

SUBCONTRACTING RETREAT:
EARLY ESTIMATES USING ADMINISTRATIVE DATA

*RETRAIMIENTO DE LA SUBCONTRATACIÓN:
ESTIMACIÓN TEMPRANA USANDO DATOS ADMINISTRATIVOS*

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ABSTRACT

Labor flexibility policies have increased temporary and subcontracted jobs. These types of employment are associated with lower quality jobs. In this paper, five-year economic census data and social security administrative data were collected to estimate, in non-census years, out-of-sample the percentage of subcontracted jobs. This evidence is relevant for assessing the impact of a legislation that banned subcontracting. Predictor variables such as time fixed effects, industry, and the rate of temporary workers were used. The results show a significant decrease in subcontracting, particularly in the secondary sector. These findings raise the need for future research on improvements in post-reform well-being in the labor market.

Keywords: Temporary Work Agencies, Domestic Outsourcing, Out-of-Sample, Job Quality, INEGI-Mexico.

RESUMEN

Las políticas de flexibilización laboral han aumentado los empleos temporales y subcontratados. Esas categorías de empleo están asociadas con empleos de menor calidad. En este artículo, se recopilaron datos quinquenales del censo económico y datos administrativos de la seguridad social para estimar fuera de la muestra, en años no censales, el porcentaje de trabajos subcontratados. Esta evidencia es relevante para evaluar el impacto de una legislación que prohibió la subcontratación. En la estimación se utilizaron efectos temporales y variables predictoras como la industria, el tamaño de la empresa y la tasa de trabajadores temporales. Los resultados muestran un descenso importante de la subcontratación, particularmente en el sector

secundario. Estos hallazgos plantean la necesidad de investigación futura sobre mejoras en el bienestar que haya habido en el mercado laboral.

Palabras clave: Agencias de empleo temporal, subcontratación, fuera de la muestra, calidad de empleo, INEGI-México.

JEL Classification/ Clasificación JEL: C82, J21, M51.

1. INTRODUCTION

The growing presence of subcontracted employment has been observed through five-year economic censuses in developed and developing countries. In contrast, employment surveys do not report a growing trend but a stable presence. This paper seeks to reconcile census information with administrative data to correct the underestimation by surveys and obtain an intercensal figures of domestic outsourcing to monitor this increasingly widespread employment class. In particular, it seeks to make inferences about subcontracting labor in 2021 and 2023, that is, after the economic crisis caused by COVID-19 and several years since the last economic census in Mexico. The use of administrative micro data is increasing in research that analyzes the disruptions caused by the pandemic in the labor market (Vavra, 2021). Administrative data have also been used to extrapolate and infer unknown numbers of individuals working in illegal activities (Baldassarini, Chiariello & Tuoto, 2019). An advantage of administrative data is that such data allow linking workers with firms and overcoming the low response rates for Labor Force Surveys or lack of sample representativeness (Bosch & Campos-Vazquez, 2014).

Although employment surveys do not adequately quantify the rate of outsourced jobs (Bernhardt, Spiller & Theodore, 2013), we posit that intercensal subcontracting figures can be obtained by combining economic census data and social security administrative data, given that i) subcontracting labor is related to observable characteristics, such as industrial structure, firm size and proportion of temporary workers and ii) a consistent estimate, accompanied by robustness tests, can be a useful instrument to compensate for the lack of information in or underestimations by Labor Force Survey data.

Domestic outsourced employment has been a poorly studied topic, even though it is a movement traceable to the late 1970s (Weil, 2014) and recently in a developing economy (Estefan, et al., 2024). Although outsourced and temporary are related, it is important to note that not all temporary employment is subcontracted employment. In the past, the high presence of temporary jobs has been analyzed. Coincidentally, a characteristic of subcontracting labor is the short duration of their contracts. Temporary jobs are not a specific phenomenon of workers with low skills. Many independent workers have resorted to temporary contracts to complement their income, and many highly trained professionals have been hired through employment agencies (MGI, 2016). In a global context, in Europe, half of young people have

a temporary job, and in the United States, the growth of employment from 2007 to 2015 was explained by temporary employment (MGI, 2016).

Thus, as the number of temporary jobs increases, job instability and low wages increase (Bernhardt, Spiller & Theodore, 2013). Faced with this trend and to address some of the negative consequences, instruments are required to assess the depth and scope of subcontracting, in order to grasp an overall perspective. Empirically, Pollio, et al. (2023) report that a higher fraction of temporary employees decreases the quality of permanent jobs, refusing the hypothesis that temporary jobs are a vehicle to a better permanent positions (Chambel, Lopes & Batista, 2016).

Relying in administrative data has advantages and provides insights on subcontracting. First, temporary workers, as well as medium and large firms, both pillars to subcontracting, are precisely captured, thus correct estimations can be drawn. Second, data covers and disaggregates firm size and industry affiliation, this is relevant to analyze the subcontracting composition and to describe the sources of variation of the overall economy. Finally, due to official registry, consistent temporal comparisons were possible, this is a major advantage over survey data and its high non-response rates, especially in pandemic months.

In April 2021, Mexico approved a strict legislation to regulate subcontracting and for improving the working conditions (Government of Mexico, 2021; Estefan, et al., 2024). Follow-up of Bank of México (2021) and the Government on the issue has used social security records. The timing of the legislation occurred while the post COVID-19 recovery was still in progress. Our results found that -due to layoffs- subcontracted labor was at a local minimum, that was a valuable time frame for firms to internalize and complied the tighter rules for subcontracting, before reaching its full capacity. In that setting, possibly the reform had a lower than expected transition cost.

The remainder of the paper is organized as follows: section two presents related literature, section three describes the data, section four presents the methodology used, section five reports the results, and then the conclusions are presented.

2 RELATED LITERATURE

Independent workers and subcontracted employees could appear similar due to the short duration of their employment. An independent worker who supply services or sells goods is characterized (MGI, 2016) by i) a high level of autonomy, with flexibility to choose quotas and workload; and ii) variable remuneration, based on contracts or sales. Subcontracted employees, in contrast, are personnel recruited by firms from contractors to maintain separate functions considered noncore. By gender, Kauhanen & Nätti (2015) found that women are overrepresented in involuntary, temporary or part-time jobs, and these jobs were associated to the highest risk of unemployment.

Subcontracting labor and its effects on the lives of workers have been studied using various sources of information. Bernhardt et al. (2016) analyzed subcontracting trends in the United States and the effect of subcontracting on employment quality. As a source of information, they used the Bureau of Economic Analysis, specifically the input-output tables, because they broadly show the national subcontracting trends. One disadvantage of this approach is that these data are not updated regularly because the information comes from an economic census; thus, these data should be used with caution (Bernhardt, et al., 2016: 31-32).

A limited capacity to understand the magnitude of subcontracting labor and the impact on employment quality prevents the creation of appropriate policies (Weil, 2014). Therefore, to obtain more detailed information, data at the industrial level have been consulted (Bernhardt, et al., 2016). The information reviewed was a) micro data from government surveys of households and businesses or administrative data; b) datasets of industry trade groups; c) structured case studies of firms; and d) interviews with industry experts. Bernhardt et al. (2016: 35) argue that this information allows a thorough analysis of subcontracting but that for a more complete understanding, it is necessary to collect new data that are representative at the national level.

To analyze the growth of temporary employment services, the Current Employment Survey of the Bureau of Labor Statistics and the National Association of Temporary and Staffing Services (NATSS) has also been used; this survey measures employment in temporary services. According to Segal and Sullivan (1997: 117-118), these data are not too sensitive to measure temporary employment. A better database is the Current Population Survey (CPS), a monthly survey of American households that provides explicit identifiers for each household; however, it does not allow matching individuals with households. CPS also underestimates subcontracting. Segal and Sullivan (1997: 120) state that this discrepancy may occur because respondents report the place where they are working as their main employer instead of reporting their employer as the firm that provides temporary services to firms. In the same vein, Bernhardt, Spiller & Theodore (2013) report the workers' inability to accurately identify whether their employer was a contractor or not. In Mexico, to measure the causal impacts of the outsourcing reform Estefan, et al. (2024) used matched hirer–employee from social security data, coupled manufacturing survey and census data.

Using administrative social security data from Germany, Goldschmidt and Schmieder (2017) studied subcontracting in the food, cleaning, security and logistics sectors. The advantage was the availability of integrated employment biographies (IEB) data from 1975 to 2009 that contained information regarding duration of employment, total payment at the end of the period worked, type of employment and a large number of demographic variables. One limitation is that there are identifiers for establishments but not for firms. Currently, there are efforts to systematize and more intensively use administrative data (D'Angiolini, De Salvo, and Passacantilli, 2016).

In a context in which data do not have a specific subcontracting variable, Goldschmidt and Schmieder (2017) applied an on-site outsourcing method that focused on personnel flow between establishments, i.e., firms hire a part of their workforce to work as legally independent subcontractors even though the employees continue their work in the same physical location. According to these authors, it is likely that there is underreporting and many cases where subcontracted workers do not change locations. Additionally, part-time workers and temporary employment suffer stigma or devaluation (Pedulla & Mueller-Gastell, 2019). Considering that employment status is related to job quality, it is not surprising that involuntarily part-time employees have low satisfaction with working conditions and perform badly on most quality of working life outcomes (Gevaert, et al., 2023; Dawson, Veliziotis & Hopkins, 2017).

Analyses have been frequently carried out in the United States and Europe, creating the need to explore what has happened in other parts of the world. Also, as a consequence of insufficient statistics, the literature on subcontracting or domestic outsourcing is scarce. Therefore, other types of work are compared. For example, Lee & Lee (2015) study the wage gap between temporary and permanent workers. The dichotomy temporary-permanent has also been used to evaluate the impacts of globalization (Görg & Görlich, 2015). In developing countries, workers are usually separated into formal and informal. In Brazil the formality is understood as the employees with a work card and civil servants (Corseuil & Foguel, 2012). Similarly, in Mexico, the informal workers are those workers who are not covered by the formal social security program (Bosch & Campos-Vazquez, 2014). The above mentioned studies can be performed on labor force or household survey data, however that data do not accurately measure subcontracted employment; therefore, there is a need to probe the usefulness of administrative data in understanding subcontracted work.

3 DATA

In this paper, information from economic censuses on groups of workers is used: i.e., owners or relatives, paid personnel, and subcontracted personnel. The figures from economic censuses are considered reliable because they are obtained from field work in which the informants are responsible for the firms. The statistics are released every five years and are available by industry and firm size. Using these data, the rates of subcontracted workers can be calculated, and these values are associated with the information available in administrative data, which are collected monthly; therefore, subcontracting can be monitored in intercensal years. Statistically, the data describe the same economy, although perceived differently. The Economic Census measure variables with information provided by most of the firms, which were visited during fieldwork. In contrast, administrative data are derived from information provided by a set of firms listed by the Social Security Institute. Administrative data from Mexico have been useful for evaluating employers, temporary

contracts and employment flexibility (Bosch & Campos-Vazquez, 2014; Kato-Vidal, 2021).

Figure 1 shows the subcontracting rates across four census years for microbusinesses and small, medium and large firms. Figure 1 reveals that medium and large firms concentrate the higher shares of subcontracting than do small firms and microbusinesses. Furthermore, in the decade from 2003 to 2013, there was a significant increase in subcontracting. The increase continued with lower intensity from 2008 to 2018. A concentration of subcontracting is observed. Together, three industries accounted for 89% of the subcontracted workers in Mexico in 2018. Two thirds of the subcontracted workers served two industries (manufacturing and services). The trade industry also had a high subcontracting labor.

The estimates obtained were used to predict subcontracting rates in two years (i.e., 2021 and 2023) in which there is no census information. Table 1 shows the number of workers in the census years from 2003 to 2018, differentiating workers who are owners or family members, paid workers and subcontracting labors (see Figure 2). Subcontracted personnel have increased considerably, whether compared to total employees or to paid workers. The subcontracting rates that are reported in the remainder of the paper are calculated with respect to paid employment. By firm size, the rates of greatest interest for the study correspond to medium and large firms, for which the highest rates of subcontracting are observed. It is recommended to not truncate the data, excluding the smaller firms, especially in developing countries, because those firms are associated to a large share of total employment (Li y Rama, 2015).

To predict with greater precision subcontracting rates, fixed effects were estimated by industry. Given the partial compatibility' codes between census information and administrative data, eight of nine administrative industries were analyzed, the two service subsectors were merged into one. In the administrative data, there are covariates that are associated with the subcontracting rate in the literature. For our estimation, we used three

TABLE 1. MEXICO: EMPLOYED PERSONS BY CLASS OF WORKER (THOUSANDS)

	2003	2008	2013	2018
Total	16 240	20 117	21 576	27 133
Paid employees	10 552	11 414	12 197	16 254
Owners and relatives	4 298	5 995	5 801	6 193
Subcontracted	1 003	2 342	3 018	4 129
Independent	387	366	560	556
<i>Subcontracted</i>				
As a % of total	6%	12%	14%	15%
As a % of paid employees	10%	21%	25%	25%

Note: Independent = fees or commissions without fixed salary. The figures represent people in all sectors, including agriculture and other services. Source: economic censuses, INEGI.

covariates: i) rate of women in the labor force, ii) rate of young workers (<25 years of age), and iii) rate of temporary workers. It has been found that women are more likely to submit for a temporary job (Pedulla & Mueller-Gastell, 2019), and also women are the majority of workers in temporary and part-time jobs (Kauhanen & Nätti, 2015).

The second covariate associates non-prime-age workers (younger than twenty-five and older than fifty-four) to nonstandard employment relationships (such as part-time and temporary jobs) (Pedulla & Mueller-Gastell, 2019), and an intersectionality surges: those on casual contracts are more likely to be younger, female, single... (Dawson, Veliziotis & Hopkins, 2017). Thirdly, a larger use of temporary workers might indicate a strategy to reduce the wage bill and a perceived erosion in the quality of jobs (Pollio, et al., 2023; Kauhanen & Nätti, 2015).

Table 2 provides the averages (and standard deviations) for our covariates. Two trends are observed since 2003 through 2023: a) growing participation by women workers, from 34.4% to 39.5%; and b) an increase in temporary workers from 10% to a peak of 13% in 2018, onwards a mild reduction is observed. Regarding the distribution of employment based on firm size, medium and large firms had the highest rates of temporary employment.

TABLE 2. MEXICO: COVARIATES BY FIRM SIZE AND YEAR (PERCENT RELATIVE TO PAID EMPLOYEES)

Panel a) All firms

	2003	2008	2013	2018	2021	2023
Temporary	9.72	10.99	13.16	13.44	13.14	12.73
s.d.	(15.17)	(13.09)	(10.21)	(9.18)	(8.28)	(8.92)
Women	34.4	35.83	36.55	37.39	38.65	39.54
s.d.	(11.12)	(11.37)	(10.96)	(10.84)	(10.45)	(10.41)
Youth	20.53	17.75	15.81	16.43	14.71	14.28
s.d.	(5.49)	(4.28)	(4.31)	(4.23)	(4.28)	(3.79)

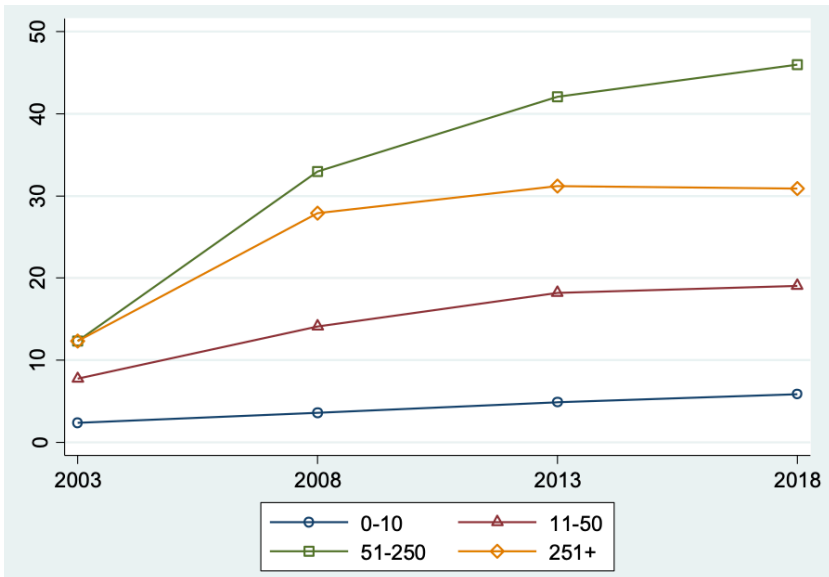
Panel b) 2003-2023

	Micro-businesses	Small firms	Medium firms	Large firms
Temporary	6.99	11.24	14.72	12.74
s.d.	(10.0)	(12.18)	(12.22)	(8.54)
Women	39.23	34.89	34.27	39.88
s.d.	(12.11)	(12.9)	(11.1)	(8.69)
Youth	10.45	14.73	16.71	17.64
s.d.	(3.19)	(3.12)	(3.67)	(5.17)

Note: 's.d.' Standard Deviation. Source: Social security data, IMSS.



FIGURE 1. MEXICO: SUBCONTRACTING LABOR BY FIRM SIZE (PERCENT OF TOTAL SUBCONTRACTING LABOR IN CENSUS YEARS)



Note: Microbusinesses, 0-10 employees; small firms, 11-50 employees; median firms, 51-250 employees; and large firms, 251 and more employees. Source: economic censuses, INEGI.

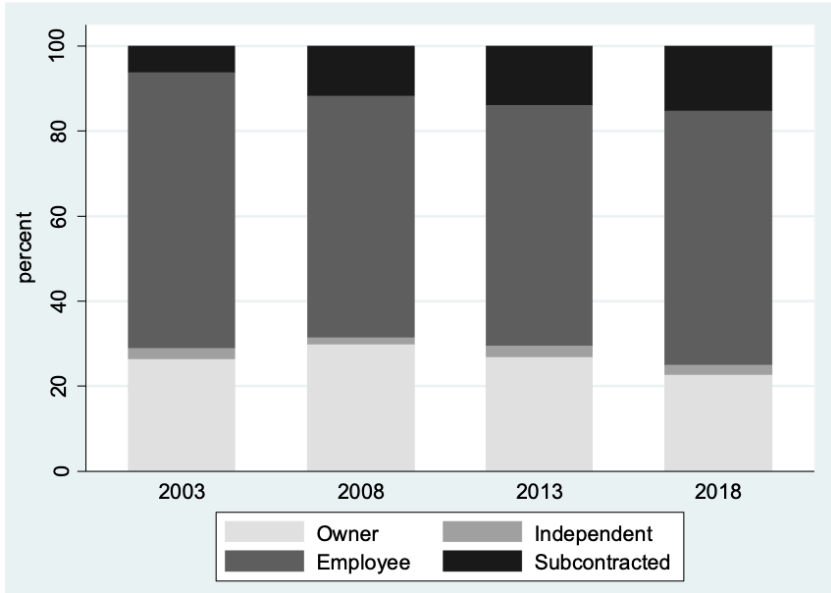
4 EMPIRICAL STRATEGY

As explained in the previous section, economic censuses are the instruments that best measure the subcontracting labor in a country. However, one disadvantage of this information is the low frequency at which the data are updated, as they are published only once every five years. Though, the data are available by firm size and economic activity. To fill the data gap, we propose to associate the data provided by the firms in economic censuses with the labor information available in the social security administrative data. The variable of interest is the rate of subcontracted workers relative to paid employment ($\theta_{i,s,t}$). The census rate θ serves to estimate correctly the rate of subcontracted workers obtained from administrative data (θ). Also providing a ratio, rather than absolute values, facilitate comparison across time and economies. The data is matched in census year t for each industry-firm size pair (i,s) .

As such, the following equation is fitted to census data and used to estimate with administrative data out-of-sample when there is no census information:

$$\Theta_i = \beta_0 + \beta_1 T_i + \beta_2 I_i + \beta_3 S_i + \beta_K X_i + \varepsilon_i$$

FIGURE 2. MEXICO: CLASS OF WORKERS (% TOTAL)



Source: Economic censuses, INEGI. Stata Command provided by Cox (2004).

where T , I and S are a set of indicator variables to isolate the fixed effects of the census years $T = \{2003, 2008, 2013, 2018\}$, industries $I = \{1, \dots, 8\}$ and firm size $S = \{1, \dots, 4\}$, respectively. In the vector X_k , interactions and three explanatory variables -calculated with administrative data- were included (see Tables 2 and Figure A1). The last term, ϵ , corresponds to the random error term. Estimation was performed using least squares. The estimated coefficients are reported in Table A1 in the Annex.

The administrative data comprise a sample of workers different from the sample in the economic census. The problem of representativeness associated with administrative data samples was noted by Vavra (2021), who recognized administrative data as a complement, not a substitute, for traditional data sources. In addition, in our paper, to match the sectoral classifications used in the census and by the social security administration, various industries were excluded; this data exclusion explains the higher rate of subcontracting in the administrative data than in the economic census in 2018 (30.7% and 25.5%, Table 1).

It is also possible to compare employment survey data and economic census data; the 2018 observed rate of subcontracting is lower in the employment survey data than in the economic census data (18.1% and 25.5%, respectively). Although the available information sources allow us to



infer rates close to the census rates, there are degrees of underestimation or overestimation that must be taken into account. In our case, we are interested in identifying the direction and amount of change in the subcontracting rate between 2018, 2021 and 2023, not the absolute subcontracting rate.

Recently, Estefan, et al. (2024) carried out a comprehensive assessment of Mexican on-site outsourcing. They reported a drastic drop of subcontracting for 2023, two years after Mexico's government banned outsourcing and create a mandatory registry for all specialized contractors (p. 7). We follow those results to predict the estimates for 2021 and 2023. Particularly, we assume that 2021 rates maintain historically high values. Later because of the subcontracting reform, the 2023 rates sharply decline reaching rates as low as two decades earlier.

5 RESULTS

Based on our assumptions, the administrative data indicate that there was a significant reduction in the subcontracting rate in 2023. Using the equation of the previous section, it was estimated that the rate of subcontracting labor in Mexico decreased by approximately 13 percentage points (pp) between 2018 and 2023, and less than one pp 2018-2021 (see Table A2). The amount of this decrease is large and is equivalent to a setback of more than a decade. The details of the estimate are shown in the Annex (Table A1). Both the dummy for industry and the dummy for firm size were significant.

To determine why the rate of subcontracting labor decreased, the data were analyzed by firm size and by industry. As seen in Table A2, the decrease in the rate of subcontracted workers was of greater magnitude in medium and large firms, that is, firms with more than 50 workers. The notorious decrease of 15 pp between 2018 and 2023 cannot be explained by changes of covariates, but due to a government ban on subcontracting. However, in medium-sized firms (51 to 250 employees), the estimated decrease of 3.2 pp between 2018 and 2021 is important. This differentiated behavior is explained by the greater percentage of job losses at medium-sized firms, both in total and subcontracted jobs, than at small firms.

A second approach to explain why a decrease in the percentage of subcontracting is estimated is to analyze the behavior by industry. As seen in Table A2, the industries with the greatest reduction in subcontracting were in the secondary sector (mining, manufacturing and construction), 2018-2023. In these industries, the *relative* decrease in subcontracting was bolder. Particularly, in manufacturing which subcontracting rate dropped below 5% in 2023. To achieve a greater reduction in subcontracting, a detailed inspection of labor contracts in the trade sector would be required. Regarding the total economy from 2018 to 2021, there was a net creation of jobs, which also contributed to a lower subcontracting rate. That is, there were two different processes that result in a lower rate of subcontracting: the dismissal of subcontracted workers and the recovery of employment (not subcontracted).

The results presented were obtained using administrative data that served to parameterize an equation and facilitate an out-of-sample prediction for 2021 and 2023. As a by-product, Figure A1 show the complex relationship between the covariates and the subcontracting rate. First, a higher proportion of temporary workers is associated to a higher percent of subcontracting labor. Second, a higher rate of women labor is not unambiguously related to subcontracting: in manufacturing, the highest rate of subcontracting is found in firms who employ relatively few women; nevertheless, the opposite is true in the service sector. Thirdly and last, the subcontracting labor is consistently higher in large firms, barely increasing in youth workers. In small firms, low -and decreasing rates of- subcontracting are related to a higher percent of youth workers.

6 CONCLUSIONS

In the last two decades, the rate of subcontracting labor has increased considerably, directly affecting working conditions. Despite this, perhaps due to the scarcity of available information, there has been little research on the topic. To reverse subcontracting, in Mexico a law was enacted in 2021 and the first positive outcomes have been observed. To increase visibility and to monitor subcontracting trend changes, we linked detailed data from economic censuses and the up-to-date administrative data.

Subcontracting labor is a form of employment that provide firms with flexibility, which could be a tool in markets with volatile demand. From the perspective of workers, subcontracting causes job instability, stigma and a gap in employment benefits between subcontracted personnel and personnel hired directly by a firm. In the long term, statistics show that subcontracting labor has ceased to be a focal phenomenon and has become a very generalized practice among industries. In fact, in the last 20 years in Mexico, much of the expansion of employment occurred through subcontracting, reaching one subcontracted worker for every four paid workers in 2018. We estimate that the reform reduced subcontracted staff by half in 2023.

Analytically, a widespread shift in hiring practices was required to attain this sharp decrease, not only the movement of some covariates. To monitor the phenomenon of subcontracting in years after the 2018 economic census, an equation was fitted and applied out-of-sample using administrative data for 2021 and 2023. The use of administrative data implies risks and involves a substantial time investment. These costs are worth it because they can achieve insights that could not be achieved otherwise. In the future, a greater integration of census statistics, employment surveys and administrative data is needed so that subcontracting trends can be better appraised.



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ANNEX

TABLE A1. ESTIMATES OF SUBCONTRACTING RATES (CENSUS AND ADMINISTRATIVE DATA)

	Baseline		Preferred
	[1]	[2]	[3]
<i>Time trend</i>			
2008 (<i>versus 2003</i>)	10.214**	12.398**	7.326°
2013	14.617**	17.548**	5.485
2018	18.815**	21.572**	9.153
<i>Firm size</i>			
Small firms (<i>versus Microbusinesses</i>)	6.882	-3.184	-1.045
Medium firms	21.319**	5.115	-32.438*
Large firms	29.478**	14.320**	-4.502
Industry fixed effects	No	Yes**	Yes**
<i>Covariates (% workers)</i>			
Youth	No	1.151*	-1.638°
Women	No	-0.674	1.052
Temporary	No	1.252*	2.748**
Temporary ²	No	-0.015*	-0.031**
<i>Interactions</i>			
Firm size * % Youth	No	No	Yes**
Industry * % Women	No	No	Yes**
Intercept	-12.403*	-14.655	-16.262
F (prob)	27.3 (0.000)	24.1 (0.000)	114.0 (0.000)
R MSE	15.129	15.06	14.7
Adjusted R-squared	0.54	0.54	0.57
AIC	1071.87	1074.05	1075.74

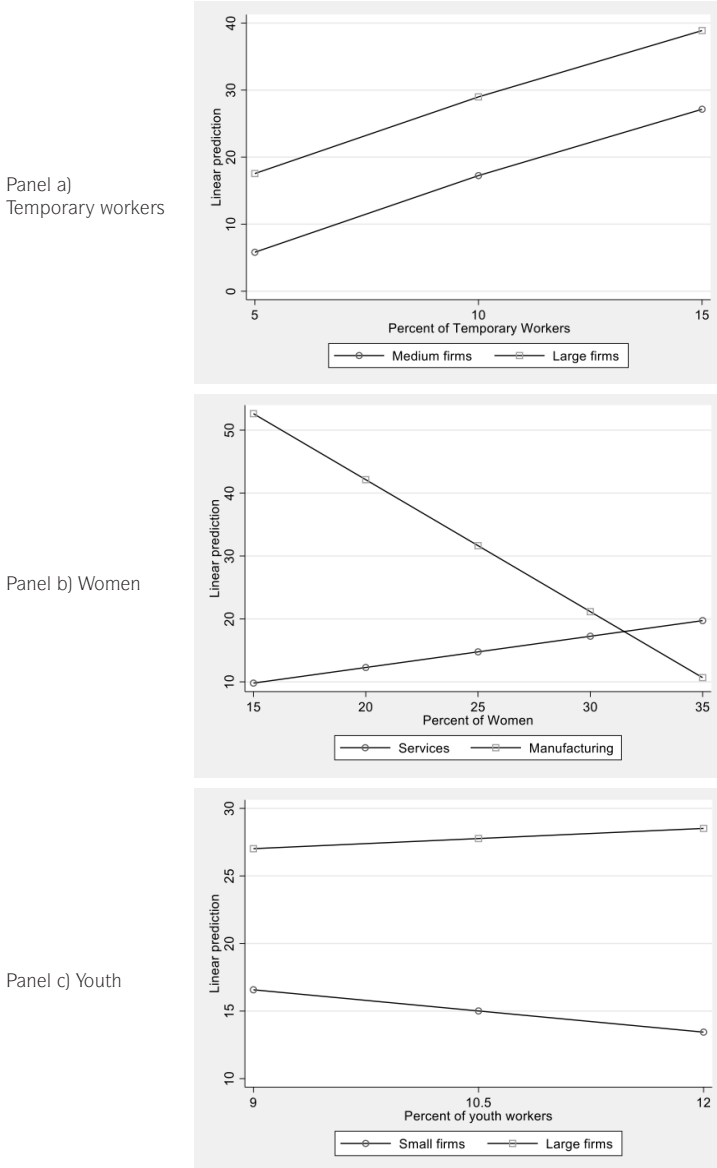
Note: The symbols °, * and ** denote significance levels of 10%, 5% and 1%, respectively. Standard errors are grouped by pair of industry x firm size. N = 128 (32 pairs and four census years).

TABLE A2. ESTIMATES: OBSERVED AND PREDICTED SUBCONTRACTING LABOR (ADMINISTRATIVE DATA)

Subcontracting rate (relative to paid employees)	2003		2008		2013		2018		Estimate		Difference	
	Act.	Est	Act.	Est	Act.	Est	Act.	Est	2021	2023	2018- 2021	2018- 2023
	Total (%)	6.9	6.9	17.1	17.1	21.5	21.5	25.7	25.7	25.0	13.0	-0.7
0 Agricultural	0	2.7	16.2	13.0	19.9	14.0	15.6	22.1	25.3	14.1	3.2	-8.0
1 Mining	10.2	10.0	16.6	17.7	24.7	23.7	30.6	30.8	27.9	13.6	-2.8	-17.2
3 Manufacturing	6	2.1	12.8	12.0	16.5	18.1	17.2	20.3	17.4	3.5	-2.9	-16.8
4 Construction	5.4	1.9	11.3	15.8	17.1	14.6	16.7	18.2	17.4	7.1	-0.9	-11.1
5 Electricity, gas & water	4.7	--	3.2	4.6	3.3	20.3	33.4	24.0	26.2	16.1	2.1	-7.9
6 Trade	12.3	33.8	47.8	43.9	57.7	48.0	58.2	50.2	49.7	38.6	-0.5	-11.6
7 Transport & communication	6.6	4.3	11.3	13.0	15.2	14.7	15.2	16.3	12.1	--	-4.2	--
8 Services	9.9	4.7	17.7	16.9	17.6	18.7	18.8	23.7	24.0	15.1	0.3	-8.6
Firm size (%)												
Microbusinesses	2	--	3.5	4.7	4	6.2	4.1	9.1	10.5	--	1.4	--
Small	5.7	--	10.3	10.0	11.9	13.8	13.2	18.2	19.1	7.4	0.8	-10.8
Medium	9.9	14.6	23.6	24.5	30.3	27.7	35.0	32.1	28.8	16.9	-3.2	-15.1
Large	9.9	20.4	31	29.3	39.9	38.3	50.6	43.4	41.6	28.0	-1.9	-15.5

Note: 'Act.' and 'Est.' denote Actual and Estimates, respectively. '--' indicates a value non distinct from zero. The estimated coefficients are reported in Table A1. Predicted values were calculated using margins and the option out-of-sample (StataCorp. 2017). The columns 2018-2021 and 2018-2023 reports the percentage points (pp) of difference between estimates. Source: Economic census, administrative data and own estimates.

FIGURE A1. COVARIATES EFFECTS ON SUBCONTRACTING RATE (%)



Note: Selected effects are shown. These estimates were predicted using results from Table A1. The effects were increasing or decreasing depending not only on the covariate but on the sector and firm size. The x-axis extreme values represent the interquartile range.

