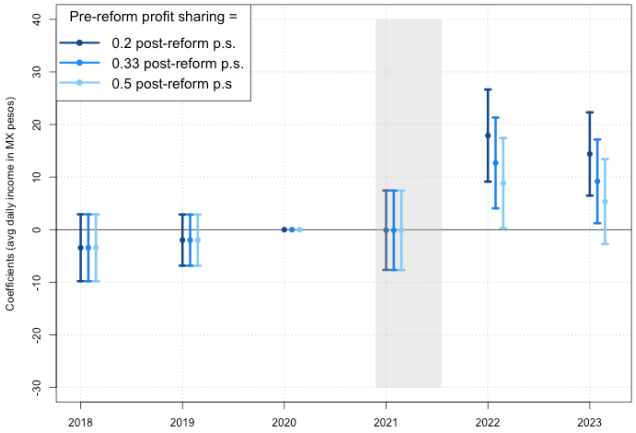
*Notes:* This Figure shows the share of establishments with positive outsourcing on each month from January 2017 to November 2022 in each group. Results are constructed using a balanced sample of establishments from EMIM. Full outsourcing establishments are those outsourcing over 95% of workers in at least one month on the year prior to the outsourcing reform, Conventional outsourcing establishments are those positive outsourcing, but lower than 95%, in at least one month on the year prior to the outsourcing reform. Control group includes establishments not outsourcing before the reform. The dashed line corresponds to November 2020, when the reform was first suggested.

Figure A.3: Evolution of firm size of surviving contracting firms post-reform



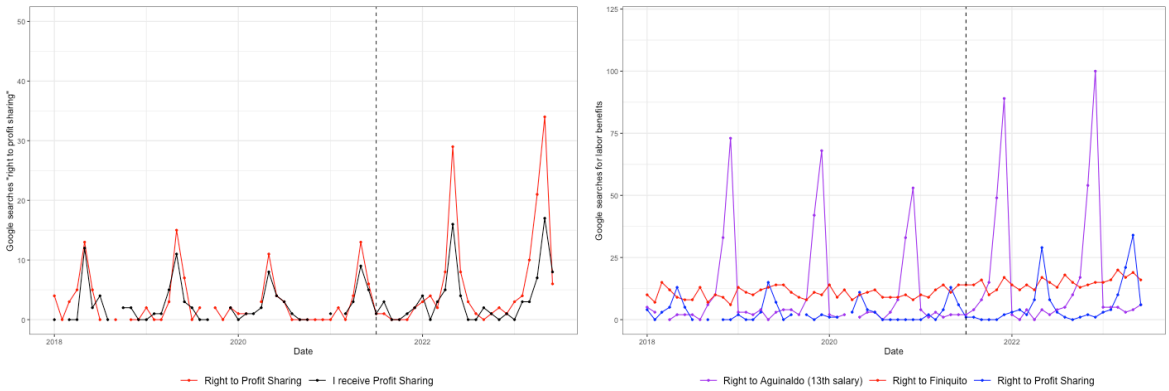

*Notes:* The figure shows the evolution of contracting firms after the reform, among the contracting firms that survived post-reform. The black line represents the average firm size over time. The figure is constructed using data from social security (IMSS). The dotted lines show the share of surviving contracting firms with less than 10 employees (red), less than 5 employees (blue), and with 1 employee (green). Time is measured relative to the reform date.

Figure A.4: Effect of the reform on yearly compensation - different assumptions on profit sharing pre-reform




*Notes:* This figure shows the estimates $\theta_k$ and their 95% confidence intervals from estimating Equation 11 on daily total compensation (wage + profit sharing income). The shaded grey area represents the year in which the outsourcing reform was approved. We plot the results on total compensation under the assumption that for treated workers their profit sharing income pre-reform was a proportion $p$ of profit sharing post reform, for $p \in \{0.1, 0.33, 0.5\}$. The regressions are estimated on a balanced 10% random sample of workers from IMSS sample aggregated at the (sector x state x size-group x outsourcing status) group x year level and standard errors are clustered at the group level.

Figure A.5: Google searches for 'profit sharing' and other labor benefits - Google trends

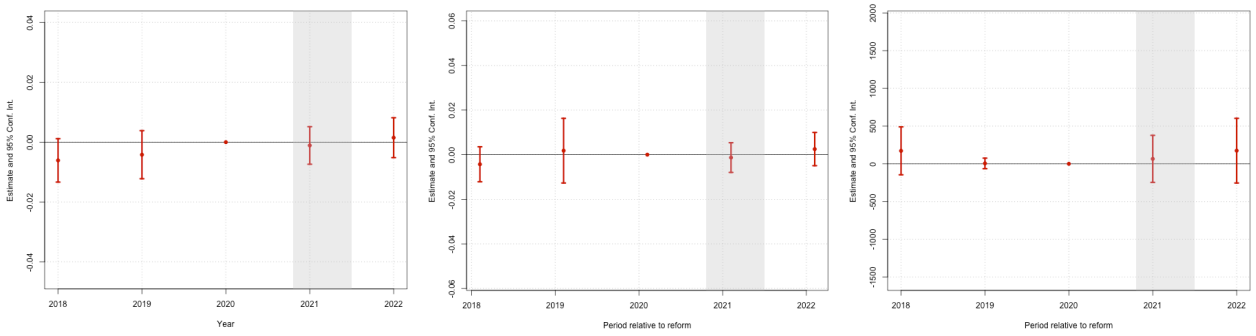



(a) 'right to profit sharing' and 'I receive profit sharing'

(b) 'right to profit sharing' compared to other benefits

*Notes:* This figure shows the google searches for different key-words related to profit sharing for the period 2018-2023. The data is collected from google trends. Panel (a) shows the results for the searches *'me corresponde utilidades'* (right to profit sharing) and *'recibo utilidades'* (I receive profit sharing). Panel (b) shows the results for the searches *'me corresponde aguinaldo'* (right to $13^{th}$ salary), *'me corresponde finiquito'* (right to separation payment) and *'me corresponde utilidades'* (right to profit sharing). Google searches are normalized by google-trends on a scale from 1 to 100, where 100 corresponds to the highest point reached by the terms searched in both panels. The dashed line marks the date the outsourcing reform was approved.

Figure A.6: Effects of reform on investment and value added per worker

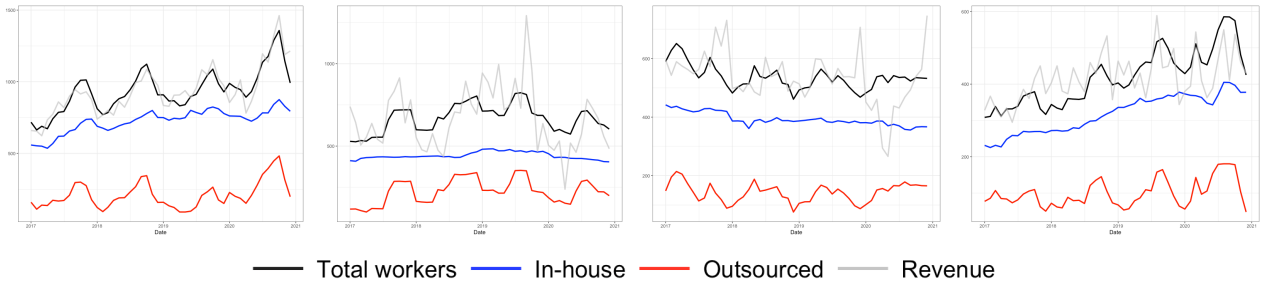



(a) Gross investment rate (b) Net investment rate (c) Value added per worker

*Notes:* This figure shows the difference in differences coefficients and 95% confidence intervals from estimating Equation 10 at the yearly level using the annual manufacturing establishment survey. The treatment group includes establishments outsourcing more than 95% of their workers pre-reform. The control group are establishments not using outsourcing pre-reform. The outcome in panel (a) is gross investment rate, measured as expenditure in tangible assets divided by the value of tangible assets. The outcome in panel (b) is net investment rate, measured as expenditure in tangible assets minus depreciation of tangible assets, divided by the value of tangible assets. The outcome in panel (c) value added over total workers. Standard errors are clustered at the establishment level. Conventional outsourcing establishments, i.e. those with positive outsourcing $< 95\%$ pre-reform are excluded from the sample.

Figure A.7: Total, in-house and outsourced workers in conventional outsourcing establishments - Selected sectors

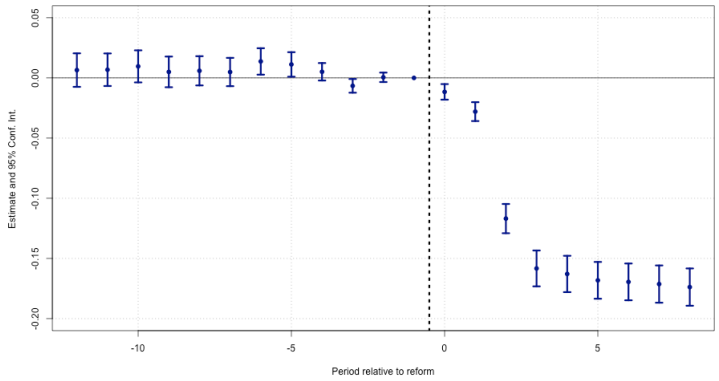
(a) Sector 3343 (b) Sector 3346 (c) Sector 3399 (d) Sector 3312



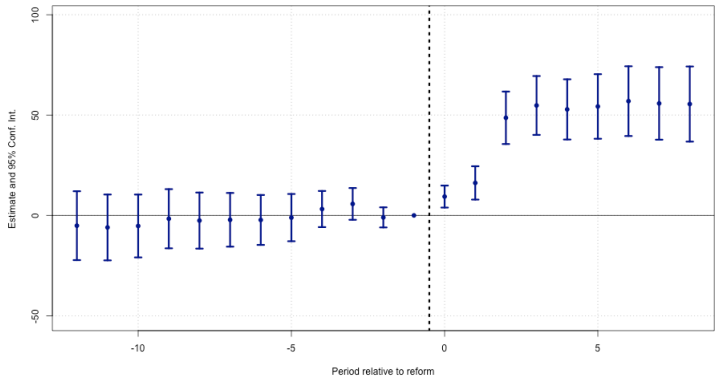

*Notes:* The figure shows trends in total employment, in-house employment, outsourced employment, and revenue across four selected sectors (NAICS codes 3343, 3346, 3399, and 3312) for conventional outsourcing establishments (establishments with positive outsourcing, but less than 95% of total workforce). Employment is divided between in-house workers (blue line) and outsourced workers (red line), while total employment (black line) combines both groups. Revenue is plotted in grey. Revenue numbers are standardized such that the mean equals that of total workers. The figures are constructed using establishment survey data from EMIM from 2017 to 2021.

Figure A.8: Effect on outsourcing and employment - Conventional outsourcing

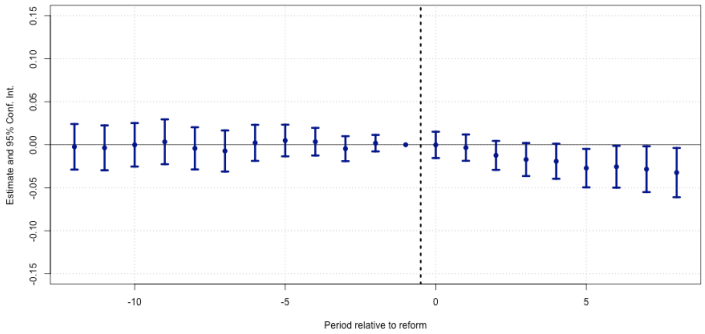
(a) Effect on outsourcing




(b) Effect on in-house workers




(c) Effect on total employment




*Notes:* This figure plots the $\theta_k$ from Equation 10 and 95% confidence intervals. The estimation is carried out on a balanced panel of establishments from EMIM between 2017 and 2022. Treatment group includes establishments outsourcing over 95% of workers before the reform (full outsourcing). Control group includes establishments with no outsourcing before the reform Establishments with positive outsourcing before the reform, but lower than 95% (conventional outsourcing) are excluded from the estimation. The outcome variable in panel 1 is the log of the total number of workers (outsourced + in-house). The outcome variable in panel 2 is the log of the total number of hours worked. The outcome variable in panel 3 is the log of the average number of hours worked. $\theta_{Q42020}$ is normalized to 0. Standard errors are clustered at the establishment level.

Table A.1: Transition Matrix by establishment type

| | Full outsourcing | Conventional outsourcing | No outsourcing |
|---|---|---|---|
| Full outsourcing | 0.969 | 0.022 | 0.009 |
| Conventional outsourcing | 0.025 | 0.853 | 0.122 |
| No outsourcing | 0.002 | 0.014 | 0.984 |

*Notes:* This table displays the yearly transition matrix across establishment types. Full outsourcing are establishments outsourcing more than 95% of workers on average in the year. Conventional outsourcing are establishments with positive outsourcing in the year, but less than 95% of their workers on average. No outsourcing are establishment with zero outsourced workers in the year. The number in each cell in row $r$ column $c$ corresponds to the proportion of establishments that were classified as $r$ in a certain year that were classified as $c$ in the following year. The table is built using a balanced sample of establishments in EMIM from 2017 to 2020.

Table A.2: Sector - level regressions on seasonality and outsourcing use

| Dep Vbles: | (1) tot workers seasonality | (2) revenue seasonality | (3) blue collar seasonality | (4) white collar seasonality |
|---|---|---|---|---|
| Intercept | 0.008** | 0.05*** | 0.007 | 0.012*** |
| | (0.003) | (0.007) | (0.004) | (0.002) |
| Prop Full Outs. | -0.01 | -0.02 | -0.01 | -0.007 |
| | (0.009) | (0.03) | (0.01) | (0.006) |
| Prop Convent Outs. | 0.07* | 0.12* | 0.11* | -0.007 |
| | (0.04) | (0.07) | (0.06) | (0.02) |
| Observations | 86 | 86 | 86 | 86 |

*Notes:* This table contains the results of a sector-level regression where the outcome variables are different measures of sector specific seasonality. The results are constructed using establishment data from EMIM for the period 2017-2019. The Coefficients of interest in rows 2 and 3 are the proportion of establishments in each sector belonging to each outsourcing group. Sector seasonality for variable x is computed as the average absolute value of the seasonal component from an additive moving-average decomposition of x, divided by the average of x over the period. We control for average establishment size in every column. Robust standard errors are in parentheses. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Table A.3: Summary Statistics on profit sharing 2022

| | Full Outsourcing | Control |
|---|---|---|
| Total profit sharing | 3205 | 2666 |
| | (7212) | (6665) |
| Profit sharing / L | 7.95 | 7.04 |
| | (14.26) | (23.43) |
| Profit sharing over monthly wage | 0.51 | 0.49 |
| | (1.16) | (1.25) |

*Notes:* This table presents the mean and standard deviation of profit-sharing statistics for full outsourcing establishments and control establishments, using 2022 data from EMIM. Full outsourcing establishments are those that were outsourcing more than 95% of workers pre-reform. Control are establishments not outsourcing pre-reform. We restrict the sample to full outsourcing establishment that were not fully outsourcing post-reform (compliers). The first two rows display the average total profit-sharing costs and profit-sharing per worker, both measured in thousands of Mexican Pesos, for each group of establishments. The last row shows the average ratio of yearly profit-sharing to total monthly wages across establishments, which is equivalent to yearly profit-sharing income per worker divided by the average monthly wage.

Table A.4: Employment declines

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | tot workers | tot workers | w.collar | w.collar | b.collar | b.collar |
| Treat | -0.01 | 0.05** | -0.02 | 0.06*** | -0.01 | 0.03* |
| | (0.03) | (0.02) | (0.02) | (0.02) | (0.03) | (0.02) |
| Observations | 7,179 | 6,376 | 7,179 | 6,376 | 7,179 | 6,376 |
| Treatment grp | Full Outs. | Conv. Outs. | Full Outs. | Conv Outs. | Full Outs. | Conv Outs. |

*Notes:* This table reports the reform's effect on a dummy variable equal to one if an establishment's de-seasonalized employment fell between the period pre-reform and 6 months post-reform. Results are built using establishment data from EMIM. . Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Table A.5: Difference in Differences estimates for total workers- Robustness

| | log(total workers) (1) | log(total workers) (2) | log(total workers) (3) |
|---|---|---|---|
| 2021-Q1 | 0.0005 | -0.0026 | 0.0045 |
| | (0.0035) | (0.0055) | (0.0056) |
| 2021-Q2 | 0.0049 | 0.0066 | 0.0105 |
| | (0.0051) | (0.0066) | (0.0080) |
| 2021-Q3 | 0.0119* | 0.0142* | 0.0102 |
| | (0.0068) | (0.0078) | (0.0112) |
| 2021-Q4 | 0.0057 | 0.0057 | -0.0004 |
| | (0.0093) | (0.0105) | (0.0143) |
| 2022-Q1 | 0.0054 | 0.0081 | 0.0051 |
| | (0.0097) | (0.0106) | (0.0142) |
| 2022-Q2 | 0.0060 | 0.0035 | 0.0051 |
| | (0.0102) | (0.0112) | (0.0153) |
| 2022-Q3 | 0.0093 | 0.0061 | 0.0041 |
| | (0.0106) | (0.0115) | (0.0163) |
| 2022-Q4 | 0.0107 | 0.0038 | 0.0039 |
| | (0.0113) | (0.0121) | (0.0185) |
| 2023-Q1 | 0.0132 | 0.0064 | 0.0068 |
| | (0.0115) | (0.0123) | (0.0189) |
| Observations | 535,458 | 577,874 | 300,502 |
| Specification | Treatment defined 2 years pre-reform | Unbalanced panel | Only single establishment firms |

*Note:* This table shows the estimated $\beta_k$ from Equation 10 for the post-reform period across different samples to show the robustness of the results. Estimation is done using data on establishments in EMIM from 2018 to 2023. Treatment group includes establishments outsourcing over 95% of workers pre-reform. Control group includes establishments with no outsourcing in the year pre-reform. Outcome for all columns is the natural logarithm of total workers (outsourced + in-house) In column (1) the treatment group includes establishments outsourcing over 95% of workers in the two years pre-reform (instead of 1 year in the original specification). Colums (2) Estimates the regression on an unbalanced panel of establishments. Column (2) includes only establishments beloning to single-establishment firms. All specifications include establishment fixed effects, sector x date fixed effects and six size-group specific time trends. Standard errors clustered at the establishment level are in parenthesis. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

# B Appendix B: Additional empirical results

## B.1 Comparing sample in IMSS data and EMIM data

For our results to be valid, it is crucial that the composition of our sample from establishment-level data closely aligns with that of the social security data sample. In other words, it is important that we are observing the same firms and workers in each sample. In this section, we provide evidence supporting the similarity of our samples in each dataset.

We first examine the proportion of full outsourcing establishments in each dataset. The relevant comparison group in EMIM are the full outsourcing establishments that insourced their workers (i.e. the compliers), as we are only able to identify full outsourcing establishments in the social security data if they insourced their workers during the reform. By January 2022, 17.2% of all establishments in EMIM fell into this category. When we restrict the IMSS dataset to establishments with over 20 employees, this proportion is 12%, and it stands at 16.8% when we further narrow the sample to establishments with more than 50 employees (we restrict the IMSS sample to align with EMIM, which strongly overrepresents large establishments in Mexico).

Figure B.1 visually demonstrates the correlation in the distribution of full outsourcing establishments across sectors in the various datasets. Barplots in Panel A depict the proportion, while Panel B illustrates the number of full outsourcing establishments in each 3-digit NAICS economic sector. We calculate these proportions using EMIM data, IMSS data with a sample restriction to establishments with over 20 employees, and IMSS data with a sample restriction to establishments with more than 50 employees. We can see that the distribution of full outsourcing establishments looks very simimlar in both datasets.

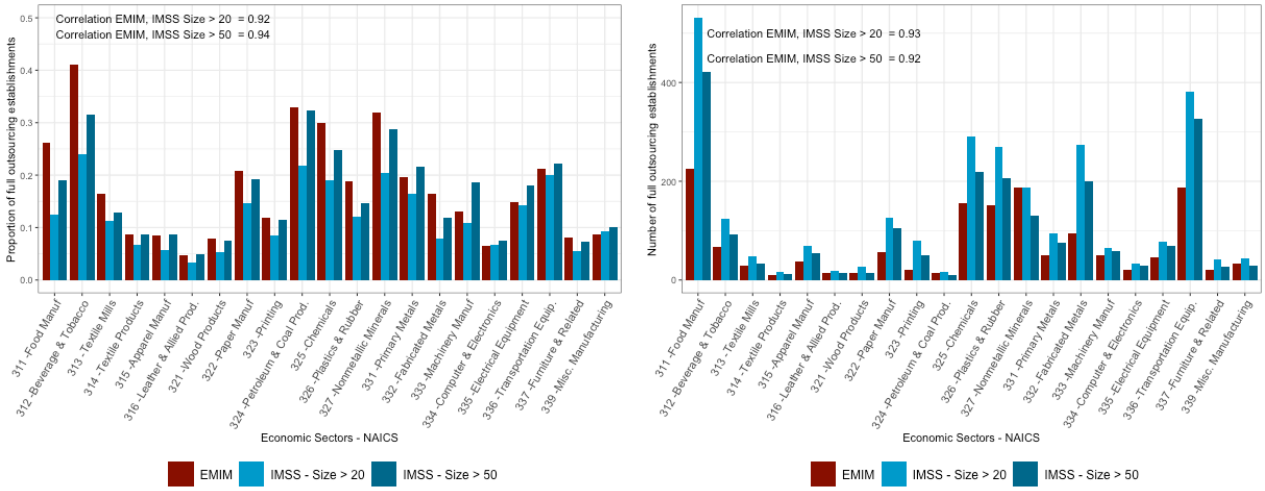
Second, we compare measurements on average wage paid by establishments in each dataset. We divide each dataset into groups and we calculate the average wage paid by establishments using both IMSS and EMIM data. Figure B.2 shows the relationship between the average wage measured in IMSS and in EMIM when we group establishments by outsourcing use (full outsourcing, conventional outsourcing and no outsourcing) and sector (Panel a), and by outsourcing use and region (Panel b). In each graph, every dot represents a group, with the dot size reflecting the number of workers included in each group. For easy reference, we include the 45-degree line in each graph. Notably, the average wages measured in each dataset are remarkably similar, with a correlation of 0.76 for sector groups and 0.75 for region groups. This underscores the consistency in the measurement of average wages between IMSS and EMIM datasets.

## B.2 Estimation of the Certainty Equivalent

In this section we explain the methodology to calculate the the average certainty equivalent of mandated profit sharing in our sample, i.e. the amount of risk-free money workers would be willing to accept instead of uncertain profit sharing. Our approach closely follows that detailed in Nimier-David et al. (2023).

We first calculate the certainty equivalent of profit sharing for each worker across different levels

Figure B.1: Distribution full outsourcing establishments by economic sector. EMIM and IMSS data




(a) Proportion of full outsourcing estab. per sector

(b) Number of full outsourcing estab. per sector

*Notes:* This figure shows the distribution of full outsourcing establishments across 3-digit NAICS sectors. Panel (a) plots the share of all establishments in the sector that are classified as full outsourcing. Panel (b) plots the number of establishments in the sector that are classified as full outsourcing. These statistics are computed using different datasets for comparison. The dark red bars use EMIM data. The light blue bars use data from IMSS, restricting establishments to those with over 20 employees on 10/2021, and belonging to the manufacturing sector. The light dark bars use data from IMSS, restricting establishments to those with over 50 employees on 10/2021, and belonging to the manufacturing sector.

of risk aversion. Subsequently, we compare this estimated certainty equivalent to the average amount of profit sharing received by the worker. This provides us with an estimate of the average value of each uncertain peso of profit sharing, in terms of a certain peso. We then use this estimate to evaluate the impact of the reform on the risk-discounted value of total compensation for the workers. If the positive impact on total compensation shown in Section 6.2.2 were fully to compensate workers for the risk associated with profit sharing, we would expect the value of total compensation to remain constant post reform.

The certainty equivalent of profit sharing for worker $i$ is defined as:

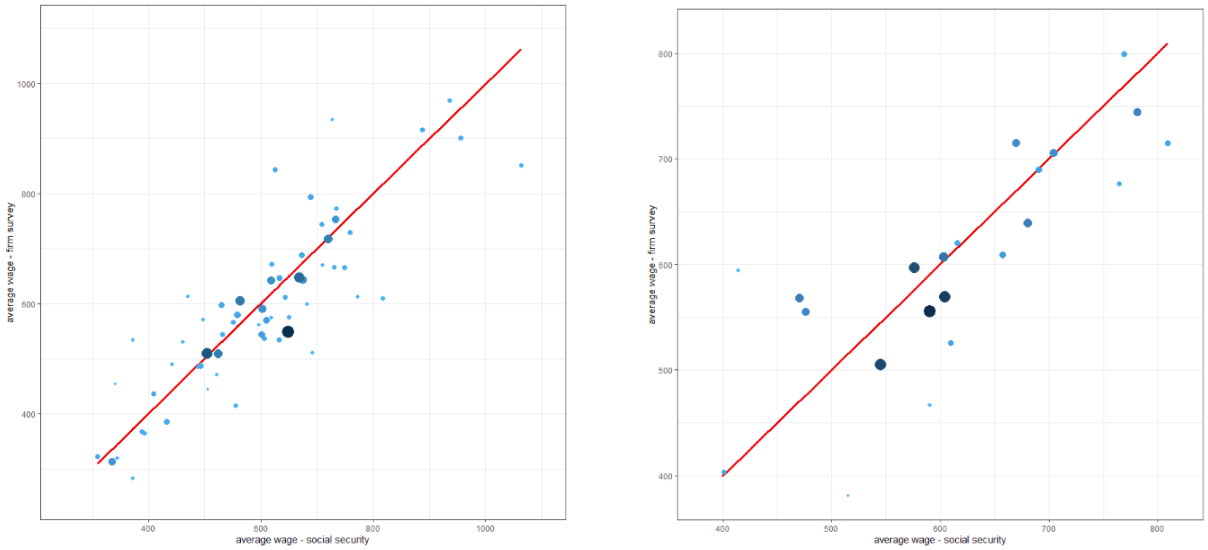
$$\mathbb{E}[u(w_i + CE_i)] = \mathbb{E}[u(w_i + ps_i)] \tag{13}$$

Where $w_i$ is the yearly wage and $ps_i$ is the amount of profit sharing the worker receives and $CE_i$ is the certainty equivalent of profit sharing.

As in the micro-foundation of the labor supply function in Section C.1, we assume CRRA utility:

$$\mathbb{E}\left(\frac{(w_i + CE_i)^{1-\gamma}}{1-\gamma}\right) = \mathbb{E}\left(\frac{(w_i + ps_i)^{1-\gamma}}{1-\gamma}\right) \tag{14}$$

Figure B.2: Average wage by establishment groups - EMIM and IMSS




(a) Groups by sector and outsourcing use

(b) Groups by region and outsourcing use

*Notes:* This figure plots the relationship between the measured 2022 average daily wage using social security data (IMSS) and firm survey data (EMIM). The values in the X and Y axis correspond to the average daily wage for all workers corresponding to a particular group calculated using either IMSS (x-axis) or EMIM (y-axis). In panel (a) each point corresponds to a NAICS 3-digit sector x outsourcing status (employed by firm that had been full-outsourcing pre-reform, and employed by a firm that had not been outsourcing) group. In panel (a) each point corresponds to a region x outsourcing status groups. Average daily wage for workers in each group using IMSS is calculated as the average base salary across all workers in the group. Average daily wage for workers in each group in EMIM is calculated as the weighted average of the average wage across establishments, with weights equal to number of in-house workers in the establishment. The size and color intensity of each point vary based on the number of workers in each group. The red lines in each graph correspond to the 45-degree line.

Given the absence of a closed-form expression for $CE_i$, we solve numerically solve for $CE_i$ for each worker. Specifically, we take the sample of workers in the control group (i.e. working for firms not doing any outsourcing). For each worker, we compute $u(w_i + ps_i)$ for each year between 2018 and 2023.[74] We then average these values over the period 2018-2023 for each worker to approximate its expected value, i.e. the expression on the right hand side of Equation 14. Subsequently, using this estimated expected utility and information on worker wages from 2018 to 2023, we numerically solve for $CE_i$ in Equation 14 for each worker.[75] This process is repeated for different values of the relative

[74] As mentioned in Section 6.2.2, we do not have information on profit-sharing income at the firm level. We have this information aggregated at the group x year level, where each group is defined by sector x state x size group x outsourcing use group level. If we were to assign each worker a value of $ps_t$ equal to the average profit sharing per worker in their group, we would likely underestimate the variance in $ps_t$ across time for each worker. Thus, in order to compute $ps_t$ for each worker we take a random draw from a gamma distribution, with the mean equal to the average $ps_t$ in the group the worker belongs to for that year, and the variance equal to the size-weighted average within-firm, across time variance of $ps_t$ for firms in that group.

[75] We verify our numerical solution by computing the equality with our $CE_i$ values, demonstrating the accuracy of the solution method.

risk aversion coefficient $\gamma \in \{1, 2, 3, 4, 5, 6\}$.[76]

We then compare the certainty equivalent to the average value of profit sharing for the 2018-2023 period. We define:

$$CE_i = \mathbb{E}(ps_i) - \pi_i^A \tag{15}$$

Where $\pi_i^A$ is the absolute risk premium, representing the amount workers are willing to pay to avoid risk and receive $\mathbb{E}(ps_i)$ with certainty. We also define the relative risk premium:

$$\pi_i^R = 1 - \frac{CE_i}{\mathbb{E}(ps_i)}$$

which indicates how much workers are willing to pay to avoid risk for each peso of expected profit sharing. Conversely, $\frac{CE_i}{\mathbb{E}(ps_i)}$ represents the value workers place on each peso of uncertain profit sharing in terms of a certain peso. We calculate this expression approximating the expected value in the denominator using the average profit sharing received during the 2018-2023 period.

The results are presented in Table B.1. We follow (Nimier-David et al., 2023) and report the ratio between the average estimated certainty equivalent and the average value of profit-sharing received by workers. We also report the average of $\pi_i^R$ in our sample. Taking the most conservative of the two measures, for a relative risk aversion of 2, one peso of profit sharing is valued at 92 cents by workers. As risk aversion increases, the value decreases, reflecting a stronger discounting of risk. For a high risk aversion value of 6, workers value one peso of profit sharing at 83 cents.

Table B.1: Certainty equivalent over profit sharing for different values of relative risk aversion

| RRA | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| $\frac{\overline{CE_i}}{\overline{PS_i}}$ | 0.96 | 0.92 | 0.89 | 0.87 | 0.85 | 0.83 |
| $\overline{\left(\frac{CE}{PS}\right)}$ | 0.97 | 0.94 | 0.92 | 0.89 | 0.88 | 0.86 |
| $\left(\frac{CE}{PS}\right)_{P25}$ | 0.94 | 0.88 | 0.83 | 0.77 | 0.73 | 0.68 |

*Notes:* This table shows the relationship between the calculated certainty equivalent and average profit sharing received by workers in our sample. The certainty equivalent is calculated on the sample of control workers from 2018 to 2023, assuming a CRRA utility function, for different values of relative risk aversion. The first row reports the ratio between the average certainty equivalent and the average profit sharing received by workers in our sample. The second row reports the average ratio between the calculated certainty equivalent and the average amount of profit sharing received by the worker, i.e. $\frac{CE_i}{\overline{PS_i}}$. The third row reports the value at the 25th percentile of the distribution of $\frac{CE_i}{\overline{PS_i}}$.

We then compute the impact of the reform on the *value* of total compensation, taking into account

[76] For $\gamma = 1$, the utility function corresponds to log utility.

how much workers discount profit sharing income due to risk, on average. We perform this for different values of relative risk aversion, $\gamma$. We estimate Equation 11 on the following outcome variable, defined as the risk-discounted value of total compensation:

$$value\ total\ compensation = wage + \hat{\alpha} \cdot profit\ sharing$$

Where $\hat{\alpha}$ are the values from the first row of Table B.1.[77] The results are presented in Figure 11. We can see that even for a very high relative risk aversion of 6, the value of total compensation increases for workers after the reform, although the increase is approximately 20% lower than the rise in total compensation when risk discounting is not considered. Even when we take a very conservative approach and replace $p$ with the value $\frac{CE_i}{PS_i}$ at the 25th percentile of the distribution (3rd row of Table B.1), we find that for a RRA of 6 the value of total compensation increased by 1.5% relative to the average pre-reform mean (significant at the 95% level).

A natural question that arises from these results is why the estimated discount for risk is so low. We argue that an important reason is that profit sharing constitutes a small proportion of total worker compensation. If we abstract from wage uncertainty and apply a first-order Taylor approximation to the left-hand side of Equation 14, along with a second-order Taylor approximation to the right-hand side around $\mathbb{E}(ps_i)$ , we derive the following expression:

$$\pi_i^R = 1 - \frac{CE_i}{\mathbb{E}(ps_i)} \approx \frac{1}{2} \cdot \gamma \cdot \sigma^2 \cdot \frac{\mathbb{E}(ps_i)}{w_i + \mathbb{E}(ps_i)} \tag{16}$$

Where $\sigma^2$ is the variance of $\frac{ps_i}{\mathbb{E}(ps_i)}$ and $\gamma$ is the relative risk aversion parameter. In our setting, profit sharing represents only about 4% of total annual income. Consequently, the last term on the right-hand side of the equation is small. This indicates that for workers to significantly discount risk, the variance of profit sharing would need to be much higher than what we observe in our sample.

### B.3 Establishment Exit from EMIM

As is mentioned in Section 3.1, the establishment surveys do not provide any information on why an establishment exits the survey sample. An establishment that ceases to appear in or sample may have exited the sample because it suspended its operations, switched to industries not covered by the survey, merged with other establishments or failed to answer the survey for some other reason (Verhoogen, 2008). Because we are not able to distinguish each of these reasons, and each reason would have a very different economic interpretation, we work with a balanced sample of establishments in our main analysis. In this section, we show that the patterns in exit do not change around the time of the reform. This suggests that the reform did not affect establishments' exit decisions. Thus, using the balanced sample of establishments in our main analysis does *not* condition on an endogenous outcome

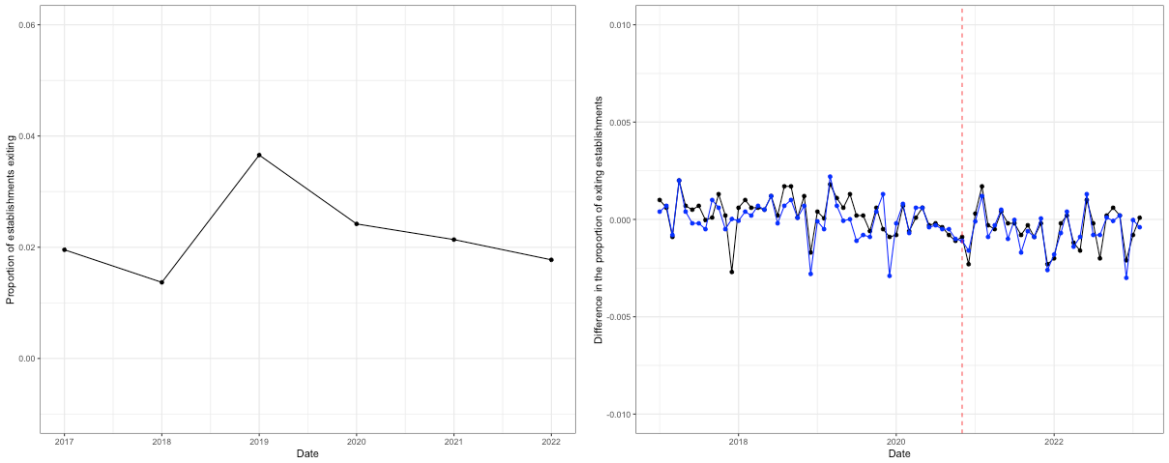
[77] It is important to note that, since $\hat{\alpha}$ is calculated using the sample of control workers, this approach may underestimate the risk-discount if profits of fully outsourcing firms were significantly more volatile than those of control firms. We test this empirically and our results show that fully outsourcing establishments were significantly (at the 95% confidence level) *less* likely to experience changes of more than 2%, 5%, 10%, or 20% from one year to the next in the pre-reform period. Thus, if anything, fully outsourcing establishments exhibited lower profit volatility compared to the control.

of the reform (i.e. not exiting).

Panel (a) of Figure B.3 shows the proportion of establishments exiting the EMIM sample in each year from 2017 to 2022. We do not find evidence of particularly high or low exit in the post-reform years 2021 and 2022. In Panel (b) we compare exit rates across time between outsourcing and non outsourcing establishments. The blue line represents the difference in the proportion of establishments exiting in each period between establishments using outsourcing and in 2017 and those not outsourcing any workers. The black line shows this same difference dividing establishments into those outsourcing over 95% of workers and those falling below this threshold. We do not find evidence indicating changes in this differential exit rate following the reform, thereby suggesting the absence of endogenous exit dynamics.

Figure B.3: Establishment exit from EMIM

(a) Yearly exit from EMIM (b) Differential exit in outsourcing establishments




*Notes:* This figure shows the evolution in establishment exit in EMIM from 2017 to 2022. Panel (a) plots the share of establishments that exited in each year. Panel (b) plots the coefficients from a regression where we regress a binary variable equal to 1 if the establishment exited between date $t$ and $t+1$ on date dummies interacted with a binary variable equal to 1 if the establishment was outsourcing more than 95% of workers on date $t$, controlling for date fixed effects. For the coefficients in blue, we eliminate establishments with positive outsourcing, but less than 95% from the sample.

## B.4 Evidence on profits of contracting firms

We argue in Section 4.2 that full outsourcing firms were outsourcing all or most of their workers to contracting firms, ensuring that these contracting firms had zero profits, or lower profits than the parent firms, and thus avoiding profit-sharing contributions with their workers. Evidence on parent firms having zero profit-sharing is clear. Showing that contracting firms had zero or low profit-sharing is challenging with our data, which does not allow us to link parent and contracting firms. However, if the contracting firm were to have positive profits sharing payments, it must have had positive profits. These positive profits would be included in the variable registered in EMIM which indicates the amount

the parent firm paid to the contracting firm:

$$payments\ to\ contracting\ firm = wages + other\ costs + profit^{78} \tag{17}$$

We can also write this expression as:

$$payments\ to\ contracting\ firm = wages + social\ benefits + other\ costs + \underbrace{0.1 * profit}_{\text{profit-sharing}} + 0.9 * profit^{79}$$

$$payments\ to\ contracting\ firm = \underbrace{wages + other\ costs + profit\ sharing\ benefits}_{\text{outsourcing labor costs}} + 0.9 * profit$$

$$outsourcing\ labor\ costs = payments\ to\ contracting\ firm - 0.9 * profit$$

$$outsourcing\ labor\ costs = payments\ to\ contracting\ firm - 0.9 * \frac{profit\ sharing\ benefits}{0.1} \tag{18}$$

This last expression allows us to estimate total outsourcing costs under different assumption of profit-sharing benefits distributed by the contracting firms pre-reform.[80] We then estimate the effect of the reform on labor costs, under different assumptions for profit-sharing benefits pre-reform. Note that the proportional change in measured costs is:

$$\Delta\%costs = \frac{wages_{post} + profit\ sharing\ benefits_{post}}{outsourcing\ labor\ costs_{pre}} - 1$$

Or, using the expression above:

$$\Delta\%costs = \frac{wages_{post} + profit\ sharing\ benefits_{post}}{payments\ to\ contracting\ firm_{pre} - 0.9 * \frac{profit\ sharing\ benefits_{pre}}{0.1}} - 1 \tag{19}$$

Equation 19 shows that higher the pre-reform profit-sharing benefits assumed, the lower are the payments to the contracting firm which correspond to employment costs, because a higher proportion of payments corresponds profits. Thus, higher assumed profits of contracting firms push down full outsourcing firms' measured costs pre-reform and increase the estimated effect of the reform on total labor costs for treated firms. This also allows us to estimate a lower bound for the effect on wages

[78] In this expression, wages includes social benefits such as social security contributions.

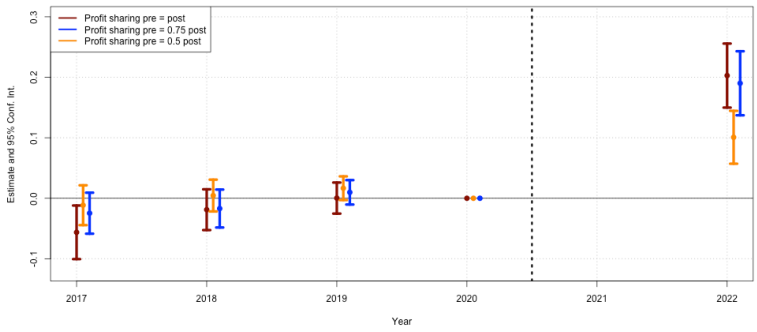
[79] These other costs included in the payments to outsourcing can include training costs, employee transport costs, etc. We discuss the measurement error introduced by the existence of these costs in Section 6.

[80] In this exercise we keep firm employment constant, consistent with our empirical findings that the reform had no effect on total workers.

post reform.[81]

Figure B.4 shows the effect of the reform on total labor costs under three hypothetical scenarios: that profit-sharing pre-reform was i) equal to post-reform ii) 75% of post-reform value, and iii) 50% of post reform value.

Figure B.4: Hypothetical increase in employment costs under different assumptions of contracting firm profits




*Notes:* This figure shows the difference in differences coefficients and 95% confidence intervals from estimating Equation 10 aggregating establishment data at the yearly level. The treatment group includes establishments outsourcing more than 95% of their workers pre-reform. The control group are establishments not using outsourcing pre-reform. The outcome variable is hypothetical log yearly total employment costs under different assumptions of the profits of contracting firms pre-reform. Total employment costs are calculated as *costs of inhouse workers* + hypothetical outsourcing costs, calculated using the expression on the right hand side of Equation 18. Standard errors are clustered at the establishment level. Conventional outsourcing establishment, i.e. those with positive outsourcing $<$ 95% pre-reform are excluded from the sample.

The results imply that, i) had profits of contracting firms been equal to the parenting firms' profits, then wages post-reform would have had to increase at least around 20% ii) had profit of contracting firms been around 3/4 of parent firms, then wages would have had to increase at least around 17% relative to the control group ii) had profit of contracting firms been around 1/2 of parent firms, then wages would have had to increase at least around 3% post-reform relative to the control group. This is not in-line with the results we find in the social security data. Thus, we conclude that the profit of contracting firms must have been either zero, or significantly lower than those of full outsourcing firms.

## B.5 Potential bias introduced by the cap con profit-sharing

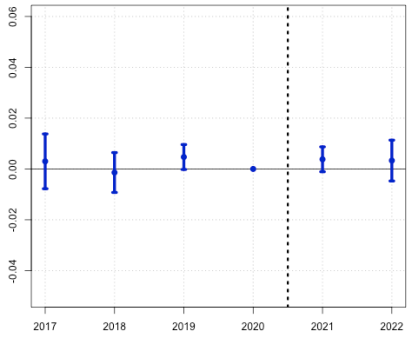
When the outsourcing reform was a approved, the Mexican government also introduced a specific limit on the total shared profits per employee. The formulation of this cap was the outcome of negotiations between policymakers and corporate stakeholders conducted before the implementation

[81] The estimate will be a lower bound due to the existence of the 'other costs' variable.

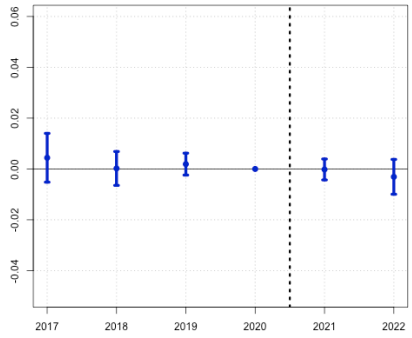
of the outsourcing reform. This limit was calculated based on the higher of two values: either three times the monthly salary of the employee or the average profit-sharing amount received over the past three years. Consequently, if an employee's corresponding profit-sharing income in 2022 surpassed *both* three times their monthly salary and the average received in the previous three years, the cap would come into effect. In such instances, the employee would receive the higher amount between these two values. Consequently, control firms that had been distributing profit-sharing contributions exceeding three times the monthly wages before the reform might be impacted by this cap, particularly if 2022 turned out to be an exceptionally profitable year. This cap could have reduced employment costs for these control firms, potentially introducing a bias into our results. We provide evidence that any potential effects of the cap on the control group were likely to be minimal.

Unfortunately, we lack precise data on the exact profit-sharing amounts received by individual workers in the EMIM dataset. Nevertheless, we estimate the average profit-sharing contributions per worker and their relationship with the average wage paid to blue-collar workers. We estimate profit-sharing as a proportion of blue-collar wages, as these workers that should receive higher profit-sharing as a proportion of their wages. We find that only around 3% of control firms reported profit-sharing contributions exceeding three times monthly blue-collar wages between 2017 and 2020. Additionally B.5 displays the results of an event-study estimation exclusively for the control group. In these regressions, the outcome variable is binary, taking the value of one if profit-sharing per employee exceeded 3 or 4 monthly wages that year. The results do not show evidence of the reform having had a negative effect on profit-sharing costs for control firms. In summary, the introduction of the profit-sharing cap, is unlikely to significantly impact the results, as the evidence suggests that the majority of control firms did not surpass the cap threshold, and the event-study analysis does not reveal a negative effect on profit-sharing costs.

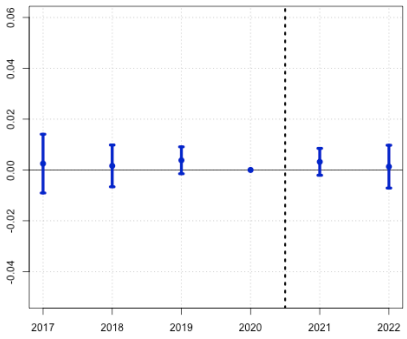
Figure B.5: Change in profit sharing post-reform. Control establishments



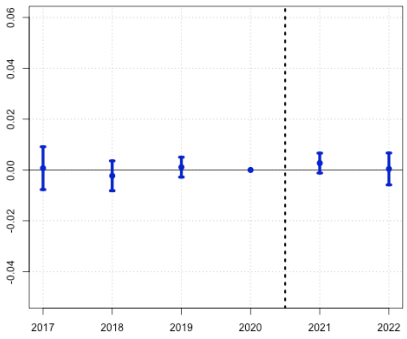

(a) Profit Sharing/Avg wage > 3




(b) Profit Sharing/Avg wage > 4




(c) Profit Sharing/Avg b.c. wage > 3




(d) Profit Sharing/Avg b.c. wage > 4

*Notes:* This figure shows the results of an event-study regression using the sub-sample of establishments from EMIM that were not using outsourcing before the reform. The data is aggregated at the yearly level from 2017 to 2022. The outcome is a binary variable, taking the value of one in panels (a) and (b) if profit-sharing per worker exceeded 3 or 4 times the monthly average wages that year; and equal to one in panels (c) and (d) if profit-sharing per worker exceeded 3 or 4 times the monthly average wages of blue-collar workers that year. The dashed lines in each graph mark the date the outsourcing reform was passed.

# C Appendix C: Theoretical Model

In this section, we solve the model presented in Section 5. We first micro-found the firm specific labor supply curve presented in Equation 3. We then derive the analytical solution for the model and the results in Predictions 1 to 3.

## C.1 Micro-founding the labor supply function

In this section we micro-found the firm specific labor supply function

$$n_j = (w_j + \mu \cdot \alpha \cdot E[ps_j])^{\theta} \tag{20}$$

Presented in Section 5, where $w_j$ represents the wage offered by firm $j$ and $E[ps_j]$ denotes the expected profit-sharing per worker offered. We use a static discrete choice framework where workers have heterogeneous preferences for firms, as is common in the monopsony literature (Card et al., 2018; Berger et al., 2022). As mentioned in Section 5, labor supply and demand decisions are made before the realization of $z_j$, when there is no uncertainty on $w_j$ but there is uncertainty on $ps_j$. Thus, to model workers' labor supply decision we consider the expected utility from working in a firm $j$ from the worker's perspective. This expectation includes the information frictions which may prevent the worker from correctly estimating her true expected utility. The indirect ex-ante utility of worker $i$ for working in firm $j$ is:[82]

$$\mathbb{E}_{ps}[U_i(w_j, ps_j)] = \mathbb{E}_{ps}\left(\frac{(w_j + \mu_i \cdot ps_j)^{1-\gamma}}{1-\gamma}\right) \cdot \epsilon_{ij} \tag{21}$$

Where $\epsilon_{ij}$ is an idiosyncratic preference shock of working at firm $j$ which follows a Fréchet distribution with shape parameter $\frac{1}{\theta}$. The parameter $\mu_i \leq 1$ is a measure of the information frictions present when evaluating profit sharing. A low $\mu_i$ can indicate that profit sharing is not very salient for workers, or that they are not well informed about this benefit. This decreases the importance of profit sharing in workers' expected utility because they put less weight on this factor. A low $\mu$ can also reflect that the complexity of profit-sharing leads workers to assign less weight to this benefit.[83] Using the definition of the certainty equivalent of profit sharing $CE_{ps}$,[84] the right hand side of 21 can also be expressed as:

$$\mathbb{E}_{ps}[U_i(w_j, ps_j)] = \frac{(w_j + \mu_i \cdot \alpha_j E[ps_j])^{1-\gamma}}{1-\gamma} \cdot \epsilon_{ij} \tag{22}$$

[82] Our utility specification follows the framework of Dube et al. (2022), but we focus on a single non-wage attribute—profit-sharing and assume perfect substitution between wages and profit-sharing, as both are monetary forms of compensation. In addition, we place greater emphasis on understanding the parameters that govern the relative importance of wages and profit-sharing in the utility function.

[83] For this second type of information frictions, $\mu_i$ can be expressed in terms of a 'simplicity equivalent': the simply described amounts individuals consider equally valuable to the complex benefit (Oprea, 2024).

[84] $u(w + CE_{ps}) = \mathbb{E}[u(w + ps)]$

Where $\alpha_j = \frac{CE_{ps}}{E[ps_j]} \leq 1$ is a measure of how much the workers discount risk associated to profit sharing. Importantly, $\alpha_j$ will affect workers' labor supply decision through worker preferences. If $\alpha_j < 1$ workers will value each unit of profit sharing less than each unit of wages, due to the additional risk associated with profit sharing. However, while the information frictions reflected in $\mu_i$ impact labor supply decisions, they do not affect utility once the worker is employed by a particular firm. In other words, these frictions are not related to workers' preferences for profit sharing but rather to constraints that prevent them from valuing it properly ex-ante.

We assume all workers have the same awareness of profit sharing $\mu_i = \mu$, and $\alpha_j = \alpha \ \forall \ j$, the likelihood of choosing employer $j$ is:

$$p_j = \frac{(w_j + \mu \cdot \alpha E[ps_j])^\theta}{\sum_{k \in \{1...J\}} (w_k + \mu \cdot \alpha E[ps_k])^\theta} \tag{23}$$

Where $\theta = (1 - \gamma)\tilde{\theta}$. For simplicity, we assume that the number of firms is sufficiently large, and that there are no strategic interactions between firms, such that Equation 23 can be approximated by $p_j = \lambda(w_j + \mu \cdot \alpha E[ps_j])^\theta$. Aggregating across workers, yields the firm specific upward-sloping labor supply curve:

$$n_j^s(w_j, E[ps_j]) = N\lambda(w_j + \mu \cdot \alpha \cdot E[ps_j])^\theta \tag{24}$$

If we normalize the size of the labor force $N$ to $\frac{1}{\lambda}$ we obtain the labor supply function in 20.

### C.1.1 Risk-adjusted value of total compensation

We now define the risk-adjusted value of total compensation, which is introduced in Prediction 3. Total expected compensation is given by $w_j + \mathbb{E}[ps_j]$. However, worker' valuation of this total compensation is affected by their risk-aversion and the uncertainty surrounding profit-sharing. To account for this, we introduce the concept of the risk-adjusted value of total compensation, which is the risk-free amount of total compensation that workers would value equally to the risky total compensation, absent any information frictions.

$$U(risk\ adj\ value\ total\ comp) = \mathbb{E}\left(U(w + ps_j)|\mu = 1\right)$$

Note that this value can also be thought of as the certainty equivalent of total compensation.[85]

$$\frac{(risk\ adj\ value\ total\ comp)^{1-\gamma}}{1-\gamma} = \mathbb{E}\left(\frac{(w_j + ps_j)^{1-\gamma}}{1-\gamma}\right) \cdot \epsilon_{ij}$$

Under the assumption of no uncertainty in wages, and using the definition of the certainty equivalent of profit-sharing introduced in C.1 we can re-write the expression as:

[85] Throughout the paper, we focus on uncertainty in profit-sharing payments and abstract from wage uncertainty

$$risk\ adjusted\ value\ of\ total\ comp_j = w_j + CE_{ps} = w_j + \alpha_j \cdot \mathbb{E}[ps_j]$$

This value is relevant when considering the effect of enforcing profit-sharing on workers, as an increase in total compensation may not necessarily reflect an increase in the value of total compensation when accounting for workers' risk preferences and the uncertainty associated with profit-sharing.

### C.1.2 Heterogenous $\mu_i$

Section 6.3 presents empirical evidence consistent with the presence of information constraints related to profit-sharing. Among the findings, we demonstrate that some workers are entirely unaware of the existence of profit-sharing in Mexico. These workers likely exhibit $\mu = 0$ as they are unlikely to factor in this benefit at all when making labor supply decisions if they are unaware of it. Furthermore, we show that the information processing constraints present in understanding and calculating profit-sharing reduce the weight workers assign to this benefit, suggesting a $\mu \in (0, 1)$ for some workers. Conversely, some workers are well-informed about profit-sharing and fully incorporate this benefit into their labor supply decisions, indicating a $\mu = 1$. Together, this evidence supports the existence of heterogeneous $\mu$ values across workers. Consequently, we extend the model to assume that workers have varying levels of misinformation about profit sharing, but that firms cannot discriminate between these different types. We demonstrate that even if *some* workers are well-informed about profit sharing ($\mu_i = 1$ for some $i$), the firm's overall elasticity of labor supply with respect to profit sharing will be affected if the average level of awareness is lower than that for wages ($\exists\ i$ s.t. $\mu_i < 1$). Thus, the lack of awareness of profit sharing in some workers will have effect on the average total compensation for all workers in the labor market, under the assumption that the firm cannot offer workers of the same labor market different amounts of total compensation. In other words, under the assumption that the firm cannot perfectly price discriminate in the labor market, as is commonly assumed in monopsony models (Card et al., 2018).

We assume $\mu_i \in [0, 1]$ has discrete probability $P(\mu_i = \mu_g) = p_g$. Then the likelihood of choosing employer $j$ for a worker with awareness parameter $\mu_g$ is:

$$P(\max_{k \in \{1,...J\}} \{U_k\} = U_j \mid \mu_g) = \lambda_g (w_j + \mu_g \cdot \alpha E[ps_j])^\theta \tag{25}$$

If we assume that firms cannot discriminate between workers of different $\mu_g$, then using the rules of conditional probability,[86] we obtain that the likelihood of any given worker choosing employer $j$ is:

$$P(\max_{k \in \{1,...J\}} \{U_k\} = U_j) = \sum_{g \in G} p_g \lambda_g (w_j + \mu_g \cdot \alpha E[ps_j])^\theta \tag{26}$$

Then, the labor supply curve faced by the firm is:

[86] $P(A) = \sum_n P(A \mid B_n) P(B_n)$.

$$n(w_j, E[ps_j]) = N \sum_{g \in G} p_g \lambda_g (w_j + \mu_g \cdot \alpha \cdot E[ps_j])^{\theta} \tag{27}$$

We can see that the elasticity of the labor supply curve with respect to profit sharing depends on the distribution of the level of awareness of workers in the labor market, $\bar{p} = \{p_1 ... p_G\}$ and $\bar{\mu} = \{\mu_1 ... \mu_G\}$. This implies that if firms cannot offer different amounts of total compensation to different types $g$, the level of awareness of profit sharing among some workers affects the total compensation for all workers.[87]

For $\theta = 1$ Equation 27 can be expressed in a form identical to Equation 20. For $\theta \neq 1$ this is not possible. However, both hold the property that if workers are risk averse ($\alpha < 1$) *or* at least one group of workers has information friction ($\exists$ $g$ s.t. $\mu_g < 1$), the partial derivative of labor supply with respect to $w_j$ will be greater than the partial derivative with respect to $ps_j$ for all values of $w_j$, $ps_j$.[88] This implies that (i) when firms fully outsource, they will decide to avoid profit sharing completely (ii) avoiding profit sharing allows firms to decrease total worker compensation. In the following section, we present the analytical solution to the model for the case of homogeneous $\mu_i$ For the case of heterogeneous $\mu_i$, we solve the model numerically under different parameter values and provide evidence illustration our predictions for specific parameter values in Figures C.1 and C.3.

## C.2 Analytical solution to the model

To solve the model, we start by deriving the optimal firm choice of wages, and profit sharing in two scenarios. The first is the scenario in which the firm decides to pay fixed cost $k$ and marginal cost $c$ of fully outsourcing, avoids mandatory profit sharing and chooses $w_j$. In the second scenario the firm decides not to avoid mandatory profit sharing. In this case, $E[ps_j]$ is determined by the firms' expected pre-profit-sharing profits,[89] and the firm decides optimally on $w_j$. We then compare expected post-profit-sharing profits in both scenarios to derive an optimal decision rule regarding whether to avoid mandatory profit sharing or not.

**Case 1: If firm avoids mandatory profit sharing**

If firm the decides to fully outsource avoid mandatory profit sharing, it pays the marginal cost $c$ and fixed cost $k$ of fully outsourcing and chooses $w_j$ to maximize profits. Under the assumption that the firm is risk neutral, the firm maximizes:

$$\max_{w_j} \ \mathbb{E}(z_j n_j - w_j n_j - c \cdot n_j) = \ \hat{z}_j n_j - w_j n_j - c \cdot n_j \tag{28}$$

[87] The intuition behind this result is similar to the argument for the micro-foundation of monopsony through differentiation across firms. In this scenario, differential preferences for firms across workers affect the wage received by all workers if firms cannot perfectly discriminate.

[88] $\frac{\partial n_j^s}{\partial w_j} - \frac{\partial n_j^s}{\partial E[ps_j]} > 0 \ \ \forall \ w_j, ps_j.$

[89] We refer to pre-profit-sharing profits as the firm profits before distributing profit-sharing, and post-profit-sharing profits as the firm profits after distributing profit-sharing.

subject to:

$$n_j = (w_j + \mu \cdot \alpha \cdot \mathbb{E}[ps_j])^{\theta}$$

which can be written as $n_j = (w_j)^{\theta}$ since $\mathbb{E}[ps_j] = 0$.

In the equality of Equation 28 we use the fact that productivity $z_j$ follows a random process $z_j = \hat{z_j} + \xi_j$ where $\mathbb{E}(\xi_j) = 0$, and that $w_j$ and $n_j$ are set before the productivity shock is drawn. Solving the firm's maximization problem, we obtain the following expressions for wages and total compensation:

$$w_j = (\hat{z}_j - c)\frac{\theta}{\theta + 1} \tag{29}$$

$$\mathbb{E}[total\ compensation_j] = (\hat{z}_j - c)\frac{\theta}{\theta + 1} \tag{30}$$

The resulting labor $n_j$ and expected profits $_j$ are:

$$n_j = \left((\hat{z}_j - c)\frac{\theta}{\theta + 1}\right)^{\theta} \tag{31}$$

$$\mathbb{E}(\Pi_j) = (\hat{z}_j - c)\frac{1}{\theta + 1}\left((\hat{z}_j - c)\frac{\theta}{\theta + 1}\right)^{\theta} - k \tag{32}$$

**Case 2: If firm does not avoid mandatory profit sharing**

If firm decides **not** to avoid mandatory profit sharing, then total profit sharing, $PS_j$ is a proportion of pre-profit sharing profits:

$$PS_j = \rho(z_j - w_j)n_j \tag{33}$$

And expected profit sharing per worker is:

$$\mathbb{E}[ps_j] = \rho(\hat{z}_j - w_j) \tag{34}$$

The firm's maximization problem is now:

$$\max_{w_j} \mathbb{E}[(1 - \rho)(z_j n_j - w_j n_j)] = (1 - \rho)(\hat{z}_j n_j - w_j n_j) \tag{35}$$

subject to:

$$n_j = (w_j + \mu \cdot \alpha \cdot \rho(\hat{z}_j - w_j))^{\theta}$$

Where in Equation 35 we again use the fact that $\mathbb{E}[z_j] = \hat{z_j}$ and that wages and labor are determined before the realization of $z_j$, and we replace $\mathbb{E}[ps_j]$ by the expression in Equation 34 in the labor supply

function. Solving the firm's maximization problem, we obtain:

$$w_j = \hat{z}_j \frac{\theta}{\theta+1} - \frac{\rho\mu\alpha \cdot \hat{z}_j}{(1+\theta)(1-\rho\mu\alpha)} \tag{36}$$

Using Equation 34 again, expected total compensation will be equal to:

$$\mathbb{E}[\textit{total compensation}_j] = \left(\hat{z}_j \frac{\theta}{\theta+1} - \frac{\rho\mu\alpha \cdot \hat{z}_j}{(1+\theta)(1-\rho\mu\alpha)}\right)(1-\rho) + \rho\hat{z}_j \tag{37}$$

The resulting labor $n_j$ and expected post-profit sharing profits $\Pi_j$ are:

$$n_j = \left(\hat{z}_j \frac{\theta}{\theta+1}\right)^{\theta} \tag{38}$$

$$\mathbb{E}(\Pi_j) = \left(\hat{z}_j \frac{\theta}{\theta+1}\right)^{\theta} \cdot \left(\frac{\hat{z}_j}{(1+\theta)(1-\rho\mu\alpha)}\right)(1-\rho) \tag{39}$$

Expected profit-sharing per worker is:

$$\mathbb{E}[ps_j] = \left(\frac{\rho\hat{z}_j}{(1+\theta)(1-\rho\mu\alpha)}\right) \tag{40}$$

### C.3 Decision on whether to avoid mandatory profit sharing

The firm will decide to avoid profit sharing if the expected profits of doing so are greater than the profits of not avoiding:

$$\underbrace{(\hat{z}_j - c)\frac{1}{\theta+1}\left((\hat{z}_j - c)\frac{\theta}{\theta+1}\right)^{\theta} - k}_{\text{expected profits when avoiding mandatory p.s.}} \geq \underbrace{\left(\hat{z}_j \frac{\theta}{\theta+1}\right)^{\theta}\left(\frac{\hat{z}_j}{(1+\theta)(1-\rho\mu\cdot\alpha)}\right)(1-\rho)}_{\text{expected profits when paying mandatory p.s.}} \tag{41}$$

By re-arranging the terms, we arrive at the inequality 6 in Section 5.2.

$$k \leq \frac{\hat{z}_j}{1+\theta}\left(\hat{z}_j \frac{\theta}{\theta+1}\right)^{\theta}\left[\left(1 - \frac{c}{\hat{z}_j}\right)^{1+\theta} - \left(\frac{1-\rho}{1-\mu\alpha\rho}\right)\right] \tag{42}$$

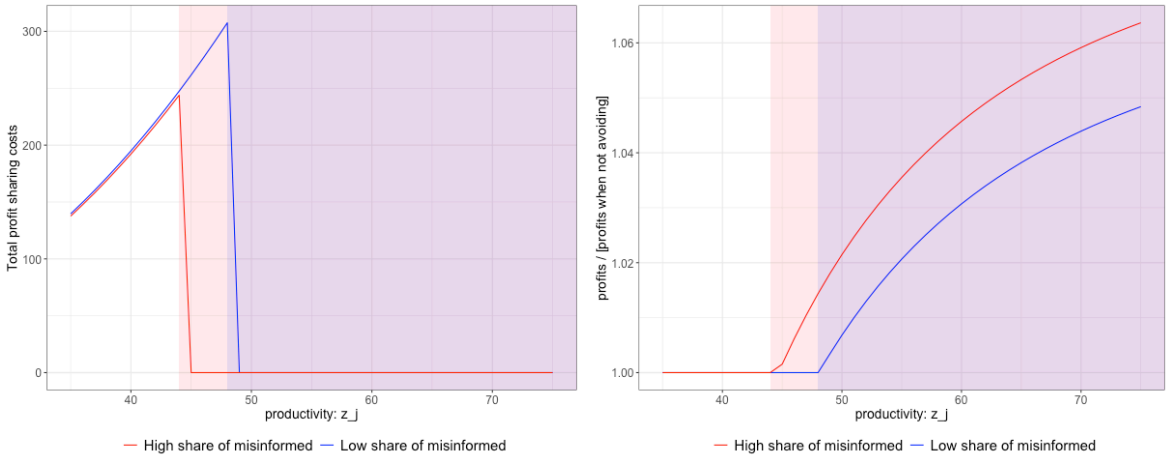
A few things to note from Equation 42:

- If $\mu \cdot \alpha = 1$ the expression collapses to $k \leq D$ with $D < 0$ , i.e. the cost of outsourcing has to be negative for the firm to outsource. If $\mu \cdot \alpha = 1$ and $c = 0$ the expression collapses to $k \leq 0$
- If $\mu \cdot \alpha = 1$ and $k = 0$ the expression above collapses to $c \leq 0$
- The right hand side of the inequality is increasing in $\rho$ and $z_j$, such that higher profit sharing requirements and higher levels of productivity will lead firms to fully outsource

- The right hand side of the inequality is decreasing in $c$ and $\mu \cdot \alpha$, such that lower outsourcing costs and lower elasticity of labor supply wrt profit sharing will incentivise full outsourcing

Figure C.1 illustrates this result for heterogenous $\mu_i$ with simulations. The red (blue) lines correspond to simulations where there is a high (low) share of misinformed workers (i.e. workers with low $\mu_g$). The shaded areas indicate the firms that choose to avoid profit-sharing in each simulation. Panel (a) displays total profit-sharing costs across different productivity levels $z_j$ , showing that higher-productivity firms are more likely to avoid profit-sharing. Additionally, the proportion of firms opting to avoid profit-sharing is greater in the scenario with a higher share of misinformed workers. Panel (b) depicts firm profits as a fraction of what profits would be if firms did not avoid profit-sharing. When firms do not avoid profit-sharing, this ratio equals 1. As firms begin to avoid, the ratio exceeds 1, indicating that avoiding profit-sharing yields higher profits than complying with it.

Figure C.1: Model simulations for heterogenous $\mu_g$: decision to fully outsource




(a) Total profit sharing

(b) $\frac{Profits}{Profits\ not\ avoiding}$

*Notes:* This figure shows the results of simulations of the model for different productivity levels $z_j \in [35 : 75]$ and different shares of misinformed workers. Panel (a) shows total profit-sharing costs as a function of $z_j$. Panel (b) depicts total profits, as a share of total profits if profit-sharing avoidance was not possible. For all simulations $\bar{\mu} \in \{0, 0.5, 1\}$. For the results in red (high share misinformed), $\bar{p} = \{0.5, 0.4, 0.1\}$. For the results in blue (low share misinformed), $\bar{p} = \{\frac{1}{3}, \frac{1}{3}, \frac{1}{3}\}$. The shaded regions indicate the firms that opt to avoid profit-sharing under each parametrization of $\bar{p}$. The parameters for the simulations are $\theta = 1.5$, $c = 0$, $k = 200$, $\alpha = 0.7$, $\rho = 0.1$.

## C.4 An increase in $k$

As can be seen in Equation 42 increase in the cost of full outsourcing $k$ will lead some firms to shift from full outsourcing & avoiding profit sharing to not avoiding. Using Equations 38 and 31, we derive the result presented in Prediction 1, which states that the effect on firm employment will be:

$$\Delta n_j = c \cdot \left(\frac{\theta}{\theta+1}\right)^{\theta} \tag{43}$$

Note that if $c = 0$, the effect on employment will be zero. The reason behind this results is that profit sharing does not distort the marginal cost of employment at the point where marginal profits are zero, i.e. where profits are maximized. We proceed to derive this result. The labor supply curves and inverse labor supply curves when the firm avoids, and when the firm complies with profit-sharing can be expressed as:

$$\begin{aligned} n_j^{avoid} &= w_j^{\theta} & \qquad n_j^{comply} &= (w_j + \alpha\mu p s_j)^{\theta} \\ w(n_j)^{avoid} &= n_j^{\frac{1}{\theta}} & \qquad w(n_j)^{comply} &= n_j^{\frac{1}{\theta}} - \alpha\mu p s_j \end{aligned}$$

Thus, the marginal cost of employment when the firm avoids, and when the firm complies with profit-sharing are:

$$MC_n^{avoid} \;=\; w(n_j)^{avoid} + \frac{\partial w_j^{avoid}}{\partial n_j} n_j \;=\; n_j^{\frac{1}{\theta}} \left(1 + \frac{1}{\theta}\right) \tag{44}$$

$$MC_n^{comply} \;=\; w(n_j)^{comply} + \frac{\partial w_j^{comply}}{\partial n_j} n_j \;= MC_n^{avoid} - \alpha\mu \left(ps_j + \frac{\partial ps_j}{\partial n_j} n_j\right) \tag{45}$$

Where,

$$\frac{\partial ps_j}{\partial n_j} = \frac{\partial \frac{\rho\Pi}{n_j}}{\partial n_j} = \rho \frac{\Pi' n_j - \Pi}{n_j^2} \tag{46}$$

Notice that when $\Pi' = 0$, we have $\frac{\partial ps_j}{\partial n_j} = \frac{-ps_j}{n_j}$, causing the second term in Equation 45 to collapse to zero. Thus, at the optimal level of labor, where profits are maximized, the marginal cost of employment with profit-sharing is identical to the marginal cost of employment without profit sharing. Importantly, this result holds without imposing any specific revenue function, and appliers to any labor supply functions of the form $(A_1 w_j + A_2 ps_j)^{\theta}$. This result is notable as it implies that profit sharing does not distort labor decisions, even if we take into account the fact that it affects labor supply.

The intuition behind this result lies in the two effects of profit sharing on the labor supply curve. First, for a given level of employment, the firm can offer a wage that is $\alpha\mu \cdot ps_j$ lower, thereby reducing the first term after the first equality sign in the marginal cost expression in 45. Second, an increase in the number of workers reduces the profit-sharing amount allocated to each worker (for a concave profit function, the numerator in Equation 46 is always negative), requiring an upward wage adjustment to compensate for this decline, equal to $\alpha\mu|\frac{\partial ps_j}{\partial n_j}|$. This adjustment raises the second term of the marginal cost. Since profits do not change at the margin in the optimum, this second effect is $\alpha\mu \cdot \frac{ps_j}{n_j}$, leading to a total cost adjustment of $\alpha\mu \cdot ps_j$. This fully offsets the initial wage reduction in the first term of the marginal cost. As a result profit sharing does not alter marginal costs at the optimal employment level.

A graphical representation of this result for a linear production function is shown in Figure C.2. The labor supply curves when complying with profit-sharing in this case is $n_j = ((1-\rho\alpha\mu)w_j + \rho\alpha\mu\hat{z}_j)^{\theta}$. These two curves intersect when $w = \hat{z}_j$. The marginal cost curves also intersect at $MC = MPL$, the point that determines optimal employment. Consequently, employment is identical in both scenarios. This is illustrated with a dashed vertical black line in Figure C.2, which also shows that while employment levels are the same, wages are higher in the avoiding scenario than in the non-avoiding scenario.

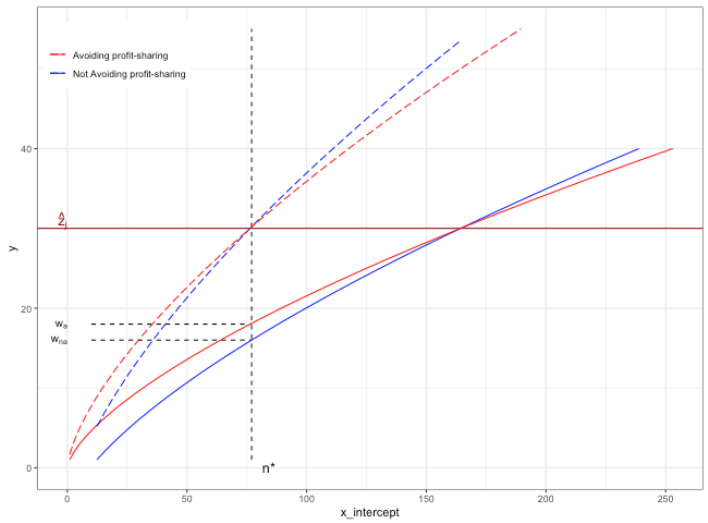



Figure C.2: Graphical illustration of optimal $w_j$ and $n_j$

*Notes:* This figure provides a graphical illustration of the firm's optimal choices for $w_j$ (wage) and $n_j$ (employment) under two scenarios: when the firm chooses full outsourcing to avoid profit-sharing (red), and when it complies with profit-sharing (blue). The solid lines represent the labor supply curves: $n_j = w_j^{\theta}$ in the avoidance scenario and $((1-\rho\mu\alpha)w_j + \rho\mu\alpha\hat{z}_j)^{\theta}$ in the compliance scenario. The dashed lines depict the marginal cost in each case. The horizontal dark red line indicates the marginal revenue product of labor, $\hat{z}_j$, and the dashed vertical black line marks the optimal employment level where $MCL = MPL$. $w_{na}$ is the optimal wage when not avoiding profit-sharing, and $w_a$ is the optimal wage when avoiding. The figure is generated with parameters $\theta = 1.5$, $\rho = 0.3$, $\rho\mu = 0.5$, and $\hat{z}_j = 30$. The fact that $n_j^*$ is equal in both scenarios illustrates Prediction 1.

Additionally, using Equations 29, 36, 30 and 37 we obtain the following expressions for the change in wages, profit sharing per worker, and total compensation for these firms. This last result is stated in Prediction 2.

$$\Delta wage = c\frac{\theta}{\theta+1} - \frac{\hat{z}_j\rho\mu\alpha}{(1+\theta)(1-\rho\mu\alpha)} \tag{47}$$

$$\Delta\,\mathbb{E}[ps_j] = \frac{\hat{z}_j\rho}{1+\theta}\left(1 - \frac{\rho\mu\alpha}{1-\rho\mu\alpha}\right) \tag{48}$$

$$\Delta\,\mathbb{E}[total\ compensation] = \frac{\hat{z}_j\rho}{1+\theta}\left(1-\frac{1-\rho}{\frac{1}{\mu\cdot\alpha}-\rho}\right)+c\frac{\theta}{\theta+1} \tag{49}$$

The expression in Equation 49 is increasing $\frac{1}{\mu\cdot\alpha}$, indicating that when labor supply is highly inelastic with respect to profit sharing, restrictions on outsourcing lead to a larger rise in total compensation. As mentioned above, $\alpha$ affects workers' utility derived from profit sharing, while $\mu$ does not. We define the change in the risk-adjusted value of total compensation for workers as $\Delta(w_j + \alpha\,\mathbb{E}[ps_j])$. This represents the change in the value of total compensation for workers, accounting for the additional risk involved in profit sharing, absent any information frictions. The effect of an increase in $k$ on this variable presented in Prediction 3 and is:

$$\Delta\,\mathbb{E}[value\ total\ compensation] = \frac{\hat{z}_j\rho\alpha}{1+\theta}\left(1-\frac{1-\alpha\rho}{\frac{1}{\mu}-\alpha\rho}\right)+c\frac{\theta}{\theta+1} \tag{50}$$

Figure C.3 illustrates simulations for the effect of an increase in $k$ on total compensation (panels a,b) and the risk-adjusted value of total compensation (panels c,d) for heterogenous $\mu_i$. Panel (a) and (c) plot the results when there is a high share of misinformed workers, while panel (b) and (d) plot the results when there is a lower share of misinformed workers.The black line in each graph represents the effect on the outcome variable when $k$ increases, leading firms that were previously avoiding profit-sharing to start complying with it. As shown in the figures, the effect on both total compensation and the risk-adjusted value of total compensation is positive, and it is higher in the scenario with a larger share of misinformed workers.

# D Appendix C: Outsourcing and avoidance of labor benefits in other countries

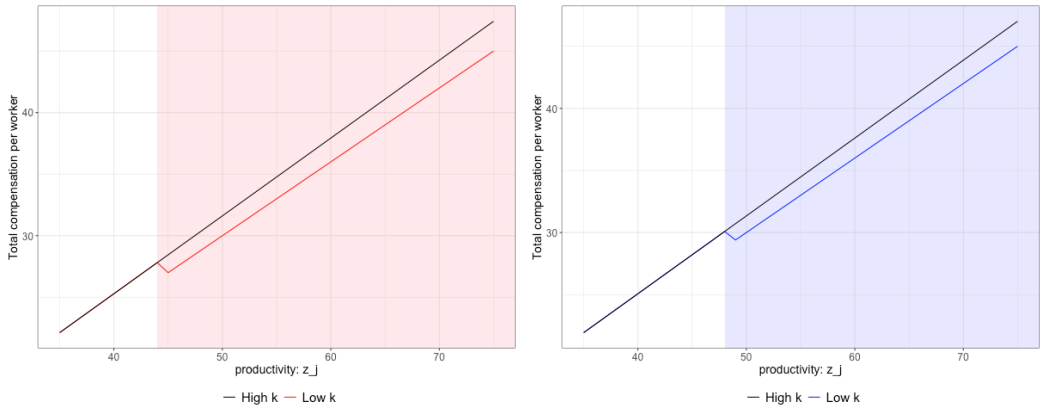
The motivation to outsource employees to avoid paying additional benefits is not unique to Mexico. Ecuador and Peru restricted outsourcing in 2008 and 2022 (Reuters, 2008; DS 001-2022-TR, 2022) with the aim of 'ending worker abuse'. In both countries, the evasion of mandatory profit-sharing was one of the reasons for the regulations.[90] More generally, the use of outsourcing to disguise working relationships and circumvent labor regulations and liabilities is a widely discussed problematic around the world (ILO, 2011). In the United States for instance, the so called 'joint employment relationship' have been a frequent source of legal dispute,[91] where large companies have been accused outsourcing to avoid liability for employment law violations, and hinder labor organizing efforts (Epstein et al., 2020; NELP, 2020, 2018; Klein and Humowiecki, 2013).[92] In the UK, Umbrella Companies have been a recent source of concern for worker rights (HM Treasury UK, 2023). Similarly to the Mexican case, in

[90] Both Ecuador and Perú have profit-sharing schemes similar to Mexico regarding coverage and the mandatory nature.

[91] An example of a legal dispute involving outsourcing is the Browning-Ferris Case.

[92] In fact the Fair Labor Standards Act's (FLSA) broad definition of "employee" aims to cover the so called 'joint employment relationships. The Trump administration passed a rule narrowing the definition of a joint employer under the FLSA. This rule was rescinded by the Biden administration, as it was claimed to weaken critical workplace protections (SHRM, 2021).

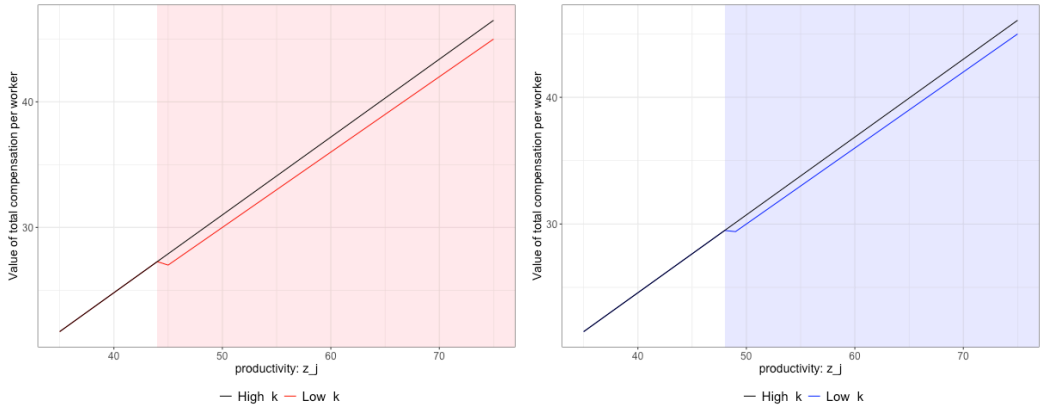
Figure C.3: Model simulations for heterogenous $\mu_g$: increase in $k$




(a) Total comp., High misinf.




(b) Total comp., Low misinf.




(c) Risk-adj value total comp., High misinf.




(d) Risk-adj value total comp., Low misinf.

*Notes:* This figure shows the results of simulations of the model for different productivity levels $z_j \in [35 : 75]$ and different shares of misinformed workers. Panels (a) and (b) show total compensation $(w + \mathbb{E}[ps])$. Panels (c) and (d) show the risk-adjusted value total compensation $(w + \alpha\,\mathbb{E}[ps])$. For all simulations $\bar{\mu} \in \{0, 0.5, 1\}$. In Panels (a) and (c) (high share misinformed), $\bar{p} = \{0.5, 0.4, 0.1\}$. For Panels (b) and (d) (low share misinformed), $\bar{p} = \{\frac{1}{3}, \frac{1}{3}, \frac{1}{3}\}$. The shaded regions indicate the firms that opt to avoid profit-sharing under low $k$ the black dotted lines in each graph depict the effect of an increase in the cost of outsourcing, $k$. The parameters for the simulations are $\theta = 1.5$, $c = 0$, $k_{low} = 200$, $k_{high} = 1e^{10}$ $\alpha = 0.7$.

Europe firms have been found to set up letterbox-type companies which are used to sign contracts with workers, and allow firms to circumvent and avoid labour law (European Parliament, 2017; McGauran, 2016).