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

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Abstract

This paper studies the use of domestic outsourcing to circumvent labor regulations and its consequences for firms and workers. Drawing on longitudinal plant data and employer-employee data from Mexico, we first provide novel evidence on a phenomenon wherein many firms were outsourcing their entire workforce. These entities operated as empty establishments, with positive production and costs but no legally hired workers. We provide evidence that a central motive for this practice was to avoid mandatory profit-sharing with employees. We then leverage a reform that significantly restricted the use of outsourcing to understand the implications for both firms and workers when this practice is constrained. Using a difference in differences design, we find that the reform caused firms to insource their workers and newly incur profit-sharing payments. We find no effect on total employment (composed of outsourced workers + in-house workers). Moreover, we find that treated firms offset the increase in profit sharing by a small decrease in wage growth relative to the control group. This decrease did not fully compensate for increases in profit sharing and total worker compensation for treated workers, i.e. wages + profit sharing, increased by around 3%. We provide a theoretical model to show that our results are consistent with a labor market where (i) firms offer workers a compensation bundle of wages and profit sharing (ii) outsourcing all workers allows firms to avoid mandatory profit sharing (iii) workers respond more to differences in wages than to differences in profit sharing when deciding where to work.

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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; Spitze, 2022) and adjustment costs (Bertrand et al., 2021; Macaluso et al., 2023). However, domestic outsourcing has also been shown to deteriorate working conditions for workers (Goldschmidt and Schmieder, 2017; Drenik et al., 2020; Bertrand et al., 2021) and has contributed to recent increases in wage inequality (Goldschmidt and Schmieder, 2017; Handwerker, 2023).

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; Epstein et al., 2020). Despite its importance, empirical evidence on the use of outsourcing to circumvent labor regulations remains scarce, likely due to the challenges in its measurement and the isolation of this aspect from other outsourcing motives. Consequently, our understanding of this phenomenon remains limited.

In this paper, we draw on plant-level longitudinal data from the manufacturing sector, employer-employee data, and census data on business establishments in Mexico to study the connection between domestic outsourcing and the circumvention of a particular labor regulation - mandatory profit sharing. We document and newly characterize a phenomenon wherein establishments were outsourcing all their workers. We provide evidence that the main motivation of this practice was to avoid profit sharing obligations. Furthermore, we combine empirical evidence with a theoretical model to understand the conditions leading firms to carry out this practice. We then leverage a restriction on outsourcing to evaluate our model and study and the consequences of heavily restricting this practice. Beyond the assessment of the policy, our empirical and theoretical analyses allow us to understand the conditions leading some firms to circumvent a mandatory component of total compensation and the impacts of enforcing labor regulations when firms have multiple margins for adjusting worker compensation.

First, we rely on detailed establishment level data and social security data to present evidence showing that a significant proportion of establishments in Mexico outsourced out almost their entire workforce.[2] We identify two distinct groups of establishments characterised by markedly different patterns in outsourcing practices. The first group, representing two-thirds of all plants using outsourcing and 89% of outsourced workers in our sample had been outsourcing practically *all* of their workers. This practice involved the complete outsourcing of their workers to a separate legal entity, frequently created by the parent firm with the sole purpose of legally hiring the workers. These establishments, which we refer to as *full outsourcing establishments*, operated as essentially empty

[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.

plants, with positive production and costs but no legally hired workers. The second group, referred to as *conventional outsourcing* establishments, had a much lower proportion of outsourced employees (averaging around 20%). Throughout this study, our primary focus lies on the *full outsourcing* establishments, due to their prevalence and distinct outsourcing patterns.

Second, we present evidence supporting the notion that full outsourcing establishments were outsourcing most of their workers to circumvent mandatory profit sharing obligations.[3] We show that 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.[4] We show that firms adopting this practice tended to be larger and more profitable, and thus benefited most from profit sharing avoidance. Furthermore, we provide evidence that alternative reasons for outsourcing studied in the literature fail to explain full outsourcing. This suggests that circumventing this regulation was the primary aim of this practice. Additionally, our evidence indicates that the motives for outsourcing among conventional outsourcing establishments differed from those of full outsourcing establishment, and were more closely aligned with those emphasized in past literature. Specifically, conventional outsourcing seemed to reduce adjustment costs during temporary changes in activity.

Third, we exploit the effect of a strict restriction on outsourcing to understand how full outsourcing establishments react in a labor market without the possibility to outsource. In April 2021, the Mexican government passed a reform that prohibited outsourcing of core firm activities. We perform a difference-in-differences analysis 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.

We find that the reform had a significant impact on employment relationships. Most treated plants insourced their employees in-house on the month the reform came into effect. We also find that the reform caused full outsourcing establishments to newly incur profit sharing payments. We find no effect on total employment (composed of outsourced workers + in-house workers), indicating that they did not downsize as a result of the increased profit sharing costs. Moreover, 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 employee. We find that average total worker compensation increased by around 2 to 3% post reform. This indicates that firms were not able to fully offset the increase in profit sharing costs through lower wages after the reform.

We set up a simple model to interpret the evidence outlined above. Our results are consistent with a labor market in which firms offer workers a compensation 'bundle' of wages and profit sharing. Outsourcing decreases the cost of avoiding mandatory profit sharing payments, allowing firms to

[3] We argue that the few workers that these establishments did hire in-house were managers or directors, who are not entitled to profit sharing benefits. More detail on this is provided in Section 5.2.1

[4] We 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.

freely choose the magnitude of this compensation. We suggest that profit sharing and wages are not perfectly substitutable for workers, and workers were less responsive to changes in profit sharing compensation than to wages when deciding where to work. This difference in elasticities prompts firms to lower total compensation disproportionately via the profit sharing margin, as this would have lower effects on their labor supply. This setting can help explain why i) certain firms found it optimal to incur full outsourcing practices to reduce profit sharing, rather than lowering wages[5] and ii) the restriction of outsourcing increased profit sharing and total worker compensation, without having a negative effect on employment.

In part, workers' relative inelastic labor supply to profit sharing can 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). However, we provide empirical evidence that risk aversion cannot fully explain our results. We propose that an important reason for this differential elasticity is likely that workers are less informed on the details of profit sharing — such as their rights to this benefit, which firms have to pay it, how it is calculated — compared to other benefits, especially prior to the reform. Consistent with prior literature, we argue that this lack of information, likely due to the complex nature of profit sharing, reduces workers' sensitivity to this form of compensation (Enke et al., 2024; Jäger et al., 2023). Evidence from the self-collected survey data supports this explanation.

Finally, we provide evidence that the reform had negative consequences for *conventional outsourcing* establishments, which were using outsourcing for motives unrelated to profit sharing avoidance. Following the reform, these firms experienced a decline in their overall employment levels, accompanied by a reduction in employment dynamism.

The rest of the paper is structured as follows. Section 2 describes the contribution to the literature. Section 3 describes institutional context. Section 4 presents the data and details on measurement. Section 5 presents descriptive evidence on outsourcing use. In Section 6 we present a theoretical framework. Section 8 describes the effects of the outsourcing reform. Section 9 concludes.

2 Related literature

The recent rise in the presence of domestic outsourcing worldwide has spurred an active literature studying the consequences and the motivations behind this practice. Recent research in this area has mostly focused on three main motivations for outsourcing, first introduced in a seminal work by Abraham and Taylor (1996). A first well documented reason for this practice is reduction in labor costs. Several studies have shown that outsourcing allows firms to reduce workers' wages (Goldschmidt and Schmieder, 2017; Drenik et al., 2020; Felix and Wong, 2021; Bilal and Lhuillier, 2021), particularly for low-wage workers (Spitze, 2022). This can be the case if firms are constrained on the minimum level of wages they can offer their in-house workers due to efficiency wages or within firm fairness considerations (Goldschmidt and Schmieder, 2017). An additional reason is

[5] The minimum wage was barely binding for treated firms. We provide more details on this below

that outsourcing can help firms adjust to changes in labor demand by reducing adjustment costs (Bertrand et al., 2021; Macaluso et al., 2023). Furthermore, 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).

Additionally, outsourcing has been frequently criticized for enabling firms to disguise employment relationships, and bypass labor regulations and liabilities such as collective bargaining agreements, overtime pay, and non-wage benefits (Epstein et al., 2020; ILO, 2011; Matza, 2018).[6] Most of these claims come from media and policy discussions around the world (HM Treasury UK, 2023; European Parliament, 2017; Reuters, 2008) but empirical evidence on this motive for outsourcing is scarce.[7] Empirically documenting the circumvention of regulations is challenging, as it is something that firms would actively try to conceal. It is also difficult to isolate this outsourcing motive from the other reason posed above. Additionally, this rationale for outsourcing only holds if the parent firm and contracting firm face different different regulatory frameworks or or enforcement measures. A few academic studies have have touched upon this motive. 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. Bertrand et al. (2021) show evidence consistent with the fact that large establishments in India use outsourcing to avoid high firing costs. However, they also show that large establishments may be inclined to outsource workers as a response to generally high labor costs.

In this paper we contribute to this literature by providing novel evidence on the circumvention of labor regulations as a motive for outsourcing use. Specifically, we show that a significant number of establishments were outsourcing practically *all* of their workforce. This extreme use of outsourcing is inconsistent with concerns about within-firm inequality and with the idea of firm specialisation, as these motives would only justify outsourcing a subset of the establishment's workforce. This practice is also inconsistent with reduction in adjustment costs, unless these establishments undergo periods with zero workforce requirements. Additionally, entities carrying out this practice did not have particularly high volatility in total employment (show this in Section 5.3). Instead, we provide evidence that outsourcing was used as a deliberate strategy to avoid paying workers profit-sharing contributions, which they are entitled to under conventional employment arrangements. Beyond documenting this phenomenon, we use different data sources to study its implications for both firms and workers. Additionally, we combine our empirical evidence with a model to understand the firm characteristics and labor market conditions that render this practice optimal to firms and accepted by employees in equilibrium.

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

[6]This Bloomberg article documents that 'contractors have provided a way for some of America's biggest employers—including Target and Walmart Inc.—to effectively benefit from cheap, undocumented labor without fear of meaningful penalties.' Another controversial example is the use of labor contractors by big farming companies such as Monsanto and Du Pont to evade legal responsibility of labor rights regulations (Investigate Midwest, 2017)

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

supervision of another firm, it is challenging to identify which workers are outsourced and which firms are using outsourcing. The availability of detailed establishment level data measuring outsourcing use and social security data, in combination with an outsourcing reform allow us to characterize firms and workers in outsourcing relationships. Most 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 4.2). Some studies use different methodologies to measure outsourcing. For instance, 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. However, none of these studies exploit both comprehensive firm-level and individual-level data as we do in this study. Amongst 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 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 two main ways. First, we emphasize and and delve into the distinctions between full outsourcing and conventional outsourcing practices. In doing so, 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 were using outsourcing to avoid a mandatory labor regulation (profit sharing), rather than offering lower wages. This approach allows us to understand the conditions under which firms choose to engage in this practice and improve our understanding of the results when assessing the impact of outsourcing restriction. Additionally, our approach can provide broader insights into the impacts of enforcing labor regulations when firms have multiple margins for adjusting worker compensation.

In emphasizing the role of outsourcing to circumvent profit sharing obligations, this project also contributes to is the work on firm performance based pay, such as profit sharing employee-ownership plans and performance bonuses (Cahuc and Dormont, 1997; Nimier-David et al., 2023). Most work in this area has focused on the effect on employee performance and firm productivity. Kim and Ouimet (2014) and Fang et al. (2015) find positive effects of such schemes on firm level productivity, particularly concentrated in small firms where workers can internalize their effect on firm performance. The closest study to ours is a recent paper by Nimier-David et al. (2023), who leverage policy reform to study the effect of profit sharing in France on workers. They find no effect of profit sharing on firm productivity. Moreover, they find profit sharing increased total worker compensation for low-skilled workers, while it is compensated by lower wages for high-skilled workers. They attribute these heterogeneous results to a binding minimum wage for low-skilled workers. This project adds to this literature by providing evidence of a practice used by firms to avoid paying profit sharing contributions to workers, namely outsourcing. Additionally, 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. Moreover, we intend to study the firm and labor market specific conditions that can lead to this practice in equilibrium.

Finally, the study contributes to the rising literature on monopsony power and rent-sharing within firms (Manning, 2004). Recent work in this field has studied the implications of monopsony for non-wage compensation (Boudreau, 2021; Lagos, 2022; Dube et al., 2022). Additionally, novel work has outlined the role of worker misinformation on the wage distribution in giving rise to monopsony power (Roussille, 2022; Jäger et al., 2023). We contribute to this literature by integrating the mechanisms outlined in the research described above. We suggest that differences in workers' knowledge (or attention) about non-wage components relative to wages can lead them to be 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. This underscores the importance of considering non-wage elements when evaluating monopsonistic labor markets, as a sole focus on wages would lead to underestimate the degree of labor market power.

3 Institutional Setting

3.1 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[8], newly created firms in the extractive industry, during the exploration period, NGOs, and public institutions (Gobierno de México, 2023).

Within the firm[9], 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). 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.[10]

[8] Up to second year of activity for firms dedicated to the production of a new produce

[9] Profit sharing is distributed at the firm level, not the establishment level

[10] 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

3.2 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. The main motivations for this initiative stated by the government were to stop the precarious labor conditions facilitated by outsourcing. (Secretaría del Trabajo y Previsión Social, 2021).[11]

The final version of reform was approved in April 2021. Firms had until July 2021 to adapt to the main changes.[12] The main changes implemented were (LFT, 2021):

- The outsourcing of workers for core activities[13] of the firm was prohibited.
- The firms outsourcing labor would be legally responsible for any violations of the labor law carried out by the employment agencies
- 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 much 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 it's effect on on small firms who relied on the flexibility given by this type of labor arrangement.[14]

4 Data and Measurement

4.1 Main datasets

The main datasets used in this project can be divided into two data blocks. Each data block allows us to measure different firm and worker outcomes and the method to measure outsourcing differs

varies according to the firms' economic sector. In Ecuador all firms with positive profits must distribute 15% of profits with employees

[11] When justifying the outsourcing reform, Mexico's president Andrés Manuel López Obrador stated: '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.'

[12] Some fiscal measures came into effect on September 2021

[13] The core activity of a firm was defined as the activities included in the company's objects clause

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

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.

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.[15] 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[16] 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 relationships (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 8.1.2). Thus, to identify and characterize these other actors in outsourcing relationship we rely on our other main data block.

[15] 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.

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

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 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. This dataset does not provide information on the number of hours or days worked per month.

Additionally, we use firms' tax records data from 2010-2015 to produce part of the descriptive evidence shown below. The data provides information on each individual firm's declared income, costs, profits and profit sharing, among many other items in the tax declaration. They can be accessed through the national tax office website.[17] 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.

4.2 Measuring outsourcing pre-reform

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.

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.[18] The outsourcing question specifically pertains to individuals who worked for the establishment but were contractually affiliated with a separate company[19], while performing tasks related to production, marketing, administration, or accounting.

[17] `http://omawww.sat.gob.mx/cifras_sat/Paginas/inicio.html`

[18] 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*

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

Thus, we have access to monthly data that quantifies the number and proportion of outsourced workers per establishment in our sample. However, it is important to note that this dataset lacks worker-level information, and thus, to measure element (2), we rely on social security data.

In contrast, 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 around the time of the reform, as illustrated in Figure 4, 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* (iii) establishment A lost more than 40% of it's workers that month (iv) 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 5 shows the number of workers satisfying conditions (ii), (iii) and (iv) 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.

Furthermore, approximately 96% of workers involved in an insourcing event were identified under condition (ii), and 70% of these insourced workers in the shaded area were insourced in July 2021. Consequently, the majority of worker transitions during the reform occurred in blocks, with most workers being insourced during the last month in which firms had the opportunity to adapt to the reform.

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

5 Descriptive results

5.1 Patterns in the use of outsourcing pre-reform

As previously mentioned, our primary method of identification relies on variation in the use of outsourcing among establishments prior to the reform. We find that 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 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. 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 observe that approximately 55% of insourcing establishments were not previously recorded in the social security data before the reform, indicating that they had not reported any employees to social security prior to the reform. Thus, in the three datasets, we identify a considerable number of establishments which had been outsourcing the majority of their workers before the reform.

Given these distinctive patterns in the use of outsourcing, we divide the treated establishments into two groups:[20]

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.

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

While the histogram in Figure 2 is computed for observations between 2020 and 2021, there is considerable persistence in the outsourcing patterns across time. Table 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%.

Table 2 presents summary statistics for each group of establishments computed using data for 2018 from from EMIM and the Economic Census. 1629 establishments are classified as *full outsourcing*, 855 as *conventional outsourcing* and 5581 did not use outsourcing, and are classified as control. Full

[20]Given that our main dataset is an establishment level survey (EMIM), our main analysis is at the establishment level. Almost all establishments in the survey were classified in the same outsourcing group as other establishments in the sample belonging to the same firm

outsourcing firms are larger and have higher levels of productivity, revenues and investment. As can be seen in the last two rows, these establishments have very low costs in profit sharing, and are much less likely to be registered in the social security institution (as most of them have zero employees registered). In the following section we provide descriptive evidence which helps understand the reasons underlying these patterns in the proportion of outsourced employees.

5.2 Full outsourcing establishments

5.2.1 Profit sharing and full outsourcing

As outlined in Section 3.1, 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 a substantial proportion 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 6 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[21].

Figure 7 presents additional evidence supporting this hypothesis using official firm tax declaration data from 2010 to 2015. The graph illustrates the relationship between firms' profits and the declaration of positive profit sharing contributions. 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. However, 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,

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

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. Tax declaration data for employed individuals shows that only 30% of workers received positive profit sharing contributions, while 96% received the 13th salary, and 80% received the mandatory vacation bonus, as required by law.

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[22] 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 [23] 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.

5.2.2 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 3 shows that full outsourcing establishments are not more likely to belong to sectors with high seasonality. Similarly, Table 4 indicates that these establishments do not demonstrate significant volatility in total workforce (both outsourced and in-house workers), suggesting that they do not particularly benefit from lower adjustment costs.

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.

[22] This number was only 39% for contracting firms hiring workers for conventional outsourcing firm

[23] See link, link

Specialization. We posit that full outsourcing is unlikely to be driven by an increase in firm specialization and economies of scale. While specialization would justify outsourcing non-core tasks such as IT, 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[24].

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 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.

5.2.3 Characteristics of full outsourcing establishments

The most defining features of full outsourcing establishments is that they are large, productive, which high profits. Table 2 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 8 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

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

to have higher profits (and potential profit sharing). Thus, these highly productive establishments benefited relatively more from the cost reduction of evading profit sharing obligations.[25] This is discussed in more detail in Section 6.

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. Furthermore, Table A.2 reveals that these establishments are situated in labor markets characterized by higher concentration, where limited outside employment options may facilitate the extraction of rent from workers.

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.[26] Therefore, for the vast majority of the cases, one should think of full outsourcing establishments as belonging to full outsourcing firms.

5.3 Conventional outsourcing establishments

While the main focus of the paper is on full outsourcing practices, for completeness we show that the motivations for outsourcing of *conventional outsourcing* establishments seemed to differ from the former. First, note in Figure 6 that these establishments' profit sharing contributions were on average very similar to the non-outsourcing establishments, highlighting the need to outsource the complete workforce to avoid this contribution.

We show three different set of results which strongly suggest that conventional outsourcing establishments seemed to have been using outsourcing to adjust their labor force to temporary changes in activity. First, we find that sectors with more seasonality in employment and revenue before the reform were had a higher proportion of establishments in this group. This can be seen in Table 3, which shows the results of regressing different measures of seasonality at the sector level on the proportion of firms belonging to each group in the sector. Second, as shown in Table 4 we find that once we control for sector, conventional outsourcing establishments tended to have more volatility in employment than non-outsourcing firms. Third, in Table 5 column 1 we show that the elasticity of total workers with respect to short-term changes in revenue was larger for conventional outsourcing establishments prior to the reform. In columns 2-4 we calculate the elasticity different employment types with respect to revenue for the sub-sample of conventional outsourcing establishments. We find that outsourced employment responded more than in-house employment to changes in revenue,

[25]Two cases of firms doing this type of practice which were present in the media are Inditex (the clothing business group which includes Zara and other brands), and the bank BBVA

[26]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.

suggesting that outsourcing is more frequently used to adjust to short-term changes in economic activity than in-house employment. Figure A.3 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. However, it does not seem to be a relevant motive for full outsourcing establishments.

6 Theoretical framework

Having documented and characterised full outsourcing practices, we present a very simple theoretical framework to understand the mechanisms behind the existence of this phenomenon. Full outsourcing allows firms to avoid or reduce profit sharing contributions. If wages and profit sharing were perfectly substitutable for workers and firms, then this practice should not change total worker compensation. In this case, full outsourcing would only change the composition of total compensation, without changing its total value. However, it is likely that full outsourcing entails a cost. This cost can include contacting or setting up a different entity to outsource the workers to, performing an extra firm-to-firm transaction, and extra administrative costs (e.g. filing an extra tax declaration each year if the contracting firm is set up by the parent firm). In this case, there must be a benefit for firms of performing this practice for it to exist in equilibrium. Thus, it is likely that this practice allowed firms to reduce total worker compensation, reducing their labor costs.

Full outsourcing would allow firms to reduce total compensation if profit sharing and wages are not perfectly substitutable. This can be the case if for firms it is less costly to reduce total compensation via profit sharing than via wages. One reason for this imperfect substituability 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 9 full outsourcing firms paid relatively high wages. In particular, 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[27]. This indicates that downward wage rigidity does not seem to be the main cause for this practice.[28]

Below, we present a very simple theoretical framework that can help explain the reasons behind full outsourcing practices, where the imperfect substituability between wages and profit sharing stems from the labor supply function. The framework is very simple, and for now serves the purpose of conveying intuition.

The model is static and in partial equilibrium. We assume a firm with productivity z_j produces

[27]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

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

a final good in a perfectly competitive product market with a linear technology function in labor n_j. Productivity z_j follows a random process $z_j = \hat{z_j} + \xi_j$ where $\mathbb{E}(\xi_j) = 0$ and firms are risk-neutral. There exists a level of mandatory total profit sharing ($\tilde{PS_j}$) which is a certain proportion ρ of pre-profit sharing payments profits, $\hat{\pi_j}$:[29]

$$\tilde{PS_j} = \rho\tilde{\pi}_j = \rho(z_j n_j - w_j n_j) \tag{1}$$

Total profit sharing paid by the firm PS_j results in a certain level of profit sharing per worker $ps_j = \frac{PS_j}{n_j} = \rho(z_j - w_j)$. Labor supply and demand decisions are made before the productivity realization. For simplicity, we abstract from wage uncertainty and assume wages are set at the beginning of the period, before the realization of z_j, while ps_j is set after z_j is realized. Therefore, when hiring workers (before ξ_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 wages (w_j) and expected profit sharing per worker ($\mathbb{E}[ps_j]$).

$$n_j^s = (\beta_w w_j + \beta_{ps}\,\mathbb{E}[ps_j])^\theta \tag{2}$$

Where β_w and β_{ps} determine the relative elasticity of workers with respect to wages vs profit sharing offered by the firm.[30] These parameters affect the optimal relative values of wages and profit sharing chosen by the firm. $\theta > 0$ defines the absolute elasticity faced by the firm with respect to the value of total compensation, $\beta_w w_j + \beta_{ps} ps_j$. θ does not influence the optimal relationship between wages and profit sharing, but will determine the value of the absolute compensation.[31]

We micro-found the labor supply function in Section C.4. We show below that our evidence suggests that β_{ps} must be lower than β_w. We propose that differences in β_w and β_{ps} could stem from two factors. The first is worker risk aversion, which makes workers value each additional peso of $\mathbb{E}(ps_j)$ less than that of w_j, as profits are more uncertain than wages (Nimier-David et al., 2023). Conversely β_w and β_{ps} may differ due to lower worker awareness on profit sharing than wages (Ouimet and Tate, 2023), which can lead them underestimate the expected value of this benefit. We present descriptive evidence on both factors in Section 8.3.

Firms can pay a fixed cost k and a variable cost c to outsource their workers to a separate entity, avoid the mandatory level of profit sharing and freely choose the optimal level of profit sharing they

[29] In Mexico, profit sharing is 10% of profits before discounting profit sharing payments

[30] $\eta_{n,x} = \frac{\beta_x \theta x}{(\beta_w w_j + \beta_{ps} ps_j)}$ for $x \in \{w, ps\}$. Thus $\frac{\eta_w}{\eta_{ps}} = \frac{\beta_w w_j}{\beta_{ps} ps_j}$

[31] We assume the elasticity of labor supply to be finite, reflecting firms' 'value setting power'. In a scenario where labor supply was perfectly elastic with respect to job value, every firm would set w_j and ps_j such that $\beta_w w_j + \beta_{ps} ps_j = \bar{U}$. Under such conditions, in our model, all firms offering zero profit sharing would provide the same wage $w_j = \frac{\bar{U}}{\beta_w}$. To evaluate this assumption, we assess whether similar workers outsourced by full outsourcing firms exhibit less wage variation across firms than other groups of workers. Specifically, we conduct a regression of log wages in 2019 and 2020 (pre-reform, for workers to be outsourced) on worker characteristics, firm size, and year, municipality, economic sector, and gender fixed effects. We compare the standard deviation of the residuals of this regression across workers outsourced by full outsourcing firms and those not outsourced. The density function of the residuals for each group can be seen in Figure A.5 We do not observe lower wage variation in the first group, providing support for our assumption that $\theta < \infty$.

wish to offer the workers. k and c include the costs of outsourcing mentioned in the first paragraph of this section. An outsourcing restriction can be interpreted as an increase in k, as the punishment for carrying out outsourcing would increase. Firms must then decide whether to pay k and outsource their workforce to avoid mandatory profit sharing or not. Then they decide on the optimal wage and, if they decided to avoid the mandatory level, the optimal level profit sharing to maximize their profits. Firm maximize expected post-profit sharing payments profits π_j:

$$\max_{w_j, ps_j} \mathbb{E}\left(z_j n_j - w_j n_j - ps_j n_j - (c \cdot n_j + k)\mathbb{1}_{[ps_j n_j < \tilde{PS_j}]}\right) \tag{3}$$

Note that if $\beta_w > \beta_{ps}$, it will be optimal for firms to offer bundles with zero $\mathbb{E}(ps_j)$ absent any mandatory profit sharing regulations. Also, in equilibrium the firm will decide to full outsource to avoid mandatory profit sharing if expected profits of doing so are greater than those of not outsourcing and complying with profit sharing:

$$\hat{z}_j n_j^* - (w_j^* + \mathbb{E}[ps_j^*] + c)n_j^* - k > \hat{z}_j n_j^{**} - w_j^{**} n_j^{**} - \mathbb{E}[\tilde{PS_j}] \tag{4}$$

Where w_j^* and n_j^* correspond to the optimal levels of wages and labor when profit sharing is avoided and w_j^{**} and n_j^{**} correspond to the optimal levels of wages and labor when total profit sharing is at it's mandatory value.

We solve the model in Appendix C. We also simulate the model for different values of z_j, β_w, β_{ps} and k. We derive four main predictions which are shown graphically in Figures 9.

Prediction 1. *If $\beta_{ps} = \beta_w$, then full outsourcing will exist only if there is no cost of doing so.*

In Appendix C we show that in Equation 4 can be expressed as:

$$k \leq \frac{\hat{z}_j}{1+\theta}\left(\beta_w \hat{z}_j \frac{\theta}{\theta+1}\right)^{\theta}\left[\left(1 - \frac{c}{\hat{z}_j}\right)^{1+\theta} - \left(\frac{1-\rho}{1 - \frac{\beta_{ps}}{\beta_w}\rho}\right)\right] \tag{5}$$

If $\beta_w = \beta_{ps}$ and $c \geq 0$ the expression collapses to $k \leq D$ with $D \leq 0$. The intuition for this result is that if $\beta_{ps} = \beta_w$, avoiding profit sharing would not allow firms to reduce total labor costs. This is because for a given level of employment, workers would have to be perfectly compensated by the absence of profit sharing with higher wages. Hence, we suggest that the mere presence of full outsourcing firms strongly suggests that $\beta_{ps} < \beta_w$.

An exception to this prediction would occur if firms are constrained by the minimum wage when they pay profit sharing. This lower bound on the wage firms can offer, but not on profit sharing per worker, would encourage some firms to avoid profit sharing. However, as mentioned above, this is not in line with empirical evidence.

Prediction 2. *More productive firms find it optimal to pay the costs of full outsourcing and avoid profit sharing.*

This result can also be seen in Equation 5 and graphically in Figure 9a. In this figure, we plot total profit sharing payments for different values of β_{ps}. The stark downwards jump in profit sharing payments occurs when firms start to find it optimal avoid mandatory profit sharing. We see that there is a threshold value $\tilde{z}$ such that all firms with productivity above this threshold find it optimal to pay the fixed cost and decrease profit sharing payments.

This prediction is in line with the descriptive results in Figures 8, where we show that more productive firms are more likely to outsource all employees. An intuition for result is that the cost per worker of profit sharing is increasing in z_j, while the cost per worker to avoid it is decreasing in z[32].

Prediction 3. *The lower the relative elasticity of workers with respect to profit sharing* $\frac{\beta_{ps}}{\beta_w}$ *the higher the number of firms avoiding mandatory profit sharing.*

This result can also be seen Equation 5 and in Figure 9a. When β_{ps} is lower (for a given β_w), the threshold at which firms choose to evade profit sharing decreases, leading to more firms to opt for avoidance. The intuition behind this result is that, if β_{ps} is low, then workers are not very sensitive to this benefit when deciding where to work. Thus, when firms decide to avoid mandatory profit sharing, they do not have to compensate the workers for this loss with much higher wages. Therefore, the lower is β_{ps}, the more firms can reduce total worker compensation by avoiding profit sharing through full outsourcing.

Prediction 4. *A sudden increase in k (interpreted as a heavy restriction to outsourcing practices*[33]*) will decrease the number of firms avoiding profit sharing. For these firms:*

4a. *If* $\frac{\beta_{ps}}{\beta_w} < 1$ *expected total compensation* $w_j + ps_j$ *will increase. The effect will be higher the lower the relative elasticity of workers with respect to profit sharing* $\frac{\beta_{ps}}{\beta_w}$.

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

$$\Delta\,\mathbb{E}[total\ compensation] = \frac{\hat{z}_j \rho}{1+\theta}\left(1 - \frac{1-\rho}{\frac{\beta_w}{\beta_{ps}} - \rho}\right) + c\frac{\theta}{\theta+1} \tag{6}$$

Where we can see that if $\frac{\beta_w}{\beta_{ps}} > 1$ the effect will always be positive, and that is depends positively on this term. The Prediction can also be seen in Figure 9d and 9e. Figure 9d shows that an increase in k causes more firms to comply with profit sharing. Panel 9e shows that for the newly complying firms, worker compensation increases, despite wages decreasing (we do not show the results for wages in these figures). The figure also illustrates how the increase in total compensation depends negatively on β_{ps}.

This result is a direct consequence of Prediction 3. When $\frac{\beta_{ps}}{\beta_w}$ is low, workers are much more reactive to a wage decrease than to a profit sharing increase. Offsetting increases in ps_j via lower wages is relatively costly for the firm, as it has a relatively large negative effect on it's labor supply. Consequently, firms will not fully compensate via lower wages and total compensation will increase.

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

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

4b. *The effect on total firm employment is increasing in c*

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

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

Which is positive whenever $c > 0$. Under the model current assumptions there will be no negative effect on total firm employment, as firms will always decide to adjust on the wage or profit sharing instead of on labor. However, if we assume that there is a fixed cost of staying in business each period, then if mandatory profit sharing, ρ, is sufficiently high, the firm will exit the market[34]. 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.

We now test the predictions of our model leveraging the effects of the outsourcing reform on employment, wages and total compensation. In Section 8.3 we present hypotheses and descriptive analyses which can help explain the imperfect substituability between profit sharing and wages for workers.

7 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.

7.1 Establishment-level effects

7.1.1 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:

$$Y_{jsgt} = \sum_{k=Q12017}^{Q12023} \beta_k \mathbb{1}_{t\in k} O_j + \lambda_j + \gamma_{st} + \phi_g t + \xi_{jsgt} \tag{8}$$

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.[35] $\mathbb{1}_{t\in k}$ is a variable equal to one is month

[34]The intuition can be seen in Equation 28

[35]We prefer to use a dummy, rather than a continuous exposure variable, as continuous exposure measures can be

t falls into quarter k. We include size-group specific linear trends, 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.

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problematic in the presence of heterogeneous treatment effects and non-linearities (Sun and Shapiro, 2022).

[36] 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).

8.1.2 Results

Effect on outsourcing use. The reform's impact on outsourcing use for each group of firms is presented in Figure 10. It is clear from the figure that the reform had a significant effect on outsourcing use (panel a) and in particular, on the proportion of firms outsourcing over 95% of workers (panel b). Moreover, Figures A.1 and A.2 in the appendix show the results of estimating Equation 9 with the proportion of outsourced employees and the number of in-house workers as outcome variables. Both figures show a clear decrease in the proportion of outsourced workers following the reform, and an increase in the number of in-house workers.

Utilizing social security data, we examine insourcing events following the reform. We consider an establishment in the IMSS data to belong to be a full outsourcing firm if the firm insourced at least 5 workers around the reform (according to the conditions stated in Section 4.2) and if the establishment was not previously identified in the social security data before the reform[37], 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 firms. We restrict the analysis to the manufacturing sector and to firms with more than 20 employees to improve alignment with the EMIM data. 19% of establishments in our sample insourced workers between June and September 2021. 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, providing additional evidence on their validity. Figure B.1 in the Appendix shows the sectoral and geographical distribution of full outsourcing firms identified in EMIM and IMSS data. Reassuringly, the results look very similar in each dataset.

Our analysis with the social security data also enables us to identify contracting firms, i.e. establishments from which workers moved out of during and insourcing event. 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). We find that that the majority of contracting firms were holding workers from only one parent firm, and were highly likely to exit post-reform. Specifically, 77% of contracting firms associated with full outsourcing firms exited within one year after the reform. Those that did not exit experienced a strong decrease in size, and remained very small (see Figure A.4 in the Appendix). These surviving contracting firms possible 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 11 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 9 but estimated at the yearly level, where the outcome variable is yearly profit

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

sharing over total workers[38]. 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.

Table 6 shows descriptive results on profit sharing amounts for treated and control firms for 2023. We restrict treated firms to the compliers, i.e. firms not outsourcing post-reform for this table. Full outsourcing firms had higher total profit sharing contributions than control firms in both absolute and per worker terms. Average profit sharing represented approximately 1/2 of monthly wages for each group.

Effect on employment. Figure 12 shows the results on the natural logarithm of total employment (total outsourced workers + total in-house workers) 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. [39] The results hold when looking at total and average hours worked at the establishment (see Figure 13a and Figure 13b), indicating that establishments did not adjust by offering workers lower hours of work[40]. As noted in above, the impact on outsourced workers was significant. Thus, on average, full outsourcing establishments insourced all workers after the reform (see Figure A.2), and did not alter their hiring and firing practices post-reform. This result is in line with the predictions in Nimier-David et al. (2023).

Table A.3 shows that the results are robust to alternative specifications of Equation 9. In particular, they are robust to computing the treatment variable using a 2-year time-frame pre reform instead of 1 year (column 1) [41] 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 reported amount paid 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. Additional costs potentially included in this figure include expenses related to worker training (mandated by law in Mexico), worker uniforms

[38] Results also shown in Table 8

[39] 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.

[40] The outlier in the coefficients on hours worked pre-reform is due to the Covid pandemic

[41] The number of observations decreases relative to estimates in Table 7 because with a 2-year pre reform time frame, more establishments are classified as conventional outsourcing, and thus excluded from the estimation sample.

or equipment, and workers' travel expenses. 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 5.2.1), 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 (comprising wages and profit sharing).

8.2 Worker-level effects

8.2.1 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.

$$Y_{isgt} = \sum_{k=2017}^{2023} \theta_k \mathbb{1}_{t=k} Insourced_i + \phi_i + \gamma_{st} + \lambda_{gt} + \xi_{isgt} \tag{10}$$

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. 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 [42]. Standard errors are clustered at the establishment level.

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

[42] IMSS data includes income from extra hours, bonuses and commissions, but not profit sharing income. Thus, an important part of the monthly variation in income comes from these components

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).

8.2.2 Results

Characteristics of treated and control workers. Table 9 shows summary statistics on the workers in our treatment and control group for the period 2017-2020[43]. We also include a column with descriptive statistics on workers who were not outsourced but worked for firms using outsourcing.

Notably, treated workers earned higher salaries pre-reform. 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.

Additionally, Table 9 shows that treated workers exhibited a slightly higher likelihood of both changing employers and participating in block movements before the reform. This implies that they may have been part of outsourcing events prior to the reform. The last two rows show the average size of the firm that the worker was *legally* hired by (current firm) and the average size of the firm that the worker was insourced by post-reform. In line with our establishment data, treated workers were predominantly associated with larger firms.

Effect of the reform on wages. Figure 14 plots θ_k from estimating Equation 10 where the outcome variable is the annual average of employees' daily wages (*not* including profit sharing income) and their 95% confidence intervals. We normalize θ_{2020} to zero. We display coefficients when restricting the sample to workers with a pre-reform tenure at the firm of least 1 year tenure (coefficients in dark red) 3 year tenure (bright red). Reassuringly, both sets of coefficients are very similar. These results are also shown in Columns 1 and 2 of Table 10. 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. In particular, we observe that 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. 2022 witnessed relatively high average nominal wage growth (approximately 13%) driven by elevated inflation rates and substantial increases in the

[43] For this table we do not restrict the sample to workers who remained with the same employer in the 3 years prior to the reform in order to be able to show statistics on worker movements pre reform

minimum wage.

Column 2 of Table 10 shows that we obtain similar results when using utilizing log wages as the outcome in estimating Equation 10.[44] Columns 1 to 4 of Table 11 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-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.[45]

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. Given the results outlined in the previous section, the implications of the reform for total labor compensation, which encompasses both wages and profit-sharing income are a priori ambiguous. In the event that businesses were able to completely offset profit-sharing increases with reduced wage growth, the overall compensation figure should remain unaffected. Total compensation would increase if wage compensation was less than perfect. Consequently, in this section we estimate the effect of the reform on total compensation.

As mentioned above, social security data does not contain information on profit-sharing income for workers. To circumvent this limitation, 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 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

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

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

their utilization of outsourcing (conventional outsourcing, full outsourcing, and control). Thus, 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. Subsequently, using information from the establishment survey, we compute average profit sharing income for workers in each group for each year.[46]

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.

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 10 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 10 where we see that the coefficients are indeed identical (standard errors change due to the higher number of observations and additional within-cell variation in worker level data). However, we lack profit sharing data, and consequently total compensation data at the worker level. Thus, we estimate Equation 10 for total compensation exclusively at the cell level, using our estimate of average total compensation described above.[47]

Figure 15a depicts the estimated effect on total compensation, under the assumption that treated workers were receiving zero profit sharing payments pre-reform. We also plot the effect on wages when controlling for worker fixed effects (in red) and group fixed effects (in black) for comparison.

[46]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

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

The standard errors in the later are larger because we cannot absorb within group variation in worker wages. The results can also be seen in Column (6) of Table 10. 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 previous to reform) and 16.5 pesos in 2023 (2.6% of treated workers' average daily compensation in the year previous to reform) on average. In other words, firms affected by the reform did not fully offset the rise in profit-sharing payments (as depicted in Figure 11) through decreased wage growth. Thus, the reform caused an overall increase in total labor compensation within full outsourcing firms.

As mentioned in Section 5.2.1, 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 mentioned in the previous paragraph. Nonetheless, we show that the results are robust to less stringent assumptions, namely that treated workers received some profit sharing pre reform. Specifically, we estimate the effect on total compensation under the assumption that the contracting firms' profits were a fraction p of the full outsourcing firms' profits, for $p = \{0.2, 0.33, 0.5\}$. By construction, the higher p, the lower is the estimated effect of the reform on total profit sharing income and consequently on total compensation. The results are shown in Figure 15b. We can see that the estimated positive effects on total compensation hold for $p = 0.2$ and 0.33, while for $p = 0.5$ the effect is positive but not statistically significant in 2023. Thus, even if contracting firms' profits were up to 0.5 parent firms' post reform profits, we estimate that the reform caused a positive effect on total labor compensation.

Table 11 shows that the results are robust to alternative ways of measuring profit sharing per worker in each cell c. In Version II, 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.3. In Version III, we use information from EMIM on the average total profit sharing[48] (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.

8.3 Interpretation of the results

In this section, we provide an interpretation of our findings based on the model introduced in Section 6. We find that a considerable number of firms in Mexico were outsourcing all their workers as a means to avoid profit sharing contributions. In Section 5 we show that this phenomenon was predominantly observed among firms characterized by high levels of profitability and productivity. Consistent with Prediction 2, we argue that for these firms incurring the fixed costs associated with outsourcing outweighed the profit sharing expenses. Given that the minimum wage is barely binding for these firms, even post reform, we argue that there must be a motive for firms to incur these costs to reduce profit sharing to decrease total compensation, rather than simply reduce wages. We argue that this

[48] Weighted average, with weights equal to firm size

motive is driven by the fact that wages and profit sharing are not perfectly substitutable for workers. As stated in Prediction 3, the observed patterns are consistent with workers being less responsive to changes in profit sharing compensation than to wages when deciding where to work. This lower elasticity of labor supply with respect to profit sharing (β_{ps}) prompts firms to disproportionately reduce total compensation through the profit-sharing margin (ps_j^*).

The impact of the outsourcing reform helps understand the determinants influencing firms' decisions to outsource most of their workforce. We find that the reform had strong effects on outsourcing use, leading firms to insource their previously outsourced workforce, and incur profit sharing payments, consistent with an increase in k. The lack of significant effects on employment is indicative of a relatively low marginal cost of outsourcing c as seen in Prediction 4b. The reform had positive effect on total compensation, again hinting towards a low β_{ps}, as mentioned in Prediction 4a. We present two mechanisms explaining why workers were possibly less reactive to changes in profit sharing relative to wages.

Risk aversion. The first hypothesis mechanism corresponds to risk aversion. This hypothesis is also discussed in (Nimier-David et al., 2023). Profit sharing tends to be more volatile than wages[49]. Thus, if workers are more risk averse than firms, then they will value each additional peso of uncertain profit sharing less than each additional peso of a stable wage. This will make workers less responsive to profit sharing changes relative to wages. However, we argue that risk aversion alone is unlikely to fully explain our results. If the increase in total compensation shown in Figure 15a was solely to compensate workers for higher risk, the value of total compensation (once accounting for risk) should not increase post-reform on average. In order to estimate the effect on the risk-discounted value of total compensation, we follow the procedure detailed in Nimier-David et al. (2023) to estimate the average certainty equivalent of profit sharing. We then compare the certainty equivalent to the average profit sharing received by workers. Appendix B.2 describes the methodology to estimate the certainty equivalent in detail. Our estimates indicate that for a relative risk aversion of 2, one peso of profit sharing is worth approximately 92 cents to workers. For a very high relative risk aversion of 6, it is worth around 83 cents. We then use these estimated to calculate the effect of the reform on the value of total compensation, taking into account this risk discount. The results, shown in Figure B.3, indicate a positive effect even for high values of risk aversion. This evidence suggests that risk aversion alone cannot fully explain our findings.

Information frictions. As a second mechanism, we argue that information frictions, low salience of profit-sharing, and information processing constraints related to its complexity likely reduce the elasticity of labor supply to this form of compensation. Ouimet and Tate (2023) highlight that wages are often more salient to workers than non-wage job attributes when comparing multiple offers. Consistent with this view, we show below that workers in Mexico have a low level of awareness regarding the details of profit-sharing payments—such as which firms offer them, how they are determined, and their historical values—compared to other benefits. Previous literature has highlighted the role of misinformation and inattention in shaping workers' decisions to switch employers (Robinson, 1933; Jäger et al., 2023; Roussille, 2022), as well as choices related to health insurance (Handel and Kolstad,

[49] The average within-firm, across-time coefficient of variation of profit sharing is approximately 5 times that of wages

2015) and consumption products (Gabaix and laibson, 2006). For instance, Chetty et al. (2014) show that most individuals are completely inelastic to price subsidies for retirement savings when making saving decisions, likely due to lack of attention or awareness on these contributions. Additionally, 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 limited knowledge of profit-sharing schemes and the complexity of their calculation likely causes workers to assign less weight to profit-sharing compensation compared to wages when evaluating job offers.

We present descriptive evidence in line with this hypothesis.[50] Figure 18 shows information from Google trends on searches related to profit sharing and other benefits across time. Two patterns stand out (i) searches for profit sharing are much lower than searches for other benefits, and (ii) after the reform, searches for 'right to profit sharing' and 'I receive profit sharing'[51] significantly increase. Additionally, we carry out a small preliminary survey (N=40) on workers in Mexico[52]to measure workers' knowledge on profit sharing relative to other benefits. Our preliminary results align with the notion that workers are relatively misinformed regarding profit sharing. Figure 19 illustrates the proportion of workers providing correct answers to questions about various benefits. Specifically, workers were asked to state their knowledge regarding: the size of the *aguinaldo* (an extra 15 days salary paid in December), how many days of mandatory vacation workers are entitled to, what the minimum wage in Mexico is, what proportion of firm profits that should be distributed as profit sharing, and which firms are obliged distribute profit sharing. We can see that the proportion of workers correctly answering questions related to profit sharing is significantly lower than those answering correctly for other labor benefits. Table 13 shows the results to these and other additional questions, breaking down results based on workers' salaries.[53] Interestingly, low-wage workers are more likely to have learned about profit sharing only after the outsourcing reform and demonstrate less awareness of its characteristics. Low-wage workers also display greater misinformation on other benefits, excluding the minimum wage, as they are more directly impacted by this factor. Low wage workers are also less likely to state that they pay attention profit sharing benefits when evaluating job offers. While we are cautious not to over-interpret this evidence, these descriptive patterns suggest that i) awareness and knowledge of profit sharing lag behind those of other benefits, and ii) prior to the outsourcing reform, awareness of this benefit was likely even lower than it is today.

8.4 Effects on conventional outsourcing establishments

While the focus of this paper is on full outsourcing, from a policy standpoint it is relevant to understand the effects of the outsourcing reform on conventional outsourcing establishments. Below, we show that the reform negatively affected these establishments by causing them to downsize and

[50]During interviews with stakeholders in Mexico, low worker awareness was frequently mentioned as a possible explanation for the avoidance of profit sharing.

[51]The searches are originaly in Spanish: 'me corresponde utilidades' and 'recibo utilidades'

[52]Conducted via Prolific.com

[53]Total N = 39 in this table because one respondent answered that he would prefer not to state his salary

reducing employment dynamism. Thus, while the aim of the reform was to end practices more in line with full outsourcing, it caused undesired consequences on this other group.

Total employment. The results for total employment among conventional outsourcing establishments are depicted in Figures 16 and 17. We small decline in total employment and total hours worked after the reform. Establishments with positive outsourcing in the pre-reform period reduced total employment by roughly 3% compared to the control group. Table A.1 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:

$$Action^{p}_{jt} = post\_reform_t * FullOuts_j + post\_reform_t * ConvenOuts_j + \lambda_j + \phi_t + u_{it} \tag{11}$$

Where $Action^{p}_{jt}$ 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 12. 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).

9 Conclusion

This paper provides novel evidence on an understudied incentive behind the utilization of outsourcing, namely its use as a means to evade labor regulations. While this practice has been frequently mentioned in policy and media spheres, it is challenging to measure empirically. In this study, we exploit rich establishment survey data, social security data, and the effects of an outsourcing reform that caused the insourcing on thousands of employees to document, characterize, and explain this practice.

We first newly document and characterize a phenomenon where a significant number of firms were outsourcing almost *all* their workers. We find that 2/3 of firms using outsourcing in Mexico were outsourcing almost all of their employees, operating as empty establishments, with no legally hired workers. We provide compelling evidence that firms carried out this extreme use of outsourcing as a means to avoid labor regulations, particularly mandatory profit sharing with employees. We show that this practice was predominant amongst large, productive and profitable firms, who largely benefits from avoiding profit sharing costs.

We then exploit the effects of a reform which imposed strict restrictions on outsourcing to understand how firms react in a labor market without the possibility to outsource. The reform caused most firms to insource their employees in-house. We also find that the reform caused full outsourcing firms to newly incur profit sharing payments. Firms did not downsize as a result of the increased profit sharing costs, but they offset the increase in profit sharing 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 employee increased by around 2% post reform.

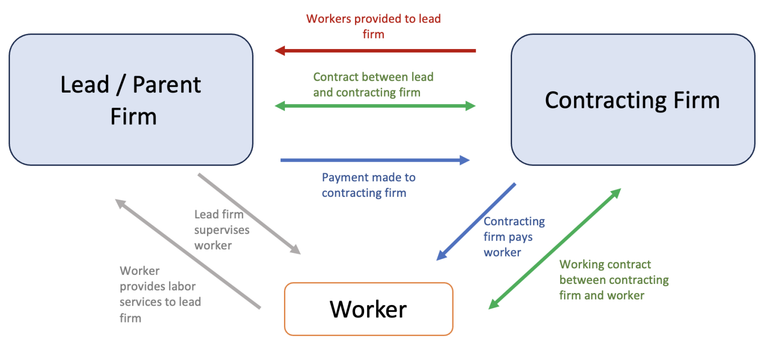
Our results are consistent with a labor market in which profit sharing and wages are not perfectly substitutable for workers, and workers are less responsive to changes in profit sharing compensation than to wages when deciding where to work. This difference in elasticities prompts firms to lower total compensation dis-proportionally via the profit sharing margin. This 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 the lower elasticity of labor supply with respect to profit sharing can be attributed to workers' relatively poorer information about profit-sharing characteristics compared to wages, especially prior to the reform. Conversely, workers may be more risk averse than firms, and value the stable income of wages relatively more.

Our findings underscore the role of avoidance of labor benefits as a key incentive driving firms to outsource employees in this context. We show that under these incentives, restricting outsourcing can increase the labor share without affecting employment levels.

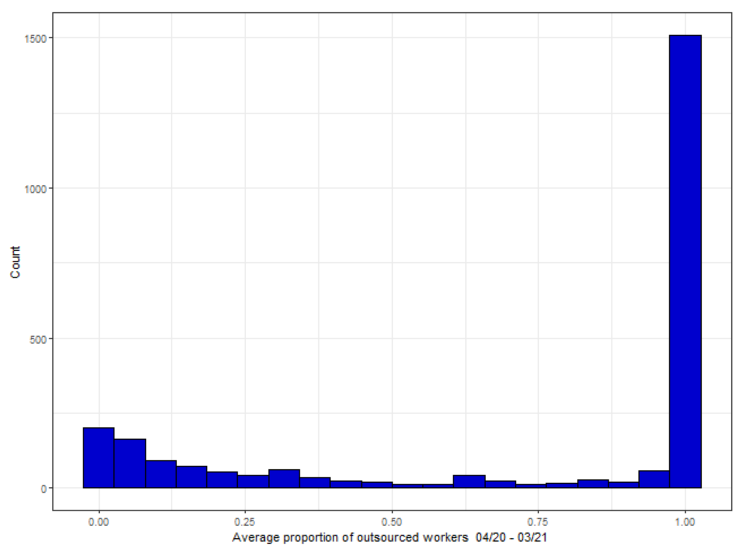
Figures

Figure 1: Schematic graph illustrating outsourcing relationship



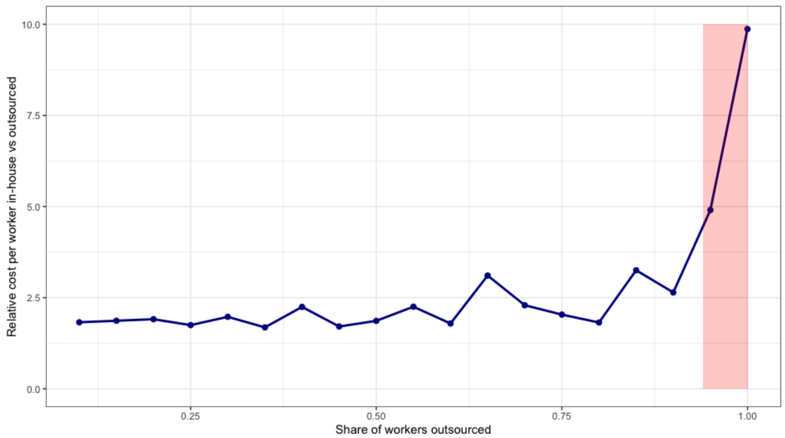
Notes: This figure shows a schematic graph on the actors in an outsourcing relationship. Blue lines indicate a payment from one actor to the other. Green lines indicate the existence of a contract between the two actors.

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



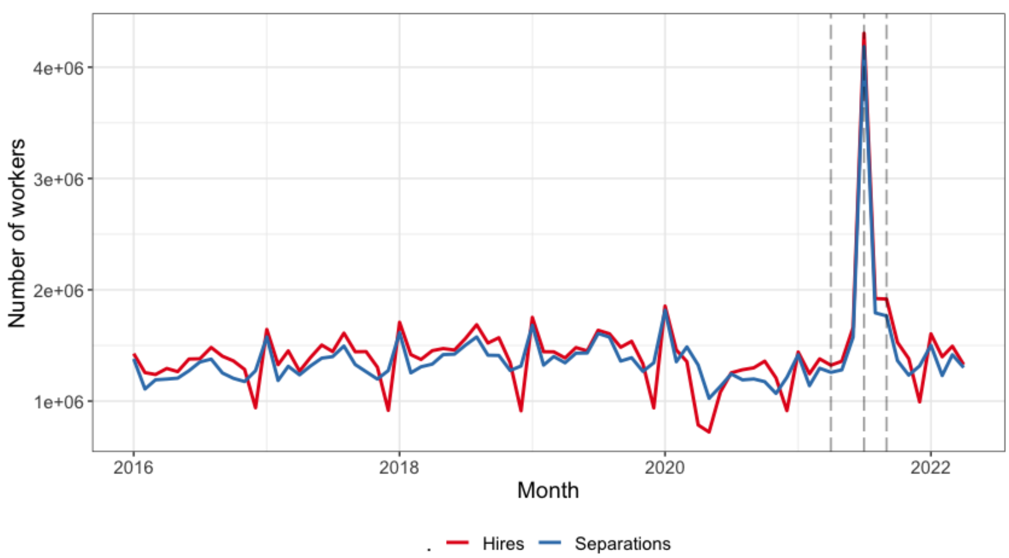
Notes: This figure plots a histogram with the average share of workers outsourced between April 2020 and March 2021 (the year before the outsourcing reform was approved) by each establishment in our EMIM dataset which has positive outsourcing in at least one month on the year prior to the reform

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



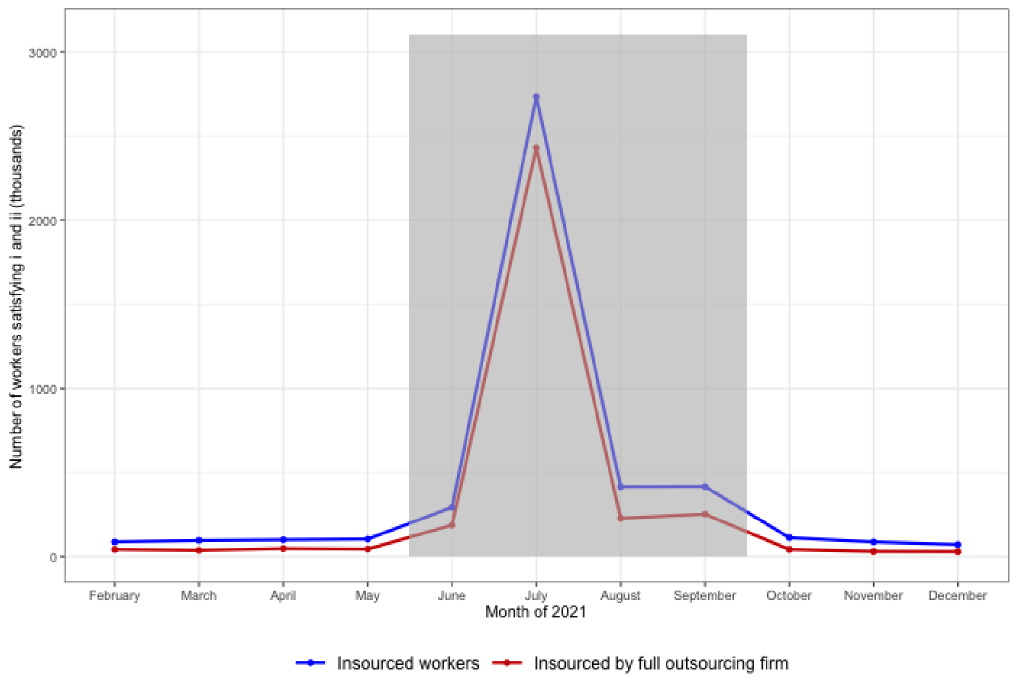
Notes: This figure plots the relationships between the relative costs of in-house workers and outsourcing share. For each observation before 2020, we compute the ratio of the average cost per in-house worker over the average cost per outsourced worker we plot the average of this ratio against the proportion 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: Monthly hires and separations



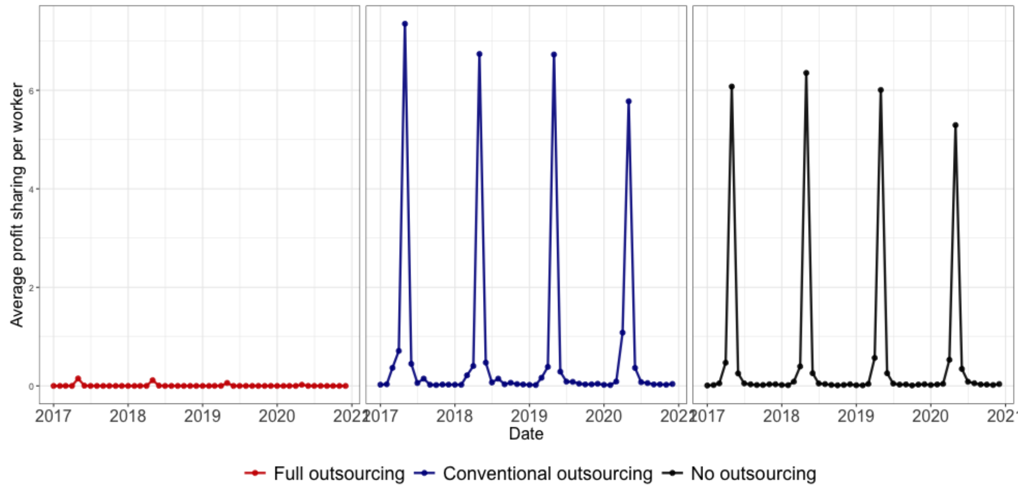
Notes: This figure shows monthly hires and separations using the universe of workers in IMSS data. The dashed lines represent April 2021, when the outsourcing reform was approved; July 2021, the deadline for firms to adapt to the reform; and September 2021, an extended deadline for some firms.

Figure 5: Number of workers satisfying conditions i and ii (thousands)



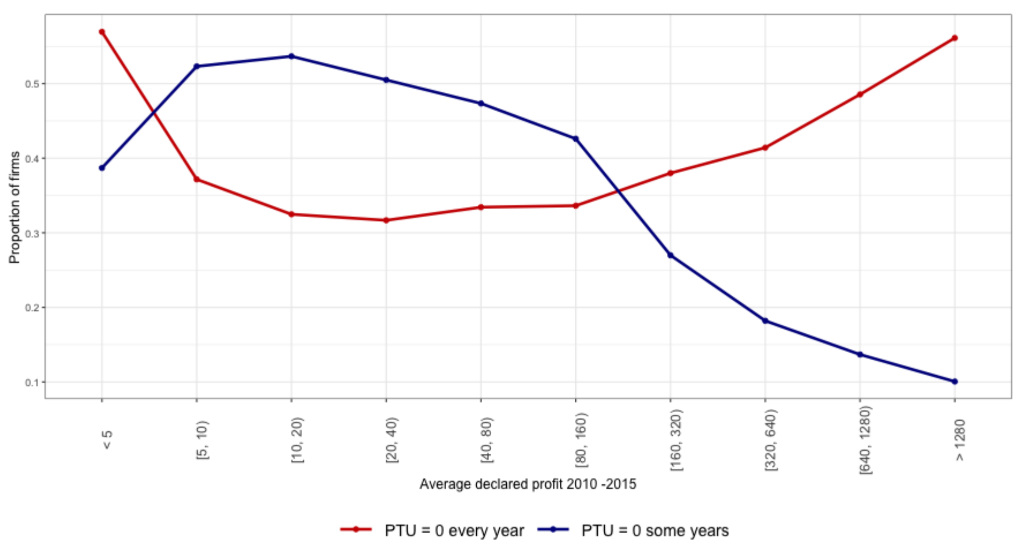
Notes: This figure shows the number of workers amongst all workers in IMSS involved in a movement between establishments where the flow satisfied condition ii) in Section 4.2 on each month between February and December 2021. The shaded area are the worker movements classified as insourcing events with the additional condition i), i.e. that the flow occured between June and September

Figure 6: Monthly profit sharing per worker, pre reform



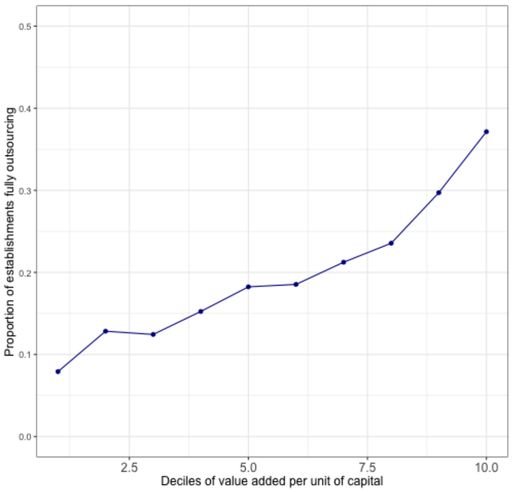
Notes: This figure plots the average monthly profit sharing per worker in thousands of Mexican Pesos for each group of establishments. The peaks in each year correspond to May, which is when profit sharing is disbursed in Mexico. The series is built with balanced establishment-level panel dataset from 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 7: Share of firms with no declared profit sharing by profit size groups

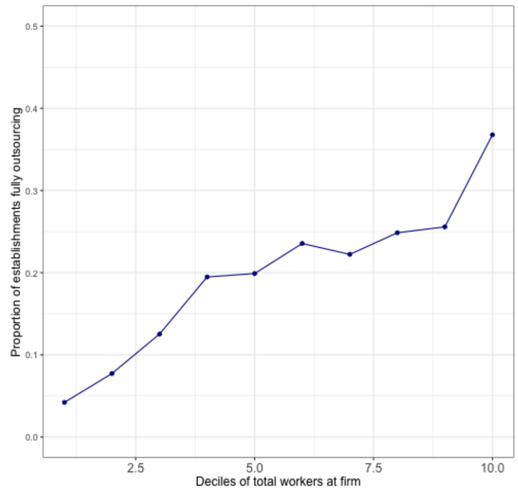


Notes: This figure plots the proportion of firms that declared zero profit sharing on *every* year from 2010 to 2015 (red line), and the proportion of firms that declared zero profit sharing on *some* year, but not every year (blue line), against average declared profit between 2010 and 2015. The series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

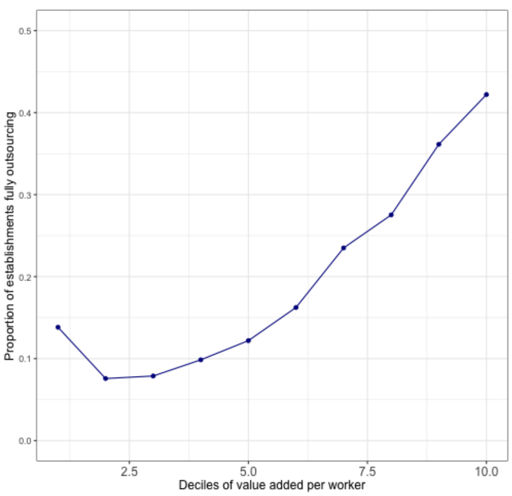
Figure 8: Full outsourcing and productivity measures



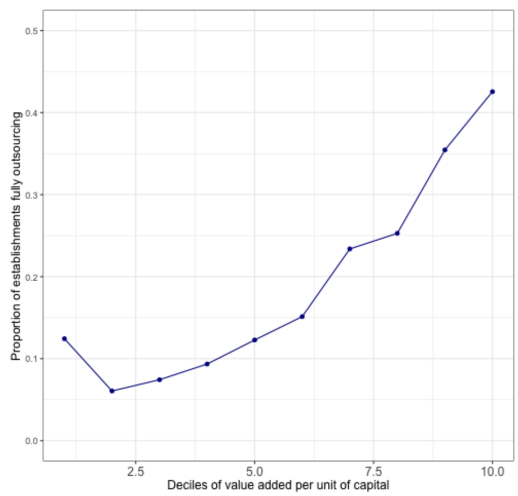
(a) Value added



(b) Firm size



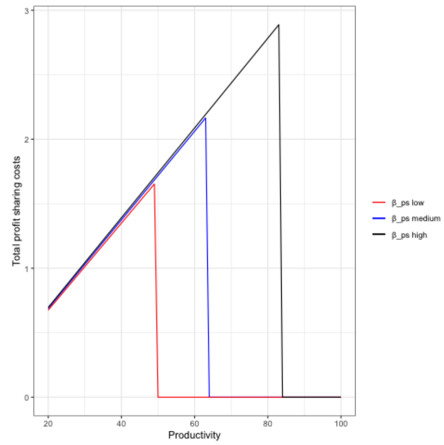
(c) VA per worker



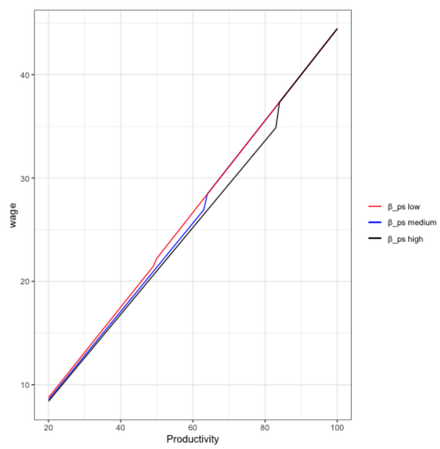
(d) VA per capital

Notes: These figures are built using establishment level data from EMIM and the 2018 Economic Census. They plot the proportion of full outsourcing firms 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.

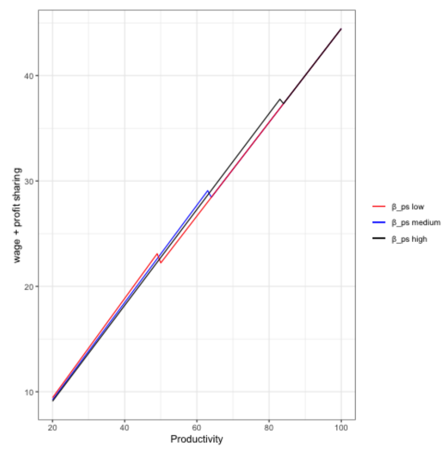
Figure 9: Model simulations - Different values of z, η_a, and k



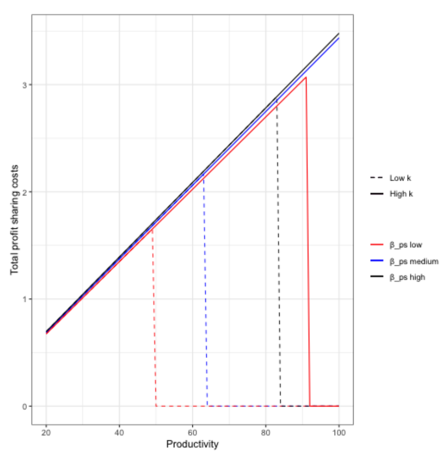
(a) Profit sharing per worker



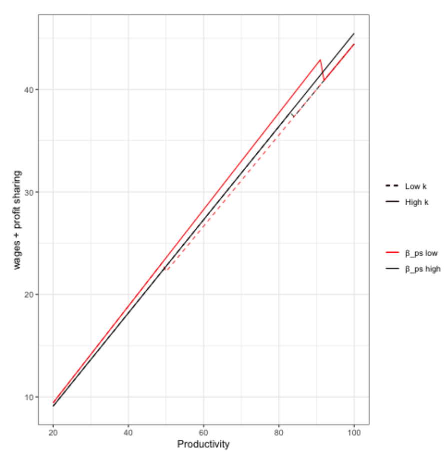
(b) Average wage



(c) Total compensation per worker



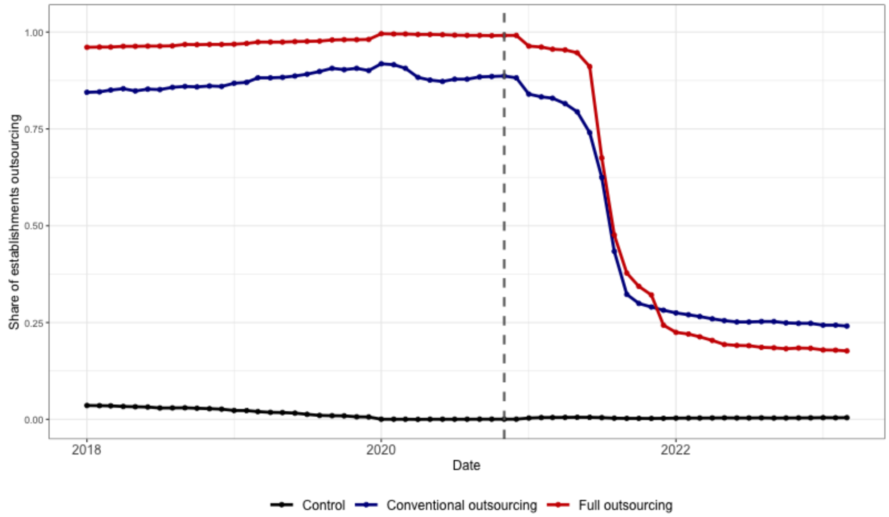
(d) Profit sharing costs, increase in k



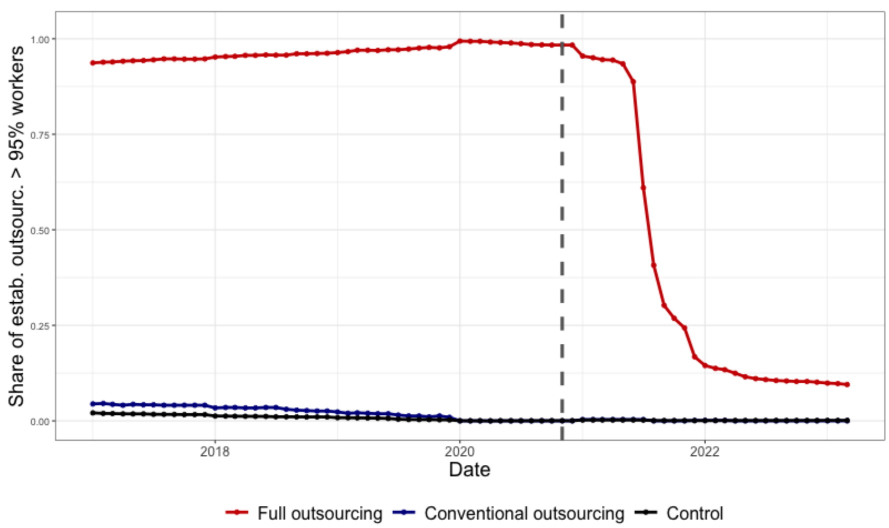
(e) Total compensation per worker, increase in k

Notes: These figures show the results of simulations from the model presented in Section 6. The horizontal axis represents different values of productivity z_j. (a) plots total profit sharing per worker for different values of the elasticity of labor supply wrt profit sharing, β_{ps}. (b) plots the average wage (c) plots total compensation, which is average wage + profit sharing per worker (d) Plots the effect on profit sharing when k increases for different values of z_j and β_{ps}. The dashed lines are identical to panel (a). Solid lines correspond to the profit sharing costs after the increase in k Panel (e) plots the effect on total compensation when k increases for different values of z_j. We only plot the variable β_{ps} low and high in this last panel low for visual purposes.

Figure 10: Effect of the reform on outsourcing



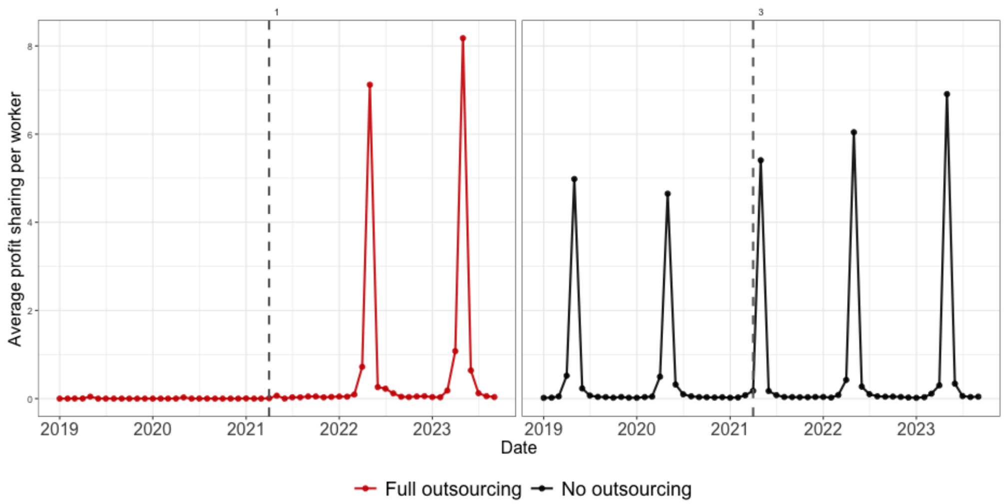
(a) Share of establishments with positive outsourcing



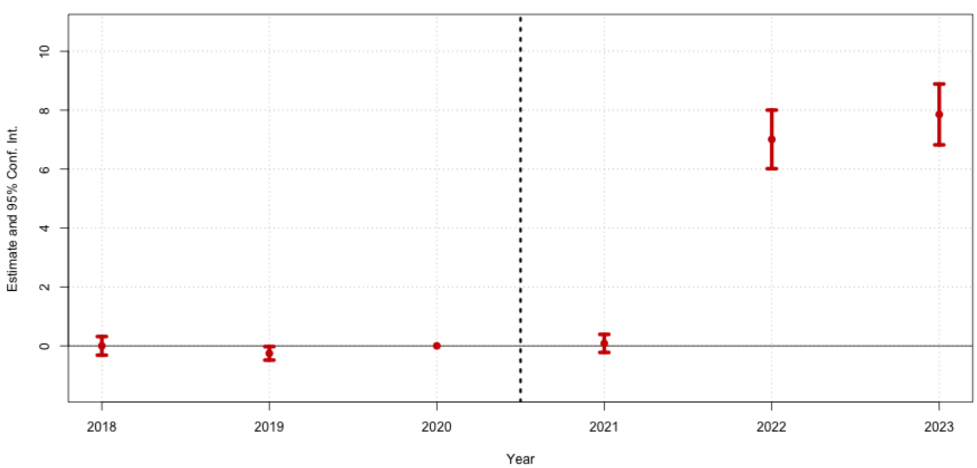
(b) Share of establishments outsourcing more than 95% of workers

Notes: This Figure shows the share of establishments from EMIM with positive outsourcing on each month from January 2017 to November 2022 in each group. 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. Group 3 are the remaining establishments. The dashed line corresponds to November 2020, when the reform was first suggested.

Figure 11: Effect of the reform on profit sharing



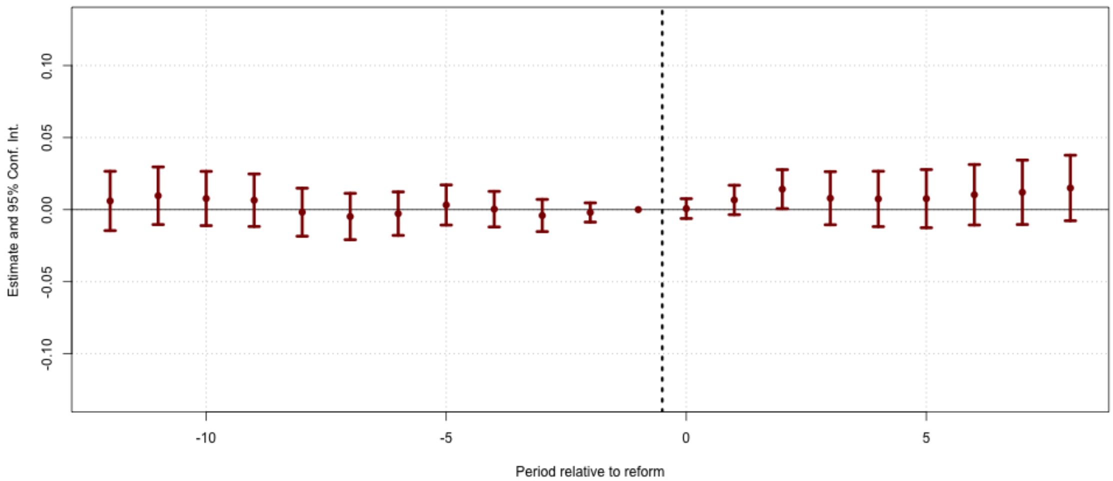
(a) Monthly profit sharing per worker



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

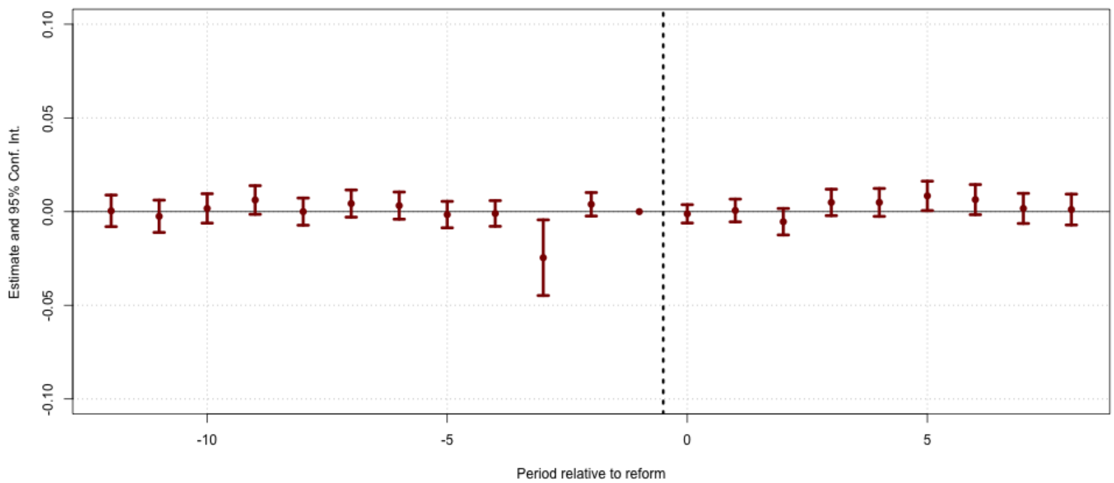
Notes: Panel (a) shows average monthly profit sharing per worker in thousands of Mexican pesos for control establishments and full outsourcing establishments. The series is constructed using a balanced sample of establishments from EMIM. The peaks in each year correspond to may, when profit sharing is typically disbursed. Panel (b) shows the difference in differences coefficients from estimating Equation 9 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. 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 12: Effect on total number of workers

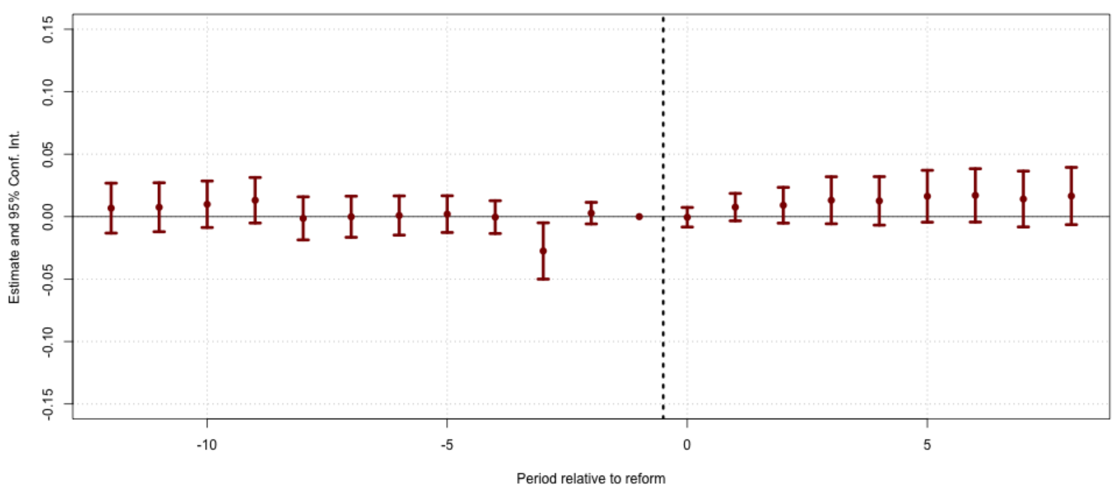


Notes: This figure plots the β_k from Equation 9 and 95% confidence intervals. The estimation is carried out on a balanced panel of establishments from EMIM between 2018 and 2022. Treatment group includes establishments outsourcing over 95% of workers before the reform (full outsourcing). Control group 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). β_{Q42020} is normalized to 0. Standard errors are clustered at the establishment level.

Figure 13: Effect on hours worked



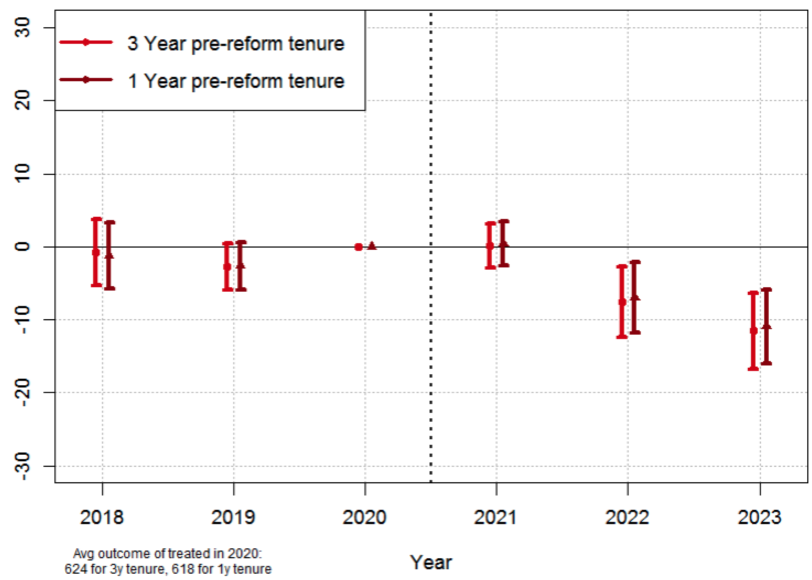
(a) Effect on average hours worked



(b) Effect on total hours worked

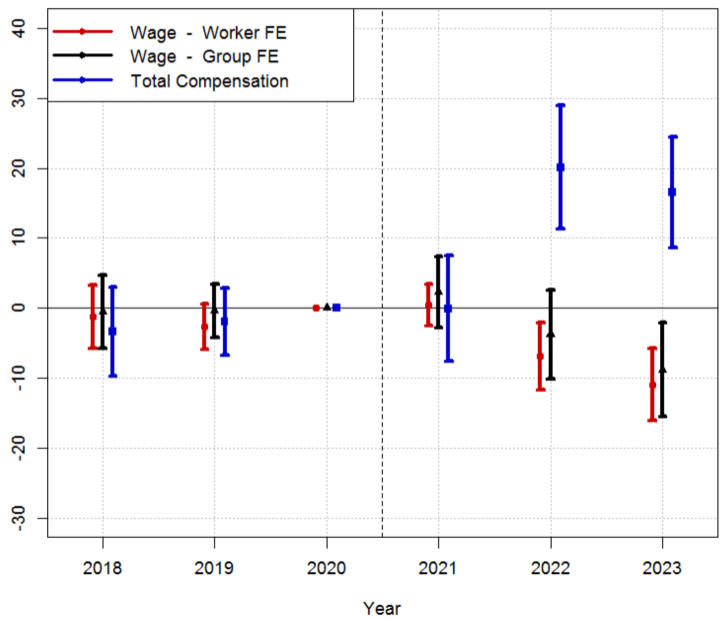
Notes: This figure plots the β_k from equation 9 and 95% confidence intervals. The estimation is carried out on a balanced panel of establishments from EMIM between 2017 and 2022. Treatment group includes establishments outsourcing over 95% of workers before the reform (full outsourcing). Control group 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 (a) is the log of the average number of hours worked(by outsourced + in-house workers). The outcome variable in panel (b) is the log of the total number of hours worked. β_{Q42020} is normalized to 0. Standard errors are clustered at the establishment level.

Figure 14: Effect of the reform on yearly wages of insourced workers

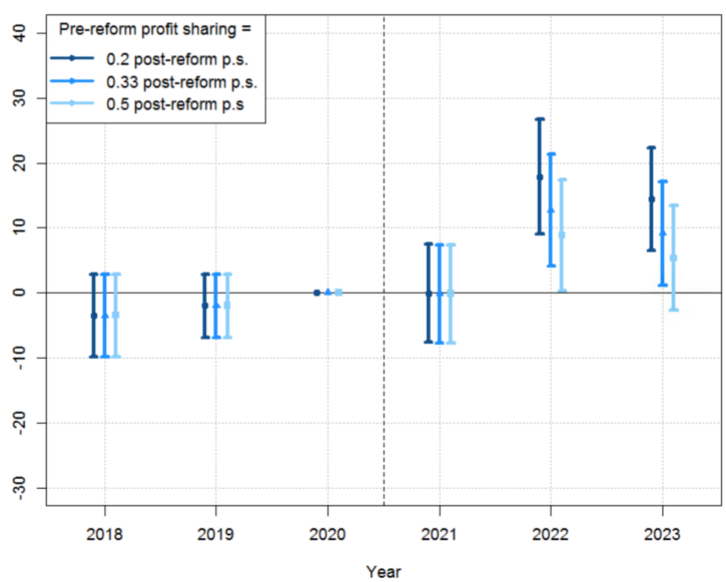


Notes: This figure shows the estimates θ_k and their 95% confidence intervals from estimating Equation 10 on on the yearly average of worker daily wages. The estimation is carried out on a balanced 10% random sample of workers from IMSS. Coefficients in bright red are obtained when limiting the sample to workers with at least three years of tenure at the firm before the reform. Coefficients in dark red are obtained when limiting the sample to workers with at least three years of tenure at the firm before the reform. Standard errors are clustered at the establishment level.

Figure 15: Effect of the reform on yearly compensation



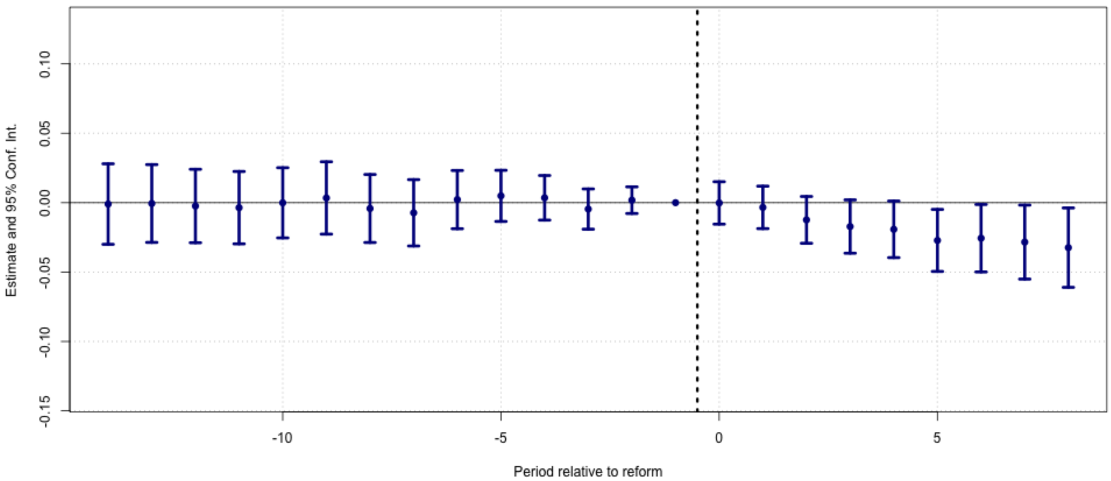
(a) Wage and Total compensation



(b) Total compensation - Different assumptions on p.s. pre-reform

Notes: This figure shows the estimates θ_k and their 95% confidence intervals from estimating Equation 10 on the yearly average of worker daily wages or daily total compensation (wage + profit sharing income). Panel (a) shows the estimates for wages when controlling for worker fixed effects, for wages when controlling for (sector x state x size-group x outsourcing status) group fixed effects, and for total compensation. In this estimation we assume that profit sharing for treated workers pre-reform was zero. Panel (b) shows 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 $p \in \{0.1, 0.33, 0.5\}$. 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.

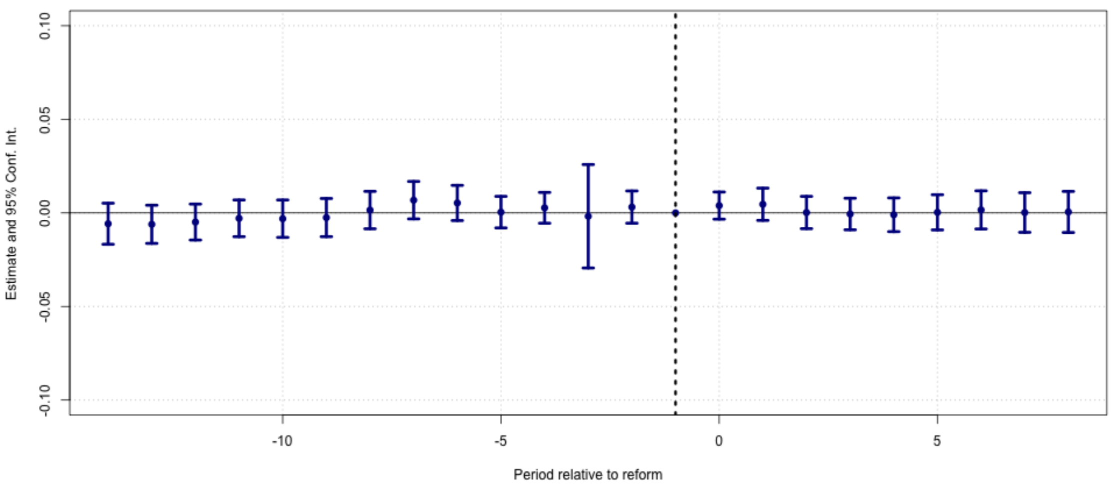
Figure 16: Effect on total employment - Conventional outsourcing



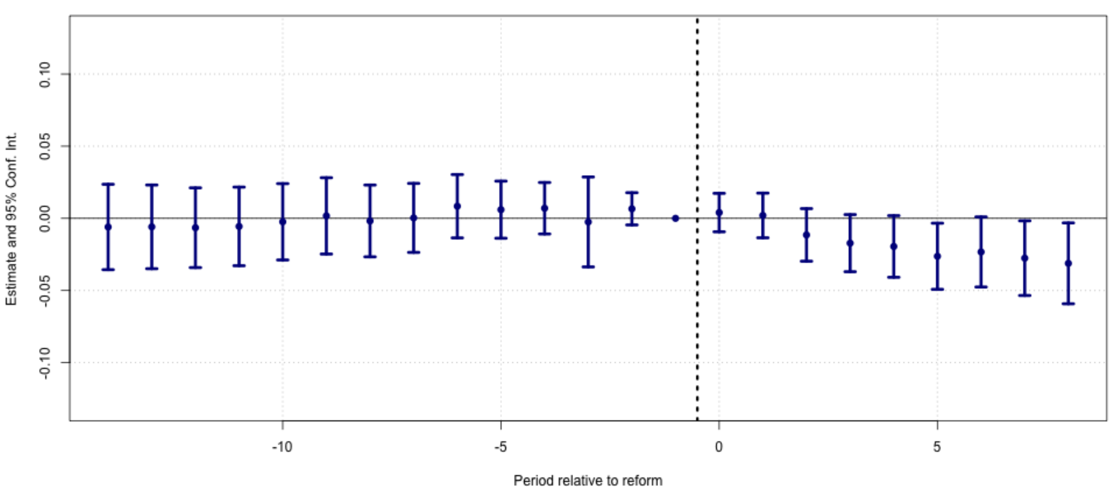
Notes: This figure plots the θ_k from equation 9 and 95% confidence intervals. The estimation is carried out on a balanced panel of establishments from EMIM between 2017 and 2022. Treatment group includes establishments with positive outsourcing before the reform, but lower than 95% (conventional outsourcing). Control group includes establishments with no outsourcing before the reform. Establishments outsourcing over 95% of workers before the reform (full outsourcing) are excluded from the estimation. The outcome variable is the log of the total number of workers (outsourced + in-house). θ_{Q42020} is normalized to 0. Standard errors are clustered at the establishment level.

Figure 17: Effect on hours worked - Conventional outsourcing

(a) Effect on average hours worked

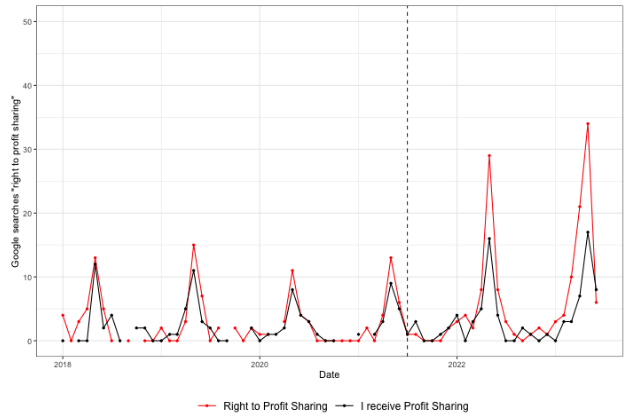


(b) Effect on total hours worked

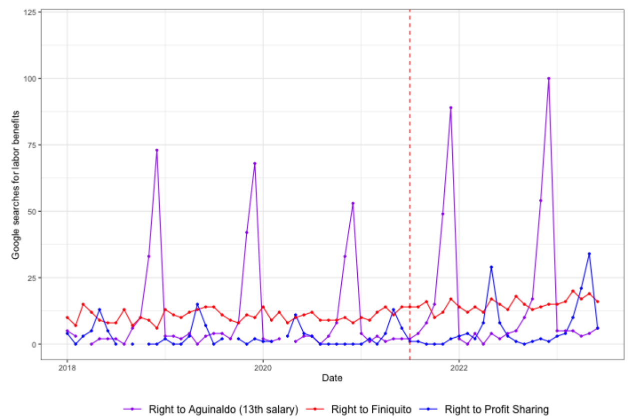


Notes: This figure plots the θ_k from equation 9 and 95% confidence intervals. The estimation is carried out on a balanced panel of establishments from EMIM between 2017 and 2022. Treatment group includes establishments outsourcing over 95% of workers before the reform (full outsourcing). Control group 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 is the log of the total number of hours worked(by outsourced + in-house workers). θ_{Q42020} is normalized to 0. Standard errors are clustered at the establishment level.

Figure 18: Google searches for ‘profit sharing‘ and other labor benefits - Google trends

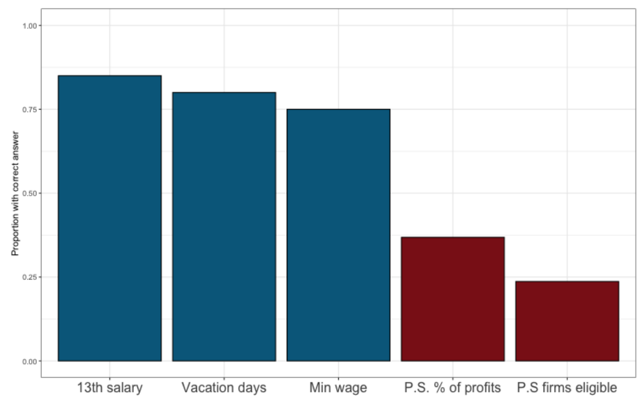


(a) Searches for ‘right to profit sharing‘ and ‘i receive profit sharing‘



(b) Searches for ‘right to profit sharing‘ compared to other benefits

Figure 19: Survey results: Share of respondents with correct response by benefit



Notes: This figure shows the share of respondents from out survey (N=40) that responded correctly to questions concerning different benefits. The questions (in order of the different bars) referred to: the amount of yearly aguinaldo (extra payment equivalent to 15 days of salary) workers are entitled to, number of mandatory vacation days per year, value of the minimum wage, share of firm profits that have to be distributed as profit sharing (10%), and definition of firms obliged to pay profit sharing (firms with profits above 300k pesos).

Tables

Table 1: Transition Matrix by establishment type

	Full outsourcing	Conventional Outsourcing	Control
Full outsourcing	0.969	0.022	0.009
Conventional Outsourcing	0.025	0.853	0.122
Control	0.002	0.014	0.984

Notes: This table displays the yearly transition matrix across establishment types. 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 proportions are calculated across a balanced sample of establishments in EMIM from 2017 to 2020.

Table 2: 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
Revenue per worker	4443	1877	1744	2303
VA 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 EMIM data from 2018 and the INEGI 2019 Economic Census. Nominal variables are in thousands of Mexican Pesos (2018 value).

Table 3: Sector - level regressions on seasonality and outsourcing use

Dep Vbles:	tot workers seasonality	revenue seasonality	blue collar seasonality	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 Coefficients of interest in rows 2 and 3 are the proportion of establishments in each sector belonging to each outsourcing group. Seasonality is measured as the the average sectoral seasonal component of employment. Both variables are divided by average sectoral employment. We control for average establishment size in every column. Robust standard errors are in parentheses. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Table 4: Outsourcing and employment volatility

	Volat Total Workers	Volat Blue Collar
Full Outsourcing	-0.003	-0.003
	(0.0017)	(0.002)
Convent. Outsourcing	0.007**	0.009***
	(0.003)	(0.003)
Observations	290,340	288,408

Notes: This table shows the results of a regression of establishment-level 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. Volatility is measured as the within-establishment yearly standard deviation of the de-trended employment. All specifications control for establishment size and include 4 digit sector fixed effects

Table 5: Elasticity of total workers with respect to revenue

	(1) log(workers)	(2) log(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	Group 2	Group 2	Group 2
Measure	de-trended	de-trended	de-trended	de-trended

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. 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.

Table 6: Summary Statistics on profit sharing

	Full Outsourcing	Control
Yearly profit sharing	3205	2666
	(7212)	(6665)
Yearly profit sharing / L	7.95	7.04
	(14.26)	(23.43)
Profit sharing over monthly wage costs 2022	0.51	0.49
	(1.16)	(1.25)
Profit sharing over monthly wage costs 2021	-	0.5
	-	(1.53)
Profit sharing over monthly wage costs 2019	-	0.55
	-	(1.33)

Notes: This table shows summary statistics on profit sharing for full outsourcing establishments and control establishments, using data from EMIM in 2023. Nominal variables are in thousands of Mexican Pesos.

Table 7: Difference in Differences estimates for post-reform period

2*Model	First stage			Employment effects		
	Share outsourced	Any outsource	Outsource > 95%	log(total workers)	log(tot hw)	log(avg hw)
	(1)	(2)	(3)	(4)	(5)	(6)
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)
Observations	540,633	540,633	540,633	540,633	537,387	537,387

Note: This table shows the estimated β_k from Equation 9 for the post-reform period. 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 8: Difference in Differences estimates for profit sharing

	Profit sharing / L	Profit sharing total
	(1)	(2)
2017	-0.2649	142.1
	(0.5882)	(260.9)
2018	-0.6761	-596.5
	(0.5062)	(387.6)
2019	-0.3303	-297.1**
	(0.2093)	(144.9)
2021	0.3612	-37.62
	(0.2595)	(144.0)
2022	6.530***	3,321.9***
	(0.4346)	(605.0)
Observations	43,260	43,260

Table 9: 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 computes 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 10: Difference in Differences results: wage and total compensation

	(1)	(2)	(3)	(4)	(5)	(6)
	Worker - level regressions				Cell - level regressions	
	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)
θ_{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 10 using data on wages from Mexican Social Security and data on profit sharing from the monthly manufacturing survey. Treated workers are those insourced after the insourcing 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 10 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 11: Difference in Differences results for wage and total compensation - Robustness

	(1)	(2)	(3)	(4)	(5)	(6)
	Worker - level regressions				Cell - level regressions	
Outcome variable:	*Wage*				*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)
θ_{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 10 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 12: Effect of the reform on employment dynamism

	p = 2%	p = 5%	p = 10%	p = 20%
Post x FullOuts	-0.015	-0.0095	0.0008	-0.0030
	(0.0103)	(0.0097)	(0.0060)	(0.0034)
Post 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 11 for different values of p. 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 January 2017- December 2018. Post-reform period is restricted to December 2021-November 2022. Clustered standard errors at the 4d sector level are in parenthesis. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Table 13: Survey results: Knowledge about profit sharing and other benefits

	Monthly salary $<$ 1k USD	Monthly salary $\geq$ 1k USD
Knows about profit sharing today	0.91	1
Became aware of existence of profit-sharing after the outsourcing reform	0.43	0.06
Correct response: Total profit sharing as % of profits	0.33	0.38
Correct response: Minimum wage	0.87	0.56
Correct response: Mandatory vacation days	0.74	0.88
Correct response: Aguinaldo	0.78	0.94
Considers profit sharing when choosing where to work	0.24	0.56
Considers extra performance bonus when choosing where to work	0.38	0.81
N	23	16

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A Appendix A: Additional Tables and Figures

Figure A.1: Effect of the reform on the proportion of outsourced employees

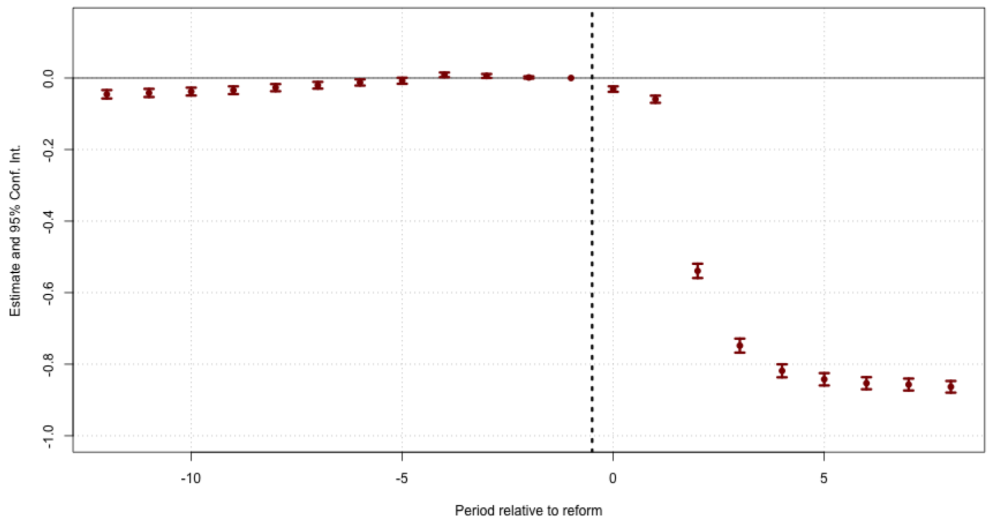


Figure A.2: Effect of the reform on the number of in-house employees

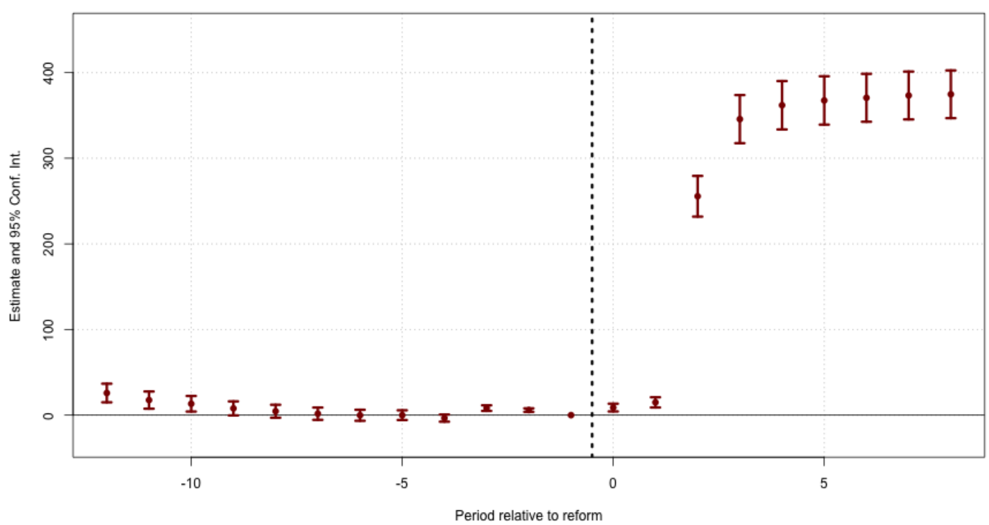
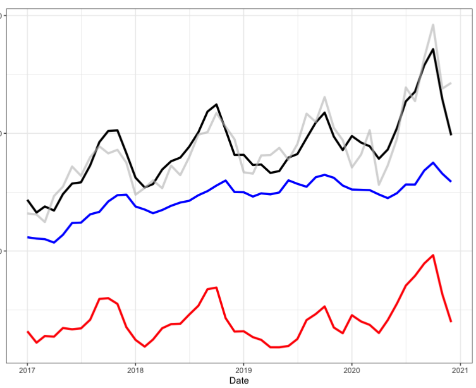
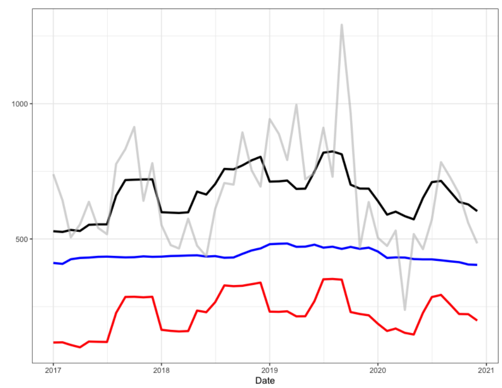


Figure A.3: Total, in-house and outsourced workers in conventional outsourcing establishments - Selected sectors

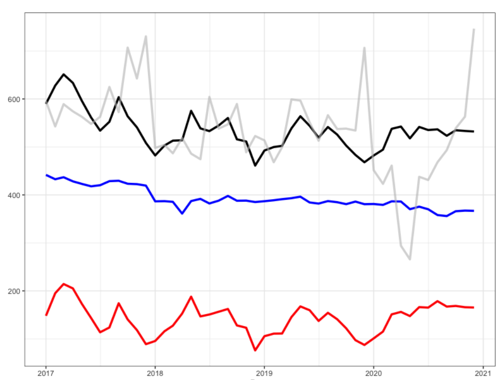
(a) Sector 3343



(b) Sector 3346



(c) Sector 3399



(d) Sector 3312

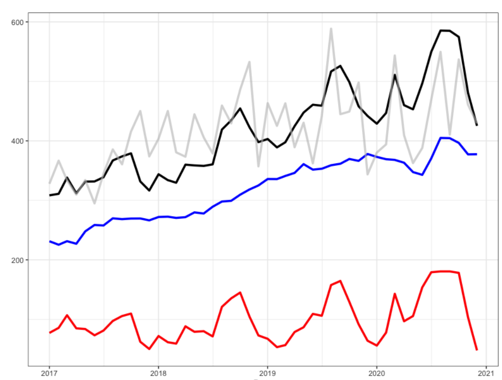


Figure A.4: Evolution of firm size of surviving contracting firms post-reform

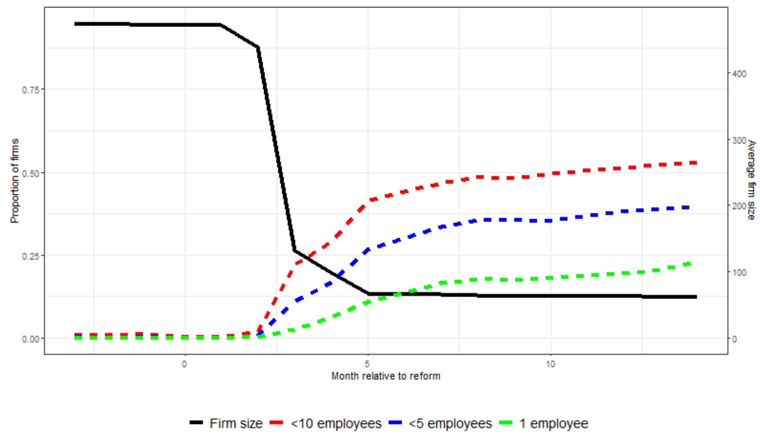
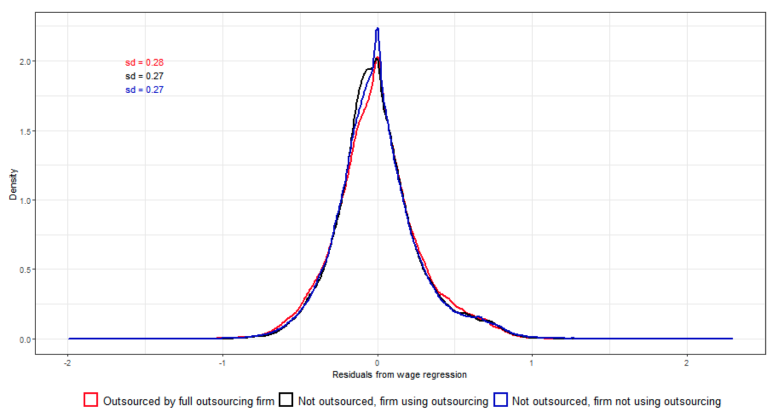


Figure A.5: Density function of residuals of wage regression



Notes. Figures built using worker level for 2019-2020 from IMSS. This figure shows the distribution of the residuals of a regression of log wages on age, age squared, years registered in IMSS, years registered in IMSS squared, firm size, quantile of average wage in 2017, and time x sector x municipality x outsourcing status x gender FE ($R^2 = 0.82$). We plot the residuals separately for workers who in 2019 and 2020 were outsourced by a full outsourcing firm, for workers not outsourced whose firm was outsourcing, and for workers not outsourced whose firm was not outsourced. The numbers in the upper left indicated the standard deviation of the residuals for each group. Back to Section 6

Table A.1: Employment declines

	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 group	Full Outs.	Conv. Outs.	Full Outs.	Conv Outs.	Full Outs.	Conv Outs.

Note 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 very similar if we consider 12 months post-reform.

Table A.2: Outsourcing and labor market concentration

	Outcome: Indicator = 1 if full outsourcing		
	(1)	(2)	(3)
HHI	0.118***	0.1136**	-
	(0.044)	(0.0460)	-
Labor market share	-	-	0.076**
	-	-	(0.0370)
Observations	6,783	6,783	6,783
Local labor market def	2d sector x munic	3d sector x munic	2d sector x munic

Notes: This table shows the results from an establishment level regression of a binary variable equal to 1 is the establishment is classified as full outsourcing on the Herfindahl-Hirschman index of the local labor market of the establishment in 2018 (columns 1 and 2) and the establishments labor market share (col 3). Local labor market is defined at municipality x 2-digit sector in the first column and municipality x 3-digit sector in the second column. The control group in all columns are establishments with no outsourcing pre-reform. All specifications control of number of workers at the establishment

Table A.3: Difference in Differences estimates for total workers- Robustness

	log(total workers)	log(total workers)
	(1)	(2)
2021-Q1	0.0005	-0.0026
	(0.0035)	(0.0055)
2021-Q2	0.0049	0.0066
	(0.0051)	(0.0066)
2021-Q3	0.0119*	0.0142*
	(0.0068)	(0.0078)
2021-Q4	0.0057	0.0057
	(0.0093)	(0.0105)
2022-Q1	0.0054	0.0081
	(0.0097)	(0.0106)
2022-Q2	0.0060	0.0035
	(0.0102)	(0.0112)
2022-Q3	0.0093	0.0061
	(0.0106)	(0.0115)
2022-Q4	0.0107	0.0038
	(0.0113)	(0.0121)
2023-Q1	0.0132	0.0064
	(0.0115)	(0.0123)
Observations	535,458	577,874
Specification	Treatment defined 2 years pre-reform	Unbalanced panel

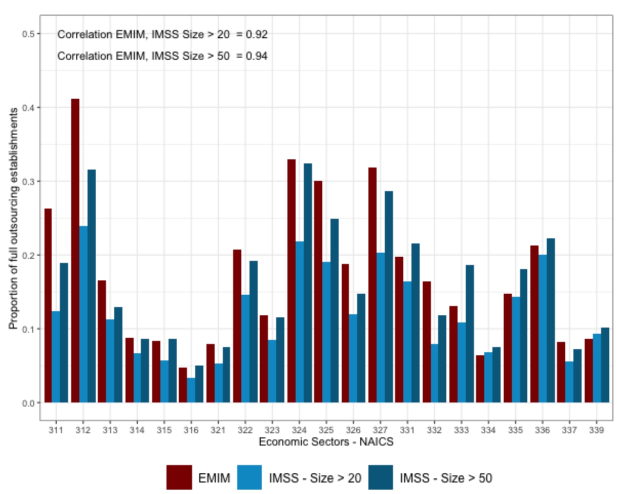
B Appendix B: Additional empirical results

B.1 Comparing sample in IMSS data and EMIM data

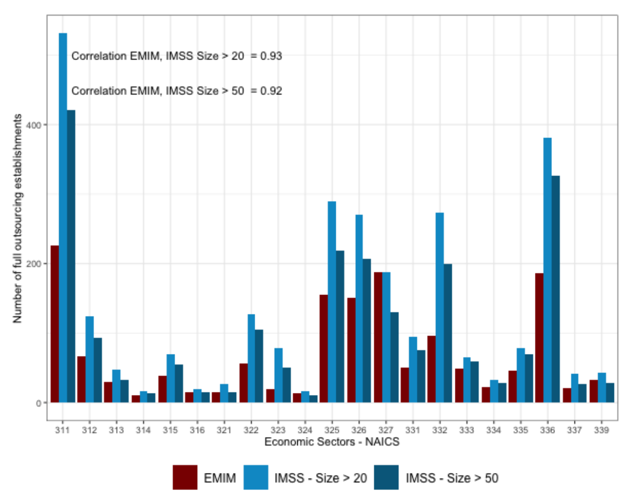
For our results to be valid, it is crucial that the composition of our sample from establishment-level data closely aligns with that of the social security data sample. In other words, it is important that we are observing the same firms and workers in each sample. In this section, we provide evidence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



(a) Proportion of full outsourcing estab. per sector



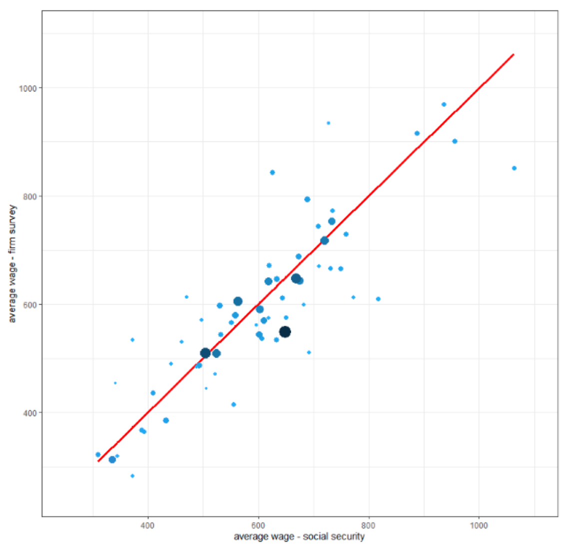
(b) Number of full outsourcing estab. per sector

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

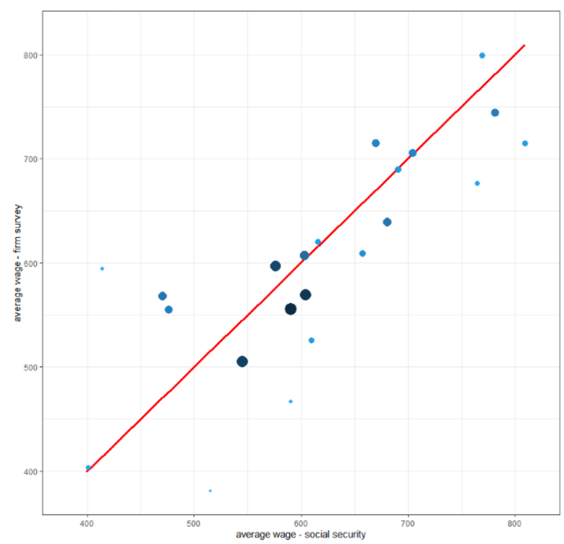
Second, we compare measurements on average wage paid by establishments in each dataset. We divide each dataset into groups and we calculate the average wage paid by establishments using both

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.

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

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 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 8.2.2 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:

$$\mathbb{E}[u(w_i + CE_i)] = \mathbb{E}[u(w_i + ps_i)] \tag{12}$$

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.

If we assume CRRA utility:

$$\mathbb{E}\left(\frac{(w_i + CE_i)^{1-\gamma}}{1-\gamma}\right) = \mathbb{E}\left(\frac{(w_i + ps_i)^{1-\gamma}}{1-\gamma}\right) \tag{13}$$

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.[54] 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 13. Subsequently, using this estimated expected utility and information on worker wages from 2018 to 2023, we numerically solve for CE_i in Equation 13 for each worker.[55] This process is repeated for different values of the relative risk aversion coefficient $\gamma \in \{1, 2, 3, 4, 5, 6\}$[56]

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

$$CE_i = \mathbb{E}(ps_i) - \pi_i^A \tag{14}$$

Where π_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

[54] As mentioned in Section 8.2.2, 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

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

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

between the average estimated certainty equivalent and the average value of profit-sharing received by workers. We also report the average of π_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. $\frac{CE_i}{PS_i}$. The third row reports the value at the 25th percentile of the distribution of $\frac{CE_i}{PS_i}$.

We then compute the impact of the reform on the *value* of total compensation, taking into account how much workers discount profit sharing income due to risk, on average. We perform this for different values of relative risk aversion, γ. We estimate Equation 10 on the following outcome variable, defined as the risk-discounted value of total compensation:

$$value\ total\ compensation = wage + p * profit\ sharing$$

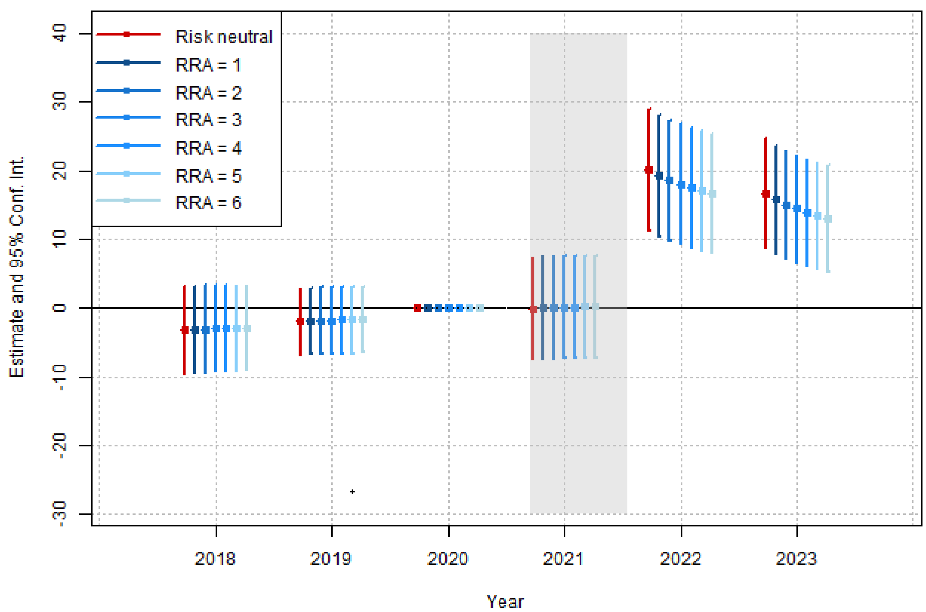
Where p are the values from the first row of Table B.1. The results are presented in Figure B.3. We can see that even for a very high relative risk aversion of 6, the value of total compensation increases for workers after the reform, although the increase is approximately 20% lower than the rise in total compensation when risk discounting is not considered. In a non-reported regression, we replace p with the value $\frac{CE_i}{PS_i}$ at the 25th percentile of the distribution (3rd row of Table B.1) and also find positive effects of the reform on the value of total compensation.

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 13, along with a second-order Taylor approximation to the right-hand side around $\mathbb{E}(ps_i)$, we derive the following expression:

$$\pi_i^R = 1 - \frac{CE_i}{\mathbb{E}(ps_i)} \approx \frac{1}{2} \cdot \gamma \cdot \sigma^2 \cdot \frac{\mathbb{E}(ps_i)}{w_i + \mathbb{E}(ps_i)} \tag{15}$$

Where σ^2 is the variance of $\frac{ps_i}{\mathbb{E}(ps_i)}$ and γ 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.

Figure B.3: Changes in the *value* of total compensation under risk aversion



Notes: This figure shows the estimates θ_k and their 95% confidence intervals from estimating Equation 10 on the yearly average of the risk-discounted value of worker daily total compensation, which is defined as $wage + p * profit\ sharing\ income$. The red coefficients correspond to no risk discounting, $p = 1$. The coefficients in different shades of blue correspond to different values of p 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.

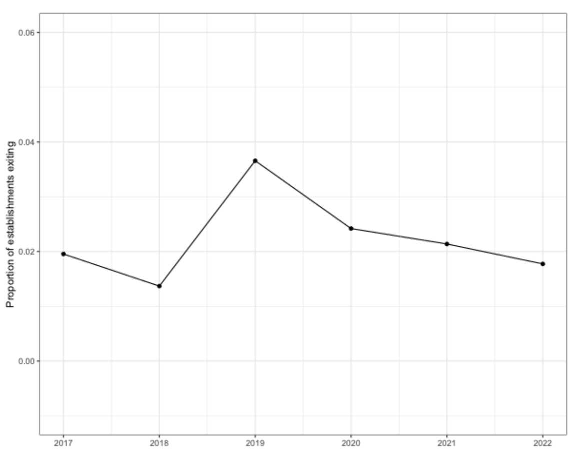
B.3 Establishment Exit from EMIM

As is mentioned in Section 4.1, 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 of the reform (i.e. not exiting).

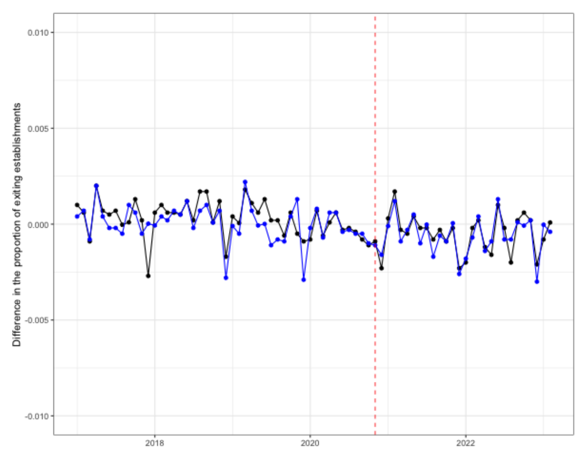
Panel (a) of Figure B.4 shows the proportion of establishments exiting the EMIM sample in each year from 2017 to 2022. We do not find evidence of particularly high or low exit in the post-reform years 2021 and 2022. In Panel (b) we compare exit rates across time between outsourcing and non outsourcing 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.4: Establishment exit from EMIM

(a) Yearly exit from EMIM



(b) Differential exit in outsourcing establishments



B.4 Evidence on profits of contracting firms

We argue in Section 5.2.1 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:

$$payments\ to\ contracting\ firm = wages + other\ costs + profit$$ [57]

We can also write this expression as:

$$payments\ to\ contracting\ firm = wages + social\ benefits + other\ costs + \underbrace{0.1 * profit}_{\text{profit sharing}} + 0.9 * profit$$ [58]

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

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

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

This last expression allows us to estimate total outsourcing costs under different assumption of profit sharing benefits distributed by the contracting firms pre-reform. 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:

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

This expression shows that higher the pre-reform profit sharing benefits assumed, the lower are the

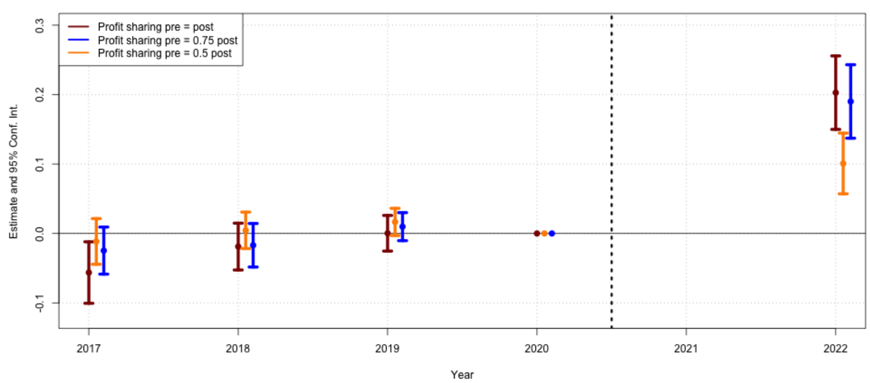
[57] In this expression, wages includes social benefits such as social security contributions

[58] 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 8

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 post reform.[59]

The figure below 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.5: Hypothetical increase in employment costs under different assumptions of contracting firm profits



Notes:

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

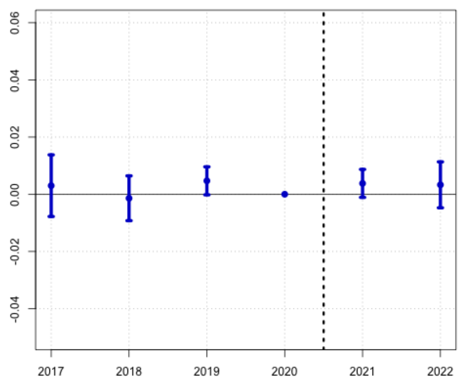
When the outsourcing reform was a approved, the Mexican government also introduced a specific limit on the total shared profits per employee. The formulation of this cap was the outcome of negotiations between policymakers and corporate stakeholders conducted before the implementation of the outsourcing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

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

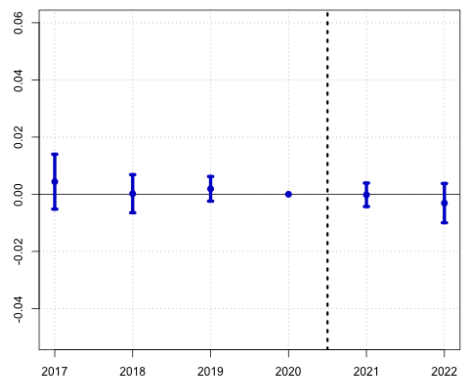
the past three years. Consequently, if an employee's corresponding profit sharing income in 2022 surpassed *both* three times their monthly salary and the average received in the previous three years, the cap would come into effect. In such instances, the employee would receive the higher amount between 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.6 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.

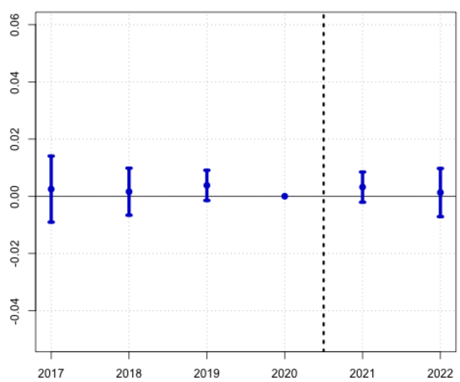
Figure B.6: Change in profit sharing post-reform. Control establishments



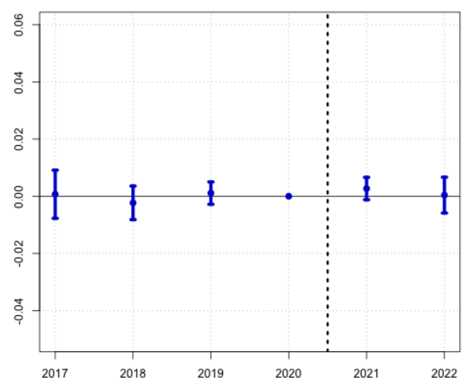
Profit Sharing/Avg wage > 3



Profit Sharing/Avg wage > 4



Profit Sharing/Avg b.c. wage > 3



Profit Sharing/Avg b.c. wage > 4

C Appendix C: Theoretical Model

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In this section, we show the analytical solution for the model presented in Section 6. 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 k, avoid mandatory profit sharing and can freely choose w_j and $E[ps_j]$. 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, and the firms 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.

C.1 Optimal labor and wages for each scenario

Case 1: If firm avoids mandatory profit sharing

If firm decides to avoid mandatory profit sharing, the firm can freely choose w_j and ps_j. Under the assumption that the firm is risk neutral, the firm maximizes:

$$\max_{w_j, ps_j} \ \mathbb{E}(z_j n_j - w_j n_j - ps_j n_j - c \cdot n_j) = \ \hat{z}_j n_j - w_j n_j - \mathbb{E}[ps_j] n_j - c \cdot n_j \tag{16}$$

subject to:

$$n_j = (\beta_w w_j + \beta_{ps}\,\mathbb{E}[ps_j])^{\theta}$$

Where in the second equality of Equation 16 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, profit sharing and total compensation:

$$w_j = \begin{cases} (\hat{z}_j - c)\frac{\theta}{\theta+1} & \text{if } \beta_w \geq \beta_{ps} \\ 0 & \text{if } \beta_w < \beta_{ps} \end{cases} \tag{17}$$

$$\mathbb{E}[ps_j] = \begin{cases} (\hat{z}_j - c)\frac{\theta}{\theta+1} & \text{if } \beta_{ps} \geq \beta_w \\ 0 & \text{if } \beta_{ps} < \beta_w \end{cases} \tag{18}$$

$$\mathbb{E}[total\ compensation_j] = (\hat{z}_j - c)\frac{\theta}{\theta+1} \tag{19}$$

The resulting labor n_j and expected profits π_j are:

$$n_j = \left(max\{\beta_w, \beta_{ps}\} \cdot (\hat{z}_j - c)\frac{\theta}{\theta+1} \right)^{\theta} \tag{20}$$

$$\mathbb{E}(\pi_j) = (\hat{z}_j - c)\frac{1}{\theta+1} \left(max\{\beta_w, \beta_{ps}\} \cdot (\hat{z}_j - c)\frac{\theta}{\theta+1} \right)^{\theta} - k \tag{21}$$

Case 2: If firm does not avoid mandatory profit sharing

If firm decides **not** to avoid mandatory profit sharing, then total profit sharing is a proportion of pre-profit sharing profits (profits before paying out profit sharing contributions to workers):

$$PS_j = \rho(z_j - w_j)n_j \tag{22}$$

And expected profit sharing per worker is:

$$\mathbb{E}[ps_j] = \rho(\hat{z}_j - w_j) \tag{23}$$

The firm's maximization problem is now:

$$\max_{w_j} \mathbb{E}[(1-\rho)(z_j n_j - w_j n_j)] = (1-\rho)(\hat{z}_j n_j - w_j n_j) \tag{24}$$

subject to:

$$n_j = (\beta_w w_j + \beta_{ps}\rho(\hat{z}_j - w_j))^{\theta}$$

Where in Equation 24 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 23 in the labor supply function. Solving the firm's maximization problem, we obtain:

$$w_j = \hat{z}_j \frac{\theta}{\theta+1} - \frac{\rho \hat{z}_j \beta_{ps}}{(1+\theta)(\beta_w - \rho\beta_{ps})} \tag{25}$$

Using Equation 23 again, expected total compensation will be equal to:

$$\mathbb{E}[total\ compensation_j] = \left(\hat{z}_j \frac{\theta}{\theta+1} - \frac{\rho \hat{z}_j \beta_{ps}}{(1+\theta)(\beta_w - \rho\beta_{ps})} \right)(1-\rho) + \rho\hat{z}_j \tag{26}$$

The resulting labor n_j and expected post-profit sharing profits π_j are:

$$n_j = \left(\beta_w \hat{z}_j \frac{\theta}{\theta+1}\right)^{\theta} \tag{27}$$

$$\mathbb{E}(\pi_j) = \left(\beta_w \hat{z}_j \frac{\theta}{\theta+1}\right)^{\theta} \cdot \left(\hat{z}_j \frac{1}{\theta+1} + \frac{\rho \hat{z}_j \beta_{ps}}{(1+\theta)(\beta_w - \rho\beta_{ps})}\right)(1-\rho) \tag{28}$$

C.2 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:

$$\underbrace{(\hat{z}_j - c)\frac{1}{\theta+1}\left(\beta_w(\hat{z}_j - c)\frac{\theta}{\theta+1}\right)^{\theta} - k}_{\text{expected profits when avoiding mandatory p.s.}} \geq \underbrace{\left(\beta_w \hat{z}_j \frac{\theta}{\theta+1}\right)^{\theta}\left(\hat{z}_j \frac{1}{\theta+1} + \frac{\rho \hat{z}_j \beta_{ps}}{(1+\theta)(\beta_w - \rho\beta_{ps})}\right)(1-\rho)}_{\text{expected profits when paying mandatory p.s.}} \tag{29}$$

$$k \leq \frac{\hat{z}_j}{1+\theta}\left(\beta_w \hat{z}_j \frac{\theta}{\theta+1}\right)^{\theta}\left[\left(1 - \frac{c}{\hat{z}_j}\right)^{1+\theta} - \left(\frac{1-\rho}{1 - \frac{\beta_{ps}}{\beta_w}\rho}\right)\right] \tag{30}$$

A few things to note from Equation 30:

- If $\beta_w = \beta_{ps}$ and $c > 0$ 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 $\beta_w = \beta_{ps}$ and $c = 0$ the expression collapses to $k \leq 0$
- $k = 0$ the expression above collapses to: $c \leq \hat{z}_j \left[1 - \left(\frac{1-\rho}{1-\frac{\beta_{ps}}{\beta_w}\rho}\right)^{\frac{1}{1+\theta}}\right]$
- If $\beta_w = \beta_{ps}$ and $k = 0$ the expression above collapses to $c \leq 0$
- The right hand side of the inequality is increasing in ρ 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 $\frac{\beta_{ps}}{\beta_w}$, such that lower outsourcing costs and lower elasticity of labor supply wrt profit sharing will intivize full outsourcing

C.3 An increase in k

As can be seen in Equation 30 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 17, 25, 19 and 26 we get at the following expressions for the change in wages and total compensation for these firms:

$$\Delta wage = c\frac{\theta}{\theta+1} - \frac{\rho\hat{z}_j}{(1+\theta)(\frac{\beta_w}{\beta_{ps}}-\rho)} \tag{31}$$

$$\Delta\,\mathbb{E}[total\ compensation] = \frac{\hat{z}_j\rho}{1+\theta}\left(1-\frac{1-\rho}{\frac{\beta_w}{\beta_{ps}}-\rho}\right)+c\frac{\theta}{\theta+1} \tag{32}$$

Both expressions are increasing in $\frac{\beta_w}{\beta_{ps}}$, indicating that when labor supply is very inelastic with respect to profit sharing, a restriction to outsourcing will cause a greater increase in total compensation. Finally, using Equation 27 and 20 we see that:

$$\Delta n_j = \beta_w \cdot c \cdot \left(\frac{\theta}{\theta+1}\right)^{\theta} \tag{33}$$

In this case, firm will decide to avoid ps if:

C.4 Microfounding the labor supply function

In this section we microfound the firm specific labor supply function

$$n_j = (\beta_w w_j + \beta_{ps}E[ps_j])^{\theta} \tag{34}$$

Presented in Section 6. We use a static discrete choice framework where workers have heterogeneous preferences for firms, as is common in the monopsony literature (Cardoso et al., 2018; Berger et al., 2022). The indirect utility of worker i for working in firm j is:

$$U_{ij} = ln(\beta(w_j + \mu_i \cdot \alpha E[ps_j])) + \frac{1}{\theta}\epsilon_{ij} \tag{35}$$

Where $\alpha \leq 1$ is a measure of how much the workers discount risk associated to profit sharing[60] and $\mu_i \leq 1$ is a measure of worker awareness regarding profit sharing. A low μ_i indicates 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. If we assume ϵ_{ij} follows a type I extreme value distribution all workers have the same

[60] α can be expressed as the fraction between the certainty equivalent of profit sharing and the expected value $= \frac{CE_{ps}}{E[ps_j]}$

awareness of profit sharing $\mu_i = \mu$, the likelihood of choosing employer j is:

$$p_j = \frac{(\beta(w_j + \mu \cdot \alpha E[ps_j]))^\theta}{\sum_{k\in\{1...J\}}(\beta(w_k + \mu \cdot \alpha E[ps_k]))^\theta} \tag{36}$$

For simplicity, we assume that the number of firms is sufficiently large, and that there are no strategic interactions between firms, such that Equation 36 can be approximated by $p_j = \lambda(\beta_w w_j + \mu \cdot \alpha E[ps_j])^\theta$. Aggregating across workers, yields the firm specific upward-sloping labor supply curve:

$$n_j^s(w_j, E[ps_j]) = N\lambda(\beta w_j + \beta \cdot \mu \cdot \alpha E[ps_j])^\theta \tag{37}$$

If we normalize the size of the labor force N to $\frac{1}{\lambda}$, set $\beta = \beta_w$ and $\beta \cdot \mu \cdot \alpha = \beta_{ps}$ we obtain the labor supply function in 34.

C.4.1 Heterogenous μ_i

Our empirical evidence presented in Section 8.3 indicates that, on average, workers have lower awareness of profit sharing compared to wages. However, it is likely that some workers are well-informed about profit sharing and fully consider this benefit when making labor supply decisions. For instance, workers with high tenure in profit-sharing firms are likely to be better informed about this benefit. Therefore, 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 (Cardoso 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 μ_g is:

$$P(\max_{k\in\{1,...J\}}\{U_k\} = U_j \mid \mu_g) = \lambda_g(\beta(w_j + \mu_g \cdot \alpha E[ps_j]))^\theta \tag{38}$$

If we assume that firms cannot discriminate between workers of different μ_g, then using the rules of conditional probability,[61] we obtain that the likelihood of any given worker choosing employer j is:

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

$$P(\max_{k\in\{1,\ldots J\}}\{U_k\}=U_j)=\sum_{g\in G}p_g\lambda_g(\beta(w_j+\mu_g\cdot\alpha E[ps_j]))^{\theta} \tag{39}$$

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

$$n(w_j,E[ps_j])=N\sum_{g\in G}p_g\lambda_g(\beta(w_j+\mu_g\cdot\alpha E[ps_j]))^{\theta} \tag{40}$$

We can see that the elasticity of the labor supply curve with respect to profit sharing depends positively on the average level of awareness of workers in the labor market $\sum p_g\mu_g$. This implies that if firms cannot offer different amounts of total compensation to different types g, the lower average information on profit sharing among workers affects the total compensation for all workers.[62]

For $\theta=1$ Equation 40 can be expressed in a form identical to Equation 34. For $\theta\neq1$ this is not possible, but the two functions remain similar. Notably, both hold the property that if $\exists\ i$ s.t. $\mu_i<1$ or $\alpha<1$, $\frac{\partial n_j^s}{\partial w_j}-\frac{\partial n_j^s}{\partial E[ps_j]}>0\ \forall\ w_j,ps_j$ implying that when firms fully outsource, they will decide to avoid profit sharing completely. We solve the model numerically for different parameter values using this labor supply function and demonstrate that all results hold.

[62] 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.