Tax Compliance and Firm Response to Electronic Sales Recording*

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Abstract

In this paper, we study the response of firms to the introduction of technology that makes sales monitoring easier for tax authorities. We analyze the introduction of sales recording modules (SRM) in every restaurant of a single Canadian province using a difference-in-differences methodology. We estimate a 5.7% average increase in reported sales, which are almost completely offset by an equal increase in expenses, leaving corporate taxable income mostly unchanged. An increase of 5.9% in wages paid (and the reporting of new employees) accounts for the majority of these additional expenses. As a result, we find evidence that stricter monitoring of firm activities by tax agencies can contribute to workforce formalization. Overall, a cost-benefit analysis suggests that the introduction of SRMs generated an additional $242M in annual tax revenues to the government, with a one-time implementation cost of approximately $37M.

JEL Classification: H26, H25, H32, H71, M13

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1 Introduction

Tax evasion hampers the ability of governments to collect taxes. This is true for personal income tax, corporate income tax, social contributions, payroll taxes, and sales tax. The difference between the taxes actually collected and what would have been collected absent any evasion is known as the *tax gap*. According to Johnson and Rose (2019), the total tax gap in the United States for the years 2011–2013 represented 16% of total tax liability. In Canada, the tax gap represents 12% of the federal government's total tax revenues,[1] including a 7.1% tax gap with respect to the federal government's goods and services tax (GST), which is equivalent to the value added tax (VAT) commonly used in many OECD countries.[2] By contrast,[3] the tax gap is estimated to be 15.2% for the European Union as a whole, 4.9% for Australia, and 10% for Sweden.

Under-reporting gross sales to the tax authority is a common tax evasion scheme for small and medium-sized firms transacting with consumers. In advanced economies, electronic payments using debit or credit cards are reported separately by third parties (Slemrod et al., 2017), but cash transactions are more difficult to monitor because they require access to the electronic records of the firm's cash registers. Even if tax enforcement agencies obtain access to these electronic records, firms can use *sales suppression technologies* that allow them to tamper with the registers' electronic records (Ainsworth, 2008). The two main types of technologies used are *phantomware*, which operates as a hidden menu in the cash register's software, and *zappers*, which operate externally, often through a USB key.[4] Governments worldwide have recognized electronic sales suppression technology as problematic (OECD, 2017). Estimates of its prevalence in different countries range from 34% in Canada to 70% in Slovenia and Sweden (Ainsworth and Chicoine, 2018). Yet, few governments have undertaken serious action against these devices. In the United States, 20 states have legislated against the use of electronic sales suppression technology, but none have introduced any countermeasures to prevent its use (OECD, 2017).

Recent evidence shows that, at least in the case of a VAT system, third-party reporting and

[1] www.canada.ca/en/revenue-agency/programs/about-canada-revenue-agency-cra/corporate-reports-information/tax-gap-overview.html.

[2] One noted exception is the U.S., where there is no a federal-level sales tax.

[3] www.canada.ca/en/revenue-agency/corporate/about-canada-revenue-agency-cra/tax-canada-a-conceptual-study/tax-canada-a-conceptual-study-2.html.

[4] Both go as far as reorganizing the order of receipts to ensure a natural flow of orders. By its nature, sales suppression is difficult to detect, even during on-location audits.

access to a paper trail of transactions have the potential to increase tax compliance (Pomeranz, 2015). Unfortunately, even when revenues are third-party reported, government revenues from corporate income can be reduced if firms can make offsetting adjustments on other unreported margins (Carrillo et al., 2017). One important under-studied margin of adjustment for firms is collusion with employees to under-report wages paid (Yaniv, 1992). Colluding to reduce reported wages can be beneficial for firms as it reduces their payroll tax and social contributions, and for employees as it reduces their personal income tax and social contributions. Although employer-employee collusion can be difficult to sustain in large organizations (Kleven et al., 2016), small businesses may be prone to such arrangements. Detecting collusion is difficult because it requires detecting discrepancies between employer-reported and employee-received wages. For instance, Kumler et al. (2020) measures these discrepancies by comparing wages reported in household surveys to wages reported by employers.

We take an alternative route to provide evidence of employer-employee collusion in reducing wages reported to the fiscal authority by combining a natural experiment with administrative data. We analyze a mandatory billing policy that specifically targeted all restaurants in the province of Québec only, Canada's second-largest province, through a "Ask for the bill" campaign coupled with the set-up of a standardized government-provided electronic sales recording module (SRM) in every restaurant.[5] SRMs record transactions as they occur, with a report sent monthly to the tax authority. These devices are connected to the tax authority over the internet and are equipped with a seal of security, which makes them traceable and difficult to tamper with. Coupled with increased customer awareness regarding asking for the bill, SRMs hamper an establishment's ability to hide sales, even when purchases are paid in cash.[6] The restaurant industry is ideal for studying the impact of increased sales monitoring on labor force formalization because of the following: (1) cash transactions[7] remain an important form of payment in this industry; (2) the industry is very labor intensive; and (3) restaurant workers are more likely to work part-time, on a temporary basis, or on-call, all of which increase the risk of off-the-book wage payments

[5]See Ainsworth and Hengartner (2009) and Revenu Québec (2013a,b) for further details on the mandatory billing policy, the introduction of SRMs, and the implementation of the fight against electronic sales suppression technology.

[6]Countries that introduced similar devices designed to fight electronic sales suppression technologies have seen reported sales increase by 8% in Belgium, 15% in Hungary, and 20% in Rwanda (OECD, 2017).

[7]In 2009 and 2013, the proportion of transactions made using cash for entertainment and catering in Canada was 69% and 56%, respectively (Fung et al., 2015).

(International Labour Organization, 2016).

We use anonymized tax data on the universe of Canadian restaurants and measure the effect of the policy by comparing restaurants in Québec and the rest of eastern Canada (RoEC)[8] before and after the introduction of SRMs using a difference-in-differences (DiD) estimation strategy. The variables of interest are sales, other revenues, wages, other costs, taxable income, and the number of employees. In the first step, we estimate the prevalence of sales under-reporting in the restaurant industry. We find that the mandatory billing policy, including the use of the SRM, increase a restaurant's average annual reported sales by 37,000 Canadian dollars (CAD),[9] or 5.7% of annual sales pre-policy. The increase in reported sales is only present for restaurants that operate in a single establishment and absent for the largest restaurants. These results are in line with predictions that tax evasion is more difficult to sustain in larger firms because of the number of individuals who need to collude to keep the scheme unreported (Kleven et al., 2016).

In the second step, we examine how firms react to an increase in the paper trail of sales. We adopt the simple theoretical framework of Allingham and Sandmo (1972), Kleven et al. (2016), Carrillo et al. (2017), and others, which we extend to include third-party sales reporting. First, we show that in a VAT system, such as that in Canada, where supplier expenses are difficult to falsify, firms have an incentive to appear small and report low wages. Second, once we introduce in the model a verifiable paper trail that makes the hiding of sales more difficult, we show that firms should choose to increase reported wages to offset their income tax burden while still appearing small.

We verify these predictions empirically. Following the introduction of SRMs, we show an increase in reported sales, which are almost exactly offset by an equivalent increase in reported expenses. As a result, the overall effect on corporate income taxes paid is essentially zero. We explore the source of these additional expenses and find that 50% to 60% of them are associated with an increase in total wages paid. The 5.9% increase in wages paid that we find operates through an increase in the number of reported employees at the firm level of 7% (or, equivalently, two employees). This suggests that, perhaps, undeclared cash sales were used to pay for unreported

[8] According to the 2016 Canadian census, the country's six easternmost provinces, including Québec, accounted for 68% of the country's 35.2 million inhabitants.

[9] Unless otherwise specified explicitly, all monetary values are presented as CAD. Using the 2016 exchange rate, we need to divide each CAD by 1.245 to obtain the equivalent in U.S. dollars (USD), so 37,000 CAD is the equivalent of 29,719 USD.

work before the policy change. In addition to the large and robust evidence that firms make offsetting expense adjustments primarily using wages, our results also provide evidence of an increase in non-wage costs. This suggest that, before the presence of SRMs, firms were under-reporting costs to reach a zero annual profit target, which is a feature predicted by models of tax evasion described in our conceptual framework.

We also measure the effect of the mandatory billing policy on entry to and exit from the industry. We find no effect on entry, which suggests that new restaurants are not more reluctant to open after the policy is implemented. In contrast, we find a notable decrease in the number of restaurants exiting the market right after the policy was put in place. These findings suggest that sales tax enforcement does not prevent new players from entering the market, but push out players who did not want to operate electronic sales recording devices. We hypothesize that more efficient sales tax enforcement levels the playing field for restaurant owners who were previously reluctant to evade taxes to survive.

Our cost-benefit analysis shows that the government recoups approximately $242 million annually in taxes from three major sources. First, the policy increases the sales taxes collected by about $103M annually,[10] or 42.5% of additional tax revenues. Second, we estimate the additional personal income taxes paid on the increased wages to be $87M,[11] or 36.0% of additional tax revenues. The remaining 21.5% comes from the restaurants' payroll tax remittance that increases by approximately $52M.[12] Not too surprisingly given past research (Carrillo et al., 2017), we find little evidence that corporate income taxes increased. These additional tax revenues come with a one-time implementation cost of approximately $37M.[13]

We rule out the possibility that our results are driven by an increase in economic activity in Québec compared with the RoEC. First, because only restaurants operating in a single establishment (i.e., not multiple-establishment restaurants) and smaller establishments respond to the policy, it is unlikely that the differential activity between Québec and the RoEC would only be observed among single-establishment and smaller restaurants, but not in restaurants operating out

[10] That is, increased sales of $37,000 according to specification 2 in Table 2 multiplied by a tax rate of 14.975% multiplied by 18,663 restaurants.

[11] That is, an additional $17,000 of labor income multiplied by 27.53%, which is the sum of the lowest combined marginal tax rate in Canada and Québec, and the employee's contribution rate to social programs, for 18,663 restaurants.

[12] That is, an additional $17,000 of labor income multiplied by a payroll tax of 16.5% multiplied by 18,663 restaurants.

[13] That is, $1,000 per SRM multiplied by an average of two SRM per restaurant multiplied by 18,663 restaurants.

of multiple establishments and larger restaurants. Second, to further test for differential macroeconomic shocks to Québec and the RoEC, we implement a triple-difference estimation strategy in which bars, which were not affected by SRMs at the same time as restaurants, but also use labor-extensive technology, are added as an additional control group. We find that our main results are qualitatively unchanged in this more stringent identification strategy, although point estimates are larger for sales and wages, resulting in larger estimated tax revenues for the government.

Our findings relate to different strands of the literature. First, recent theoretical and empirical results on firm response to taxation show that tax compliance is higher on third-party reported than self-reported items. This includes employers reporting wages for employees (Kleven et al., 2011), credit card companies and banks reporting sales for sellers (Slemrod et al., 2017), and suppliers deducting taxes paid on inputs in a VAT system (Pomeranz, 2015, Carrillo et al., 2017). Our results confirm that restaurants use the margin that is not third-party reported more extensively, that is, wages. Within this literature, economists have estimated tax evasion near sales thresholds and notches in the tax codes, both of which determine monitoring intensity by tax authorities. For instance, Onji (2009), Liu et al. (2017), Almunia and Lopez-Rodriguez (2018), and Bachas and Soto (2018) rely on kinks and discontinuities to identify credible local treatment effects. Another approach is to examine government intervention aimed at increasing reporting. For instance, Naritomi (2019) studies a Brazilian government intervention, which registered consumers in a lottery to induce them to verify that firms declared their sales to the tax authorities. Naritomi (2019) finds that firms reported increased sales but also increased expenses. Despite this, total government revenues, net of the rewards paid, increased by 9.3%. The natural experiment we examine also aims at increasing reported sales to final consumers, but through a government mandated and operated technology imposed on restaurants.

We also contribute to the firm-response to taxation literature by studying the effect of stricter sales monitoring under a VAT system. This allows us to test important spillovers to items not covered by VAT, and in particular, to wages paid. Such spillover is of first-order importance as it not only affects tax collected by the government but also the employee's social contributions and benefits. Although tax enforcement can lead to spillover effects on different margins (Dubin et al., 1987, Rincke and Traxler, 2011, Evans et al., 2018, Alm, 2012), our paper is the first to document a spillover effect of tax enforcement on wages declared and labor force formalization.

Third, our paper is linked to the incidence of new tax policies on the welfare of workers. We contribute to this tax burden literature by studying how stricter sales monitoring affects the formalization of restaurant workers and their welfare. By declaring a large share of their employee wages, restaurants are entitling their workers to the social safety net that comes with being a documented worker. This includes unemployment insurance, worker's insurance, and contributions to government-sponsored retirement programs. Formalization comes, however, at a cost for workers, who now pay more income tax. Our results therefore partially confirm the results of Suárez Serrato and Zidar (2016), in which workers are found to bear 40% of the corporate tax burden in a spatial equilibrium model with imperfect mobility (we find that labor income tax represent 36% of additional government revenues). We also confirm the worker welfare result of new tax policies of Fuest et al. (2018), who estimate that workers bear about half of the changes in the tax burden of German municipalities, with low-skilled and female employees bearing an even larger share.

Finally, our paper is the first to examine the value of new *internet of thing* technology in tax enforcement. The return for tax agencies of setting up the simple *tax-tech* device under examination is very large; we find an annual increase of tax revenues 6.5 times the cost of the device. More importantly, perhaps, the technology used in the natural experiment in Canada is easily scalable and implementable in any developed country or tax jurisdiction.

In the remainder of this paper, we first present Canadian tax collection institutional details and the technology that we examine. We then present the conceptual framework of the paper in Section 3. In Section 4, we present the administrative data that we use and the empirical strategy that we adopt for this study. In Section 5, we present the effect of the tax technology on reported sales, wages, other expenses, taxable income, and industry entry and exit, with our main results being robust to size and macroeconomic activity controls. Section 6 concludes the paper.

2 Institutional Details

2.1 The Canadian goods and services tax

The Canadian GST is similar to VAT used in over 160 countries.[14] Like VAT, the GST is an indirect tax that is paid at each production stage whenever value is added (i.e., the sale price is greater than the cost of the material that has already been taxed). This way, all participants in a supply chain, from the supplier of raw material to the manufacturer and to end consumer, pay the GST, and not only the end consumer. This come in contrast to sales taxes in the U.S. states, which are only paid by the end consumer.[15] Evidence shows that paying taxes whenever value is added increases the paper trail and is one of the advantages of the VAT system (Pomeranz, 2015). In Canada, sales taxes can be levied both by the federal government and provinces. Since January 1, 2008, the federal-level GST has been set at 5%. Provinces set their own tax rate that piles on to the federal tax rate.[16]

In the province of Québec, *Revenu Québec* administers the GST/QST in accordance with rules set by the federal government, which makes Revenu Québec the sales tax collector for its own QST and the federal-level GST. It is the only province in Canada to do this. Firms report to Revenu Québec for everything related to sales taxes, including returns, tax collection, and audits.

2.2 The "Mandatory Billing" Policy

In an effort to fight tax evasion in the restaurant sector,[17] in January 2008, the Government of Québec announced a program called "Mandatory Billing," which was to be implemented between September 2010 and November 2011.[18] The policy enforces the following: (i) the obligation to give

[14] https://www.calculator.net/sales-tax-calculator.html

[15] See Kopczuk and Slemrod (2006) for a theoretical analysis of the different taxes that a firm has to pay or remit to the government.

[16] GST rates reduced from 7% to 6% on July 1, 2006, and to 5% on January 1, 2008. In nine of Canada's ten provinces, an additional sales tax is levied on top of the federal-level GST – no additional sales tax is set in the province of Alberta or in Canada's three territories. Provincial tax rates range from 6% to 10%. In the province of Québec, the provincial sales tax (known as the QST) increased from 7.5% to 8.5% on January 1, 2011, and to the current 9.975% on January 1, 2012.

[17] According to the Québec Ministry of Finance (http://www.finances.gouv.qc.ca/documents/EEFB/en/eefb_vol1_no1a.pdf – accessed last on November 13, 2019), tax evasion represented 16% of total sales in restaurants.

[18] See http://collections.banq.qc.ca/ark:/52327/bs1972728 – accessed last on November 13, 2019 – for more information on the implementation of the policy. Although the mandatory billing policy was in effect only in the province of Québec, the Government of Ontario, Canada's largest province, studied the possibility of implementing a similar program in 2015 (Ontario Ministry of Finance, 2015), which corresponds to the last year for which the admin-

clients their receipts, (ii) the obligation to produce receipts using an SRM, and (iii) the obligation to produce a monthly sales summary using an SRM and to send it to the tax authority. Starting on September 1, 2010, the first phase of the "Mandatory Billing" policy required all restaurants[19] to provide sales receipts to clients. Individual customers were also encouraged to ask for the receipt when eating out in the hope that providing a receipt would allow customers to verify the accuracy of both the amount charged and the amount of tax collected by the restaurant. The second phase of the program was implemented gradually between September 2010 and November 2011. It required all restaurants to generate all sales receipts using an electronic SRM. A total of 33,000 SRMs were in operation in more than 19,000 establishments by November 2011.[20]

Implemented only in the province Québec, the mandatory billing policy was initially introduced in restaurants, with a similar program for bars introduced in 2016. Restaurants that do not comply with the policy face fines of up to $100,000.[21] The program has been strictly enforced. Between September 1, 2010 and October 31, 2012, Revenu Québec conducted close to 16,000 inspections in restaurants, issuing close to 1,500 warnings and 3,800 statements of offense. Fines of $1.3M were levied from these inspections – which is quite low given the $260 million in additional sales tax remitted[22] – with a total of 2,200 convictions. Approximately half of the statements of offense issued related to not providing the customer with a bill produced by an SRM.[23]

Panel (a) of Figure 1 presents a picture of an SRM and how it fits between the point-of-sale system and the receipt printer. As microcomputers connected to the restaurant's sales recording system, SRMs are designed to record transaction data from bills and receipts, and allow for secure data extraction.[24] SRMs are protected with a security seal that prevents the device from being

istrative data necessary for our study are available. Despite being part of Ontario's 2018 budget proposal, we are not aware of any plan to roll out such a program.

[19]For the purpose of this policy, *restaurants* are defined as establishments where meals are sold for consumption on the premises or elsewhere, excluding establishments for which 90% or more of sales consists of alcoholic beverages (bars), or for which 90% or more of the meals are either tax-exempt (grocery stores), reserved for the staff of a business (cafeteria), or sold in concession stands (Revenu Québec, 2013a).

[20]For fiscal year 2013–2014, Revenu Québec estimates that SRMs helped in collecting an additional $260 million in sales tax, which would not have been remitted otherwise (see, https://www.ceic.gouv.qc.ca/fileadmin/Fichiers_client/centre_documentaire/CEIC-R-3572.pdf – accessed last on September 1, 2020).

[21]See https://www.revenuquebec.ca/en/press-room/press-releases/details/73883/2013-02-14/ – accessed last on November 13, 2019.

[22]See https://www.ceic.gouv.qc.ca/fileadmin/Fichiers_client/centre_documentaire/CEIC-R-3572.pdf – accessed last on September 1, 2020.

[23]Revenu Québec, *Ibid.*

[24]At the time when the mandatory billing policy was implemented, SRMs used by Revenu Québec were AAEON microcomputers, model AEC-6822, and modified by IBM Canada for the intended use (Revenu Québec, 2013a). The reported cost of each device in 2012 was $1,000; in 2019, the cost of a new SRM was $1,500, which is one-third of the

opened. Each device has its own unique identifier provided by the tax authorities. SRMs are used to produce standardized bills on which a predetermined set of information is displayed. Panel (b) of Figure 1 presents an example of such a bill. It provides a description of the items ordered, their price, the total amount, the two sales taxes (in French: TPS and TVQ), the registration numbers of GST (TPS) and QST (TVQ), and a bar code that records the unique information for the bill. Restaurant operators are also required to send a monthly report of the sales summary to Revenu Québec using their uniquely identified SRM device. Panel (c) of Figure 1 presents an example of such a monthly report. It includes data on the transactions recorded by the SRM in a given month in the form of bar codes.

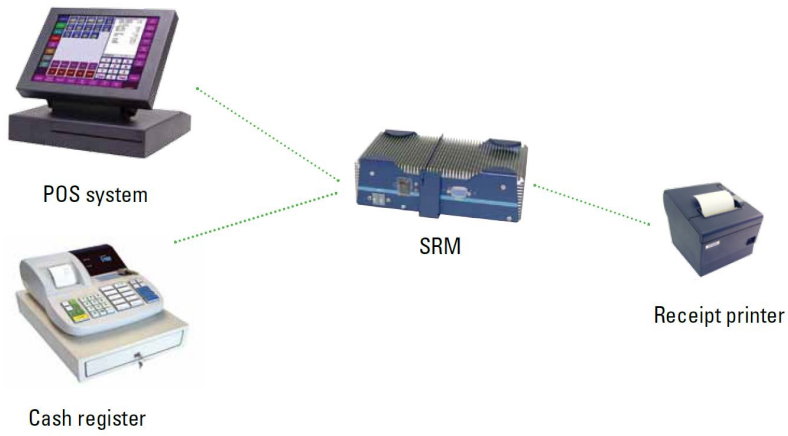
3 Conceptual Framework

We model each restaurant's reporting decision following the standard Allingham and Sandmo (1972) model, including recent extensions to third-party reported items as in Kleven et al. (2016) and Carrillo et al. (2017). We extend this framework by allowing wages to be accounted for separately from cost of goods expenses in the profit function. Two reasons justify this framework given the context we examine. First, Canada has the equivalent of a VAT system that allows all cost of goods expenses to be deducted from taxable revenues and requires a paper trail. Such expenses are more difficult to falsify, which justifies a special treatment in our model. Second, although employers act as a third-party reporter for their employees, there is still room for collusion between employers and employees to decrease wages reported to the fiscal authority (Yaniv, 1992). This can be profitable for employers because they avoid paying payroll taxes, and for employees because it reduces their personal income tax. Although such collusion is difficult to sustain in large firms, collusion is more likely in smaller, single-establishment restaurants.

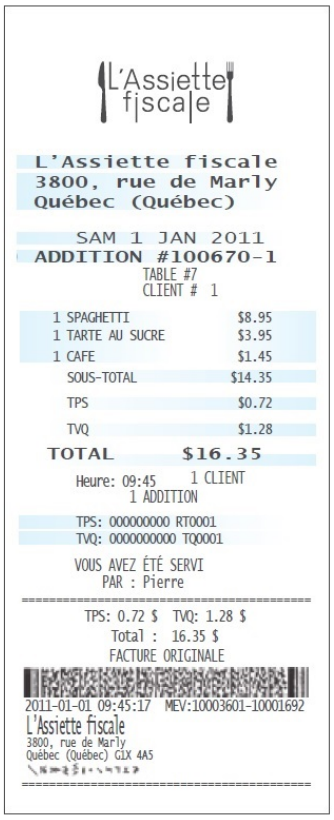
Firms have operations that generate revenues, for which they have to incur costs and pay wages to their employees. Revenues and costs include third-party and self-reported amounts so that $R = R_T + R_S$ and $C = C_T + C_S$. Wages paid to employees can also be third-party reported by the employer to the fiscal authority or paid directly to employees who could self-report the amount: $W = W_T + W_S$. Reported revenues, costs, and wages are denoted by $\widehat{R}$, $\widehat{C}$, and $\widehat{W}$,

total cost of setting up the display shown in Panel (a) of Figure 1. On the resale market (e.g., Kijiji), a used five-year-old SRM could be purchased for $350 in late 2019, or even less in mid-2020.

(a) Sales Recording Module



(b) Bill Produced by an SRM



(c) Monthly Sales Report Produced by an SRM

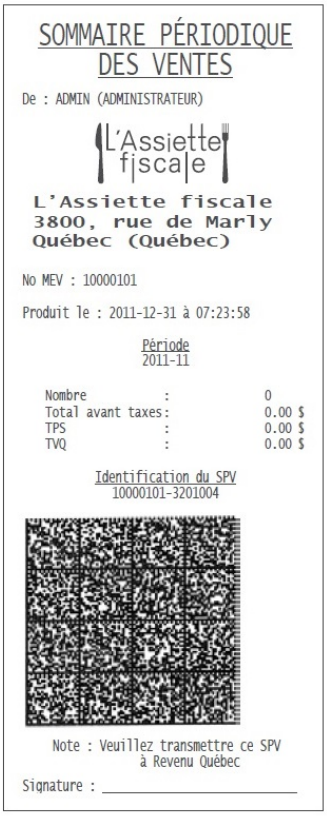


Figure 1: Mandatory Billing

Note: Source Revenu Québec (2013a).

respectively. True profits are given by $\pi = R - W - C$, and reported profits by the analog $\widehat{\pi} = \widehat{R} - \widehat{C} - \widehat{W}$.

Firms face a proportional tax rate τ_π on reported profits $\hat{\pi}$, a proportional payroll tax rate τ_W on total wages paid $\hat{W}$, and must remit sales tax τ_R to the government on reported total revenues $\hat{R}$. We follow Carrillo et al. (2017) and assume that evasion is detected with probability $p(s)$, where s is a signal that the government receives about the likelihood that a firm's report is fraudulent (i.e., $p'(s) < 0$), with s being a function of how different $\widehat{\pi}$, $\widehat{R}$, and $\widehat{W}$ are from what the government expects. In Carrillo et al. (2017), $s = (\widehat{\pi} + \epsilon)/\widehat{R}$, with $\epsilon > 0$. If the firm is not caught cheating on its taxes, it can pocket the unpaid payroll tax and the unremitted sales tax, which, together, are equal to $\tau_W(W - \widehat{W}) + \tau_R(R - \widehat{R})$. If the firm is caught cheating on its taxes, we assume that it has to pay all of the owed taxes, $\tau_\pi \pi + \tau_W W + \tau_R R$, in addition to a penalty Θ. The penalty (in dollars) is a function of the total tax evaded so that $\Theta = \theta[\tau_\pi(\pi - \widehat{\pi}) + \tau_W(W - \widehat{W}) + \tau_R(R - \widehat{R})]$. Knowing the audit function of the government, the firm chooses what to report to the tax authority to maximize its expected value function given by

$$EV = (1 - p(s))V\left[\pi - \tau\widehat{\pi} + \tau_W(W - \widehat{W}) + \tau_R(R - \widehat{R})\right] + p(s)V\left[\pi - \tau\pi - \Theta\right]. \tag{1}$$

We compare the choice of wages reported by firms in two contexts: In the first, revenues are not third-party reported; and in the second, revenues are third-party reported through the SRM in the natural experiment that we examine. In both cases, costs are assumed to be third-party reported (because of Canada's VAT-like system). For simplicity, we follow Kleven et al. (2016) and Carrillo et al. (2017), and assume that any misreporting of third-party verified costs and revenues are detected with probability 1, so that firms always report truthfully any third-party verified costs and revenues. By varying the extent to which revenues are third-party reported by SRMs, we can study the effect of the mandatory billing policy.

Proposition 1. *When costs are third-party reported but not revenues, a firm maximizes its value by reporting (1) costs that are equal to their third-party verified amount, that is, $\widehat{C}^* = C_T$, (2) revenues that are equal to verified costs, that is, $\widehat{R}^* = \widehat{C}^* = C_T$, and (3) no wages $\widehat{W}^* = 0$.*

Proof. When costs are third-party reported but not revenues, firms want to report the lowest level of revenues consistent with their costs. Reported costs are equal to third-party verified costs be-

cause any other report would surely be detected, hence $\widehat{C}^* = C_T$. Because the probability of detection is inversely related to the ratio of reported profits to revenues (i.e., $p' < 0$), the firm chooses $\widehat{R}^*$ and $\widehat{W}^*$ such that $\widehat{\pi}^*/\widehat{R}^* = 1$. Given $\widehat{C}^* = C_T$, it is optimal for the firm to report the smallest profits that can be reported given costs, which is obtained by setting wages equal to 0 and reported revenues equal to verified costs. □

When only costs are third-party reported, the firm's optimum choice it to report the lowest level of revenues, taking into account that the probability of detection is inversely related to revenues declared.[25] Hence, in a VAT world, firms have an incentive to decrease reported wages. Under risk neutrality, a set of contract wages in a collusion equilibrium can be obtained following Yaniv (1992).

Proposition 2. *When costs and revenues are third-party reported, a firm maximizes its value by reporting costs and revenues equal to their third-party verified amount, that is,* $\widehat{C}^* = C_T$ *and* $\widehat{R}^* = R_T$. *Regarding reported wages,* $\widehat{W}^* = \widehat{R}^* - \widehat{C}^* = R_T - C_T$ *if* $R_T > C_T$, *and* $\widehat{W}^* = 0$ *otherwise.*

Proof. When costs and revenues are third-party reported, firms continue to choose to report profits that minimize their tax burden. Reported costs and revenues are equal to their third-party verified amount, or else evasion is detected, hence $\widehat{C}^* = C_T$ and $\hat{R}^* = R_T$. Given these verified costs and revenues, the firm maximizes its value by minimizing its income tax burden, which occurs when $\widehat{\pi}^*/\widehat{R}^* = 1$. Consequently, if $\widehat{R} > \widehat{C}$, then taxes paid are minimized when reported wages are given by $\widehat{W}^* = \widehat{R}^* - \widehat{C}^*$. □

When both costs and revenues are third-party reported, a firm must then use a third margin of adjustment, which in our case are the wages paid to employees. We show that declared wages are greater when revenues are third-party reported. Propositions 1 and 2 provide the main predictions we test in the empirical analysis. In a VAT context, costs are fixed to their third-party reported values; firms cannot increase costs in an effort to decrease their tax burden. However, if they are willing to collude with their employees, firms can under-report wages paid to employees. Once revenues are also third-party reported, wages paid become a margin of adjustment to decrease a firm's corporate tax burden. We test these predictions in Section 5.

[25] We allow the firm to report 0 wages, although we could easily fix a lower bound for this amount, which would increase reported profits by the same amount.

4 Data and Empirical Strategy

4.1 Identification

We exploit the fact that the introduction of SRMs was limited to the province of Québec to analyze the effect of the policy using a difference-in-difference (DiD) model. Restaurants in Québec form the treated group, whereas restaurants in other provinces of the rest-of-eastern Canada (RoEC) form the control group. Canada's six easternmost provinces (from west to east: Ontario, Québec, New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland & Labrador) account for 68% of Canada's 35.2 million inhabitants. We detail our choice of control group in Appendix A. Our empirical strategy consists of comparing restaurants in Québec to restaurants in the RoEC, before and after the introduction of SRMs. Because the program was rolled out from September 2010 to November 2011, we explicitly allow for an implementation phase in our econometric model (During) in addition to the post implementation phase (After).

Specifically, we estimate the following econometric model:

$$Y_{i,p,t} = \Gamma(During \times QC)_{p,t} + \beta(After \times QC)_{p,t} + X_{i,p,t}\delta + \gamma_p + \lambda_t + u_{i,p,t}, \tag{2}$$

where $Y_{i,t}$ represents the outcome of interest in our analysis (e.g. sales, costs, and wages), i indexes restaurants, p indexes provinces, and t indexes calendar years. $(During \times QC)_{p,t}$ is a dummy variable for the implementation phase-in period of the SRMs, and $(After \times QC)_{p,t}$ is a dummy variable for the completed implementation of the SRMs. When using a fixed effect model, we implement $u_{i,p,t} = \alpha_i + \epsilon_{i,p,t}$, where α_i represents a firm fixed effect.

When $Y_{i,t}$ represents reported sales or wages, the coefficient on β_1 measures the change in sales or wages reported after the policy change, net of the change in sales or wages reported for other provinces, respectively. We attribute this change to the introduction of SRMs. Because restaurants could reduce under-reporting of expenses after the policy's implementation, we also analyze the policy effect on non-wage operating expenses and total wages. To explore entry to and exit from the restaurant industry as a result of SRMs, we estimate equation (2) on dummy variables that identify the first year a restaurant is in the data (entry) in addition to the last year it is present in the data (exit) using probit models.

As a refinement to the DiD approach, we also conduct a triple-difference estimation by incorporating a sector of the economy that was not affected by the mandatory billing policy, that is, drinking places (i.e., bars), as defined by the firms' NAICS codes 7224 (Drinking Places). Between 2004 and 2015, 6,307 so-called bars operated in the province of Québec and 11,368 in the RoEC. We construct a dummy variable BAR equal to 1 if the business is defined as a bar, and 0 otherwise. The econometric specification of the triple-difference empirical model is then given by

$$\begin{aligned} Y_{i,r,p,t} = \Gamma(During \times Resto \times QC)_{r,p,t} + \beta(After \times Resto \times QC)_{r,p,t} \\ + X_{i,r,p,t}\delta + \gamma_{p,t} + \lambda_{r,t} + \theta_{r,p}. + u_{i,r,p,t} \end{aligned} \tag{3}$$

When $Y_{i,t}$ represents reported sales, costs, or wages, γ_1 measures the increase in sales, costs, or wages in Québec net of the increase in sales, costs, or wages for bars, net of their increase in sales, costs, or wages in the RoEC, respectively. We can then attribute these changes to the mandatory billing policy that uses SRMs to fight electronic sales suppression. As with the DiD approach, we can evaluate total increase in sales tax collected, corporate profit tax, personal income tax, and additional social contributions because of the introduction of SRMs. When using a fixed effect model, we implement $u_{i,r,p,t} = \alpha_i + \epsilon_{i,r,p,t}$.

4.2 Data Source

We use the National Accounts Longitudinal Microdata File (NALMF) provided by Statistics Canada as our main data source. This administrative dataset includes anonymized information on nearly every business operating in Canada, regardless of whether it is incorporated. Firm-level data provide a full set of annual financial statements.[26] The information in NALMF comes from the Corporate Income Tax Form (T2 Schedule 200), the General Index of Financial Information, and the Statement of Remuneration Paid (T4). We can then extract information on the firm's balance sheet (T2 Schedule 100) and income statement (T2 Schedule 125).[27] From the date, we can calcu-

[26]NALMF data are at the firm level. Each firm is coded separately, even when an entity owns multiple registered firms. For multi-establishment firms, however, the information is not reported at the establishment level, but aggregated at the firm level.

[27]The data also provide information on Schedule 5, which allocates taxable income among Canadian jurisdictions when the enterprise is in a province whose corporate income tax is collected by the federal government. This is irrelevant in the case of Québec, which collects its own income tax.

late total wages paid and the number of firm employees based on the number of T4s submitted to the Canada Revenue Agency. Appendix A provides the details required to build each variable used in our analysis.

We identify the province of operation from the administrative records. We restrict the sample to establishments that operate in a single province and in a single industry. We identify restaurants by the firm's NAICS industry classification code (7225: full-service restaurants and limited-service eating places).[28] Using the NALMF, we can identify 33,323 establishments that operated as restaurants in the province of Québec at least once between 2004 and 2015 inclusively, in addition to 64,811 establishments that operated as restaurants in the RoEC. After removing observations for inactive firms, firms that operate in more than one province or industry, and firms for which some of the data necessary to conduct our analysis are missing, we have 18,663 restaurants in the province of Québec and 33,147 restaurants in the RoEC. Conducting the same exercise for bars takes us from a sample of 4,794 in Québec and 4,010 in the RoEC to a final sample of 2,615 in Québec and 1,804 in the RoEC. Sample construction details are presented in Appendix A.

4.3 Descriptive Statistics

Table 1 presents means and standard deviations of the variables of interest using the final sample of establishments. On the left of the table, we present averages and standard deviations for *Restaurants* in Québec and in the RoEC. On the right, we present the means and standard deviations in the case of *Bars* for the same variables regarding *Restaurants*.

Table 1 shows that Québec restaurants and bars tend to have lower sales, but pay higher wages on average than RoEC establishments. This is true despite restaurants in the two samples having, on average, 33 employees. Other expenses (i.e., non-wage costs) are significantly lower in Québec than the RoEC. Finally, from the balance sheet section of the table, Québec restaurants report approximately $20,000 less in total assets than restaurants in the RoEC, use less debt financing than in the RoEC, and report greater shareholder equity. The summary statistics for bars are similar.

[28] Before 2012, this category was split into two NAICS codes (7221: full-service restaurants and 7222: limited-service eating places).

5 Main Results

5.1 Effect of the Policy on Sales and Other Revenues

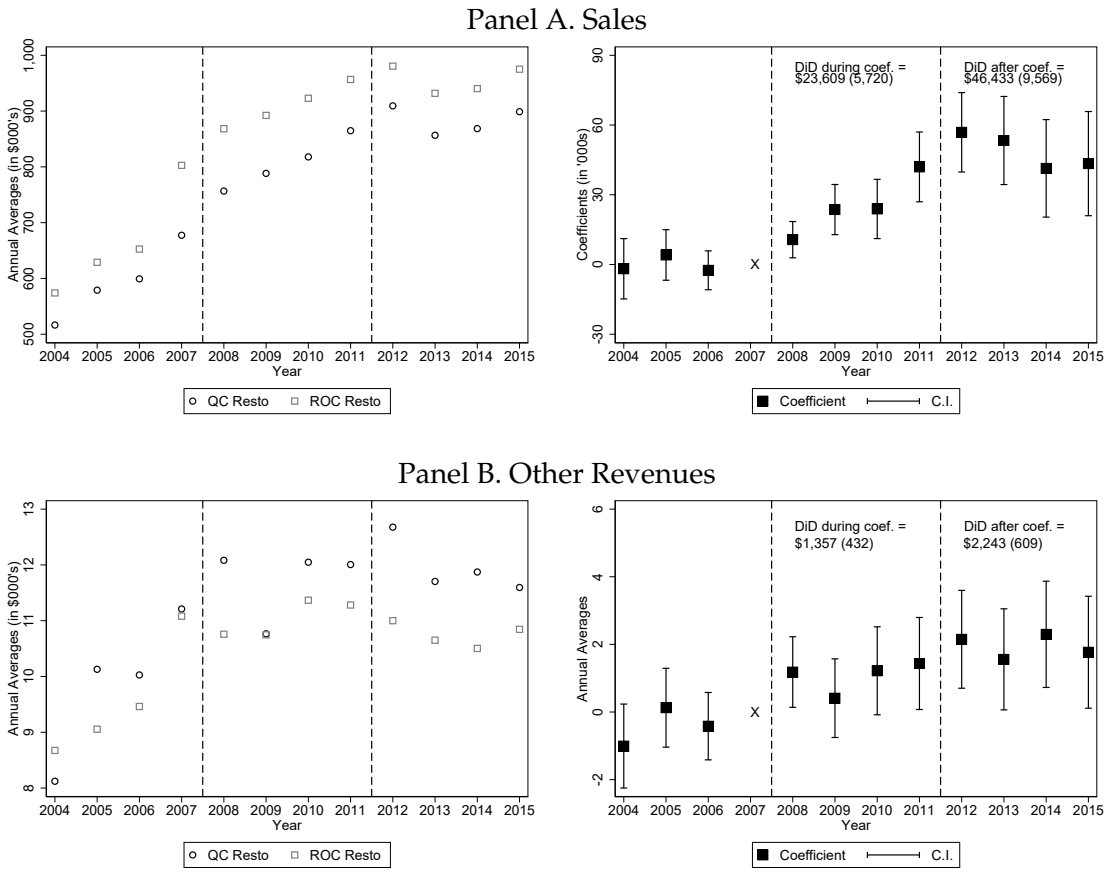


Figure 2: Effect of the Policy on Revenues

Note: This figure presents average annual reported revenues for restaurants in Québec and the RoEC (left panel), and the coefficients from estimating equation (2), replacing the during and after dummy variables with calendar-year dummies (right panel).

Panel A of Figure 2 plots average annual reported sales for restaurants in Québec and the RoEC (left panel), and the coefficients from estimating equation (2) replacing the during and after dummy variables with calendar-year dummies (right panel). We see a clear increase in reported sales for firms operating in Québec both during the implementation of the mandatory billing policy (from 2008 to 2011) and after all restaurants were equipped with SRMs (2012 onward). Figure 2 also allows us to assess the parallel trend assumption required when estimating DiD models. We can see that none of the coefficients in years before the policy implementation are statistically different from zero. Panel B of Figure 2 shows that the policy had no impact on revenues other

than sales.

In Panels A and B of Table 2, we quantify the effect of mandating the use of SRMs on reported sales. The table shows a series of results from estimating equation (2) that gradually control for firm fixed effects, year fixed effects, province fixed effects, and region fixed effects. The results are generally stable across the four model specifications. Including province-specific trends (models 2 and 3) allows us to estimate that sales increased by about $37,000 after the full implementation of SRMs as part of the mandatory billing policy, or a 5.7% increase as estimated in logs.

As a back-of-the-envelope calculation, the $37,000 increase in annual sales represents an additional $103M in annual sales tax remitted to the government (i.e., an average increase of $37,000 in annual sales multiplied by the sales tax rate of 14.975% multiplied by 18,663 restaurants in operation in the province). Of this amount, approximately one-third is associated with the GST, which means that it is transferred to the federal government. Hence over $68M go into the coffers of Revenu Québec.

5.2 Effect of the Policy on Wages, Other Expenses, and Documented Workers

We now investigate the effect of the policy on operating costs, examining wages and other operating expenses separately. The left-hand side of Panels A and B of Figure 3 plot average wages and other expenses for restaurants in Québec and the RoEC, with the right-hand side displaying the estimated coefficients from equation 2, replacing the during and after dummy variables with calendar-year dummies. We see a clear increase in both types of operating costs after the policy's implementation.

In Table 2, Panels C and D show that these results are robust to different specifications. Similar to our results for sales, including province-specific trends reduces the importance of the increase in both reported operating costs. The total increase in operating costs of $33,000, which is split almost evenly for wages and other expenses, almost offsets the increase in sales documented in Section 5.1. In terms of percentage increase, column (4) of Table 2 shows that wages increased at double the pace of other expenses (5.9% versus 3%). This suggests that the relative increase in wages was more important, all proportions considered, than that of other costs, and that wages increased at the same pace as sales.

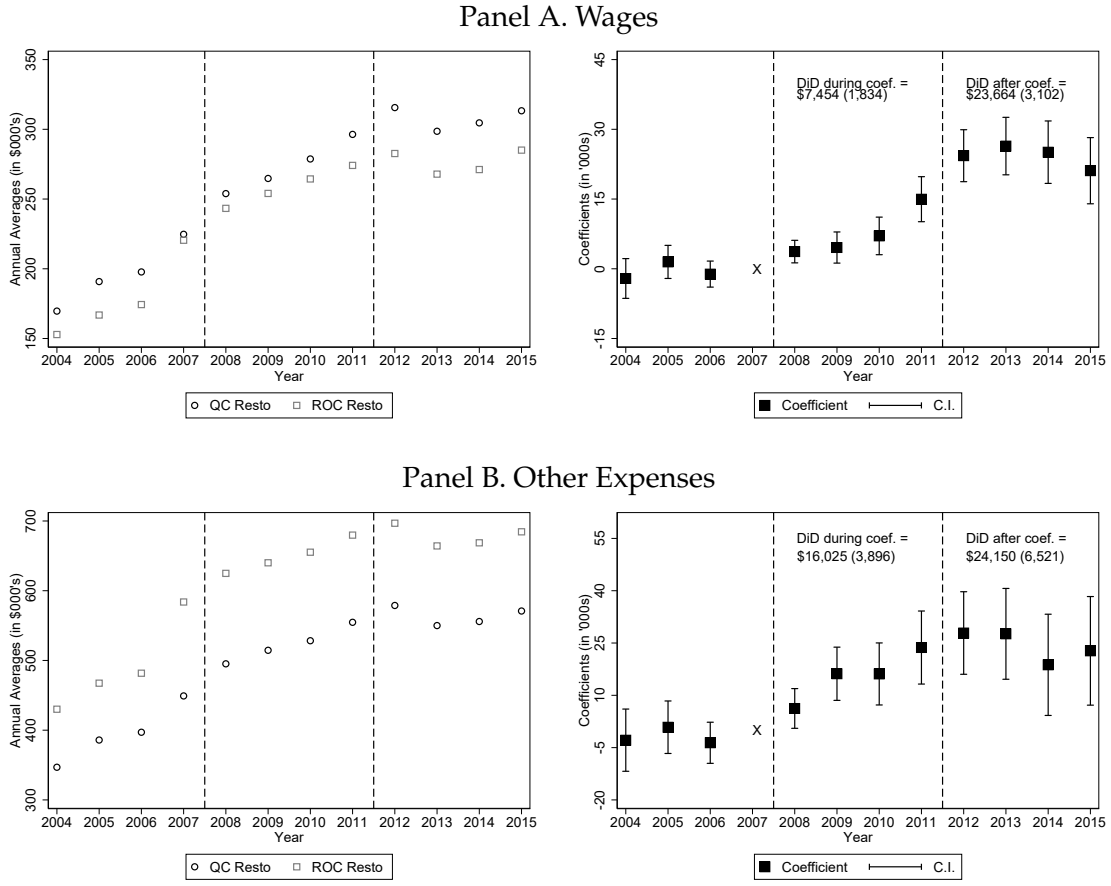


Figure 3: Effect of the Policy on Operating Expenses

Note: This figure presents average annual reported expenses for restaurants in Québec and the RoEC (left panel), and the coefficients from estimating equation (2) replacing the during and after dummy variables with calendar-year dummies (right panel).

The statistically significant impact on wages of introducing SRMs raises the question of whether the mandatory billing policy had an impact on labor force participation in this industry. Before the introduction of SRMs unreported cash transactions could have been used to pay undocumented employees to avoid paying payroll taxes; that is, there was an incentive for restaurants to understate their labor costs prior to the mandatory billing policy implementation. The advantages for employees of receiving unreported income are that (1) they do not need to pay income tax and social contributions from this undocumented income, and (2) they are less likely to lose some social benefits targeted toward low-income earners, such as welfare checks, free medication insurance, and subsidized day care. There is, of course, an indirect cost to being an undocumented employee in that one has to forgo social benefits designed for documented income earners, such as access to a public pension plan (the Canadian partially funded equivalent to Social Security) and unemploy-

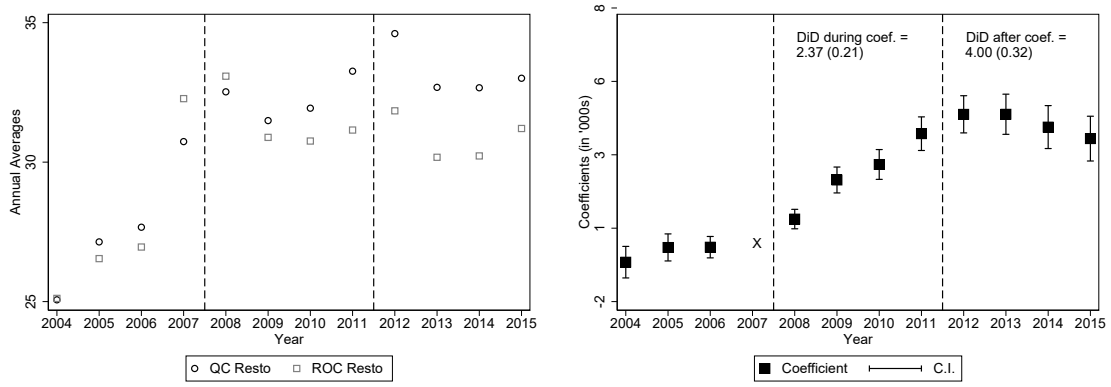


Figure 4: Effect of the Policy on the Number of Employees

Note: This figure presents the average annual reported number of employees for restaurants in Québec and the RoEC (left panel), and the coefficients from estimating equation (2) replacing the during and after dummy variables with calendar-year dummies (right panel).

ment insurance, but these benefits are likely to have only a second-order effect. For employers, there is no second-order benefit associated with foregoing hiring undocumented workers.

Figure 4 presents the effect of the policy on the total number of employees reported on a restaurant's payroll. Our baseline specification suggests that four new employees are added to the payroll after the full implementation of the mandatory billing policy. The regression results in Panel E of Table 2 show that, once we include province-specific trends, two additional employees were reported to be working in Québec restaurants, which represents an increase of 7% of the workforce in that industry. We interpret these statistically and economically significant results as the addition of over 37,000 restaurant workers (two additional workers multiplied by 18,663 restaurants),[29] suggesting that SRMs helped to formalize a number of labor force participants who were previously undocumented. Given the 370,000 unemployed individuals in the province of Québec at the end of 2011,[30] our estimate suggests that the number of unemployed individuals would have fallen by 10% if the newly formalized workers were previously unemployed, and the unemployment rate would have almost decreased by a full percentage point (from 8.7% to 7.8%).

With an average increase of the payroll of $17,000, a restaurant has to increase its social contribution, which is calculated as a payroll tax. In the province of Québec, the payroll tax in 2016 was approximately 16.5% for restaurants. Similar to the scenario in the U.S., the payroll tax in Québec

[29] If these 37,000 additional workers lived in the same municipality, it would be the 30^{th} largest in the province.
[30] https://www.stat.gouv.qc.ca/statistiques/travail-remuneration/resultats-epa-201112.pdf.

can vary from employer to employer because of the calculation of unemployment insurance premiums or the cost of some social policies (e.g., the financing of Medicare), and from one year to the next because of economic conditions. As a result of the implementation of the mandatory billing policy, we estimate that restaurants have to pay $52 million more per year[31] in payroll tax.

Because the additional $17,000 in wages becomes third-party (i.e., restaurant) reported to the fiscal authorities following the mandated use of SRMs, restaurant employees, including waiters, who were paid *under the table*, have no other choice but to declare this additional income to the tax authorities. To estimate the additional tax revenue of governments, we assumed that these wages were taxed at the lowest (positive) combined federal-provincial tax rate, which was 21% in 2016. Additionally, the province of Québec asks salaried and non-salaried individuals to contribute 6.5% of their income as social contributions. This means that we can estimate that workers who are now receiving on average $17,000 more in wages need to pay, as a group, $87 million more per year[32] in personal income tax. This is likely to be an upper bound given that a fair number of newly formalized workers may not need to pay any income tax because they remain at the low end of the income distribution.

5.3 Effect of the Policy on Taxable Income

Given the significant impact of SRMs on restaurant revenues and operating costs, it is natural to investigate their effect on taxable income. In Figure 5, the left-hand panel shows the average taxable income and the right-hand panel shows the coefficients from estimating equation (2), while replacing the during and after dummy variables with calendar-year dummies. The results show an increase in taxable income during the policy implementation phase, which is quickly reverted once the policy is fully implemented. Panel F of Table 2 shows that the effect of the mandatory billing policy disappears once we control for province-specific trends. With restaurants almost fully offsetting increases in revenues with an equivalent increase in total operating costs, we are reminded of the 96% adjustment of costs to increased revenues found by Carrillo et al. (2017).

These results imply that, despite substantial increases in sales tax revenues stemming from the mandatory billing policy, restaurants adjust their reported operating costs sufficiently so that no

[31] That is, 18,663 restaurants multiplied by 16.5% multiplied by $17,000.
[32] That is, 18,663 restaurants multiplied by 27.5% multiplied by $17,000.

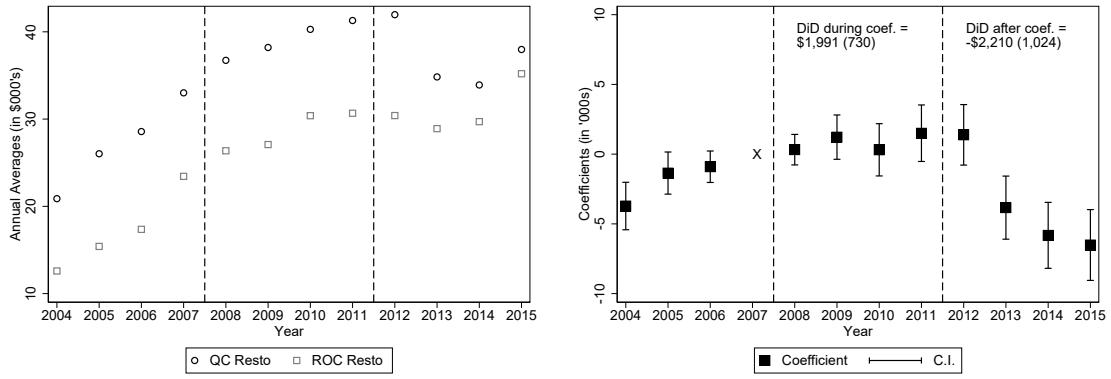


Figure 5: Effect of the Policy on Taxable Income

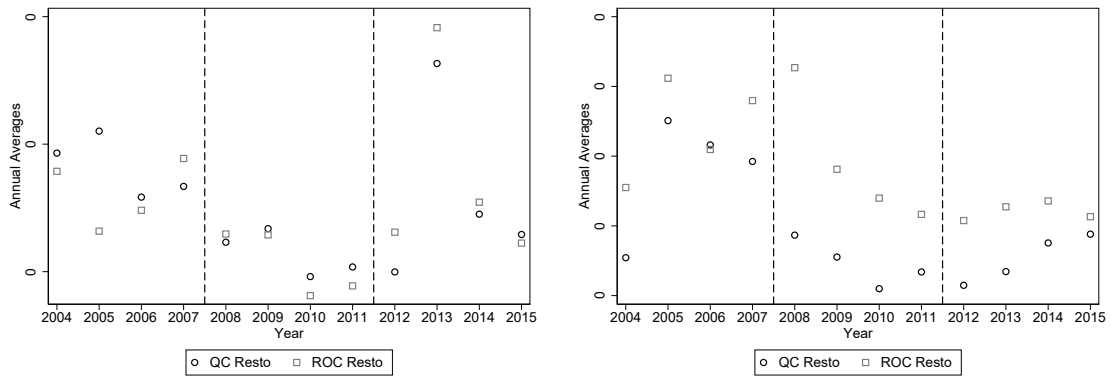
Note: This figure presents average annual reported taxable income for restaurants in Québec and the RoEC (left panel), and the coefficients from estimating equation (2) replacing the during and after dummy variables with calendar-year dummies (right panel).

additional tax revenues are collected from corporate income taxes.

5.4 Entry and Exit

Thus far, we have shown that introducing SRMs in every restaurant in the province of Québec increased their cost of doing business, if only by forcing them to pay their payroll tax, and inducing them to remit the collected sales tax to the government. By increasing the cost of doing business, SRMs could have caused restaurants to exit the market. If that is the case, then it will most likely be the under-profitable restaurants that would be forced out of the market as a result of a policy that increases sales monitoring. To fill the vacuum generated by supposedly cheating establishments exiting the restaurant industry, new productive (and compliant) establishments can enter and repopulate the industry, being fully aware of the stricter monitoring policy. Additionally, the introduction of SRMs also acts as a market disrupter in the sense that restaurant owners may feel that it introduces risk in the payment system because of the new technology. This means that the mandatory billing policy using SRMs could have delayed the opening of new restaurants as owners waited for the technological uncertainty to be resolved. Because the mandatory billing policy and the advent of SRMs affected the entire restaurant industry, we have an almost ideal laboratory to investigate the effect of tighter fiscal monitoring on industry-level firm creation and destruction.

As an initial test, Figure 6 plots the aggregate entry (right panel) and exit (left panel) rates for



(a) Entry (b) Exit

Figure 6: Entry Exit

Note: This figure presents average annual entry and exit rates for restaurants in Québec and the RoEC.

Québec and RoEC restaurants. There does not seem to be an obvious pattern in the proportion of restaurants that enter the industry, although the exit rate seems to decrease once the policy is fully implemented. Table 3 quantifies the results displayed in the previous Figure 6 and shows that an additional 2.5% of restaurants exited the Québec market as a result of the mandatory billing policy. This suggests that the introduction of the mandatory billing policy using SRMs in the province of Québec did not cause more restaurants to become inactive, but instead decreased the exit rate of restaurants. A reason may be that the additional *tax reporting cost* associated with the introduction of SRMs (i.e., the remittance of sales tax and the payment of payroll tax) was not sufficiently large to induce, by itself, the closing of any establishments. Instead the policy leveled the playing field for business owners who, perhaps, had a difficult time staying open without cheating before the policy was implemented.

5.5 Effect of Establishment Size

Next, we investigate how the increase in reported sales varies with the size of an establishment. Theory suggests that evading taxes is easier in smaller firms because the cost of sustaining a collusion equilibrium increases with the number of agents involved (Kleven et al., 2016). We investigate the role of the restaurant size in two different ways. First, we proxy for size using a variable that identifies single – accounting for 98% of all restaurants in the country – and multiple-establishment restaurants. Because it is costlier to sustain collusion across many establishments, the policy's ef-

fect should be smaller for restaurants that operate out of multiple establishments. The results from estimating equation (2) on the subsamples of multiple and single establishments shown in Table 4 show no effect of the mandatory billing policy on multiple-establishment restaurants; a result that is consistent with the hypothesis that collusion to suppress sales is more difficult and thus less prevalent in these restaurants. For single-establishment restaurants, the point estimates of the regression models of sales, wages, and other expenses are, not surprisingly, higher that our baseline findings of Table 2.

In our second examination of the role of restaurant size, we investigate the effect of the mandatory billing policy along the distribution of sales, wages, and other expenses using a set of quantile regressions. Table 5 presents the results of estimating equation (2) at the 10th, 25th, 50th, 75th, and 90th percentiles. The results show an increase in the impact of the introduction of SRMs on sales and wages at every point of the distribution, except for the highest decile, and the results show no significant impact at better than the 10% level for other expenses. This suggests that firms with larger sales and larger wages, do not respond to the mandatory billing policy, consistent with a model in which the difficulty of sustaining a collusion equilibrium increases with the number of agents involved (Kleven et al., 2016).

5.6 Triple Differences

Despite the annual trends of the variables of interest for Québec and RoEC restaurants moving closely together before the introduction of SRMs and the mandatory billing policy, one concern is that some aggregate shocks to the Québec economy caused an increase in real activity, leading to an increase in restaurant sales, their operating costs, and employment. To rule out this alternative hypothesis, in our analysis, we include a control group whose operations are highly correlated with activities in the restaurant industry, but were not affected by the introduction of SRMs. The industry group corresponding to *Bars* (NAICS code 7224 – Drinking Places), is a good candidate: Bars were not subject to the "Mandatory Billing" policy during the years under study[33] and, similar to restaurants, they are labor intensive organizations.

Figure 7 presents the average outcomes for the main variables we study separately for restaurant and bars, for Québec and the RoEC, whereas Figure 8 shows the coefficients from estimating

[33]SRMs were introduced in bars starting in 2016.

Equation (3) replacing the DURING and AFTER dummy variables with calendar-year dummies. Table 6 quantifies the effect by estimating Equation (3) on the main outcomes studied in our analysis. Most results remain qualitatively the same. Sales increase by about $57,000 annually after the introduction of SRMs – a point estimate that is slightly larger than the $37,000 in the main regression of Table 2. Wages paid increase more than what we had in the body of the paper ($34,618 in Table 6 versus $16,711 in Table 2), and the increase in the number of employees is smaller at 1.28, although still significantly different from zero at the 10% significance level in regression specification 3. Taxable income is now significantly positive, suggesting an increase of about $6,500 per restaurant in taxable income following the introduction of SRMs. Using the point estimates of the triple DiD approach[34] and using the same calculation as before, additional tax revenues collected annually by the government of Québec are estimated to be of the order of $159M in sales tax remittance, $175M in personal income taxes and employee social contributions, $105M in payroll taxes, and $23M in corporate income tax.[35] The total amounts to $462 million in additional taxes annually, for a one-time implementation cost of approximately $37M.

6 Conclusion

We study the introduction of a *tax-tech* device in every restaurant in a single Canadian province as part of that province's mandatory billing policy intended to fight tax evasion. In Canada, tax evasion represents 12% of total tax revenues, including 7.1% of revenues generated by its GST, which is equivalent to VAT. Sales Recording Modules (SRMs) are credible enforcement devices that considerably reduce the effectiveness of electronic sales suppression tools such as phantomware and zappers. We document a large increase in reported sales for restaurants affected by the policy, with the most substantial increase found for smaller or single-establishment restaurants. Because of Canada's VAT-like system, increasing expenses to offset the increase in reported revenues can almost only be done through non-VAT expenses, such as wages. In accordance with theory, we find robust and economically significance evidence that wages increased following the introduc-

[34] Note that using the triple DiD approach generates slightly noisier point estimates than in the DiD approach.

[35] That is the sum of, for the 18,663 restaurants in the province, (i) $57,000 in increased sales multiplied by tax rate 14.975%; (ii) $34,000 in additional wages multiplied by 27.53%, which is the sum of the lowest marginal tax rate in Canada and the employee's contribution rate to social programs; (iii) $34,000 in additional wages paid multiplied by a payroll tax of 16.5%; and (iv) $6,500 in additional taxable income multiplied by the Québec plus federal corporate income tax rates applicable to these establishments of 18.5%.

tion of SRMs. Additionally, we find that the number of reported employees increased in the same proportion as wages and sales.

According to our best point estimates, we document a collective effect on tax revenues of $242 million from three major sources: sales tax remittance ($103M), payroll taxes ($52M), and personal income taxes and social contributions ($87M). We find no significant impact on corporate income taxes. Taking into consideration industries similar to that of restaurants in a triple DiD approach (i.e., drinking places and bars), we find that the government of the province of Québec was able to recoup almost $462 million in unpaid taxes and social contributions as a result of the introduction of the SRMs. The costs of implementing the program for the government are in large part caused by subsidizing the equipment to restaurants during the initial roll-out of the program;[36] the one-time cost of the policy was $37M.[37]

By introducing a device such as an SRM in mostly cash businesses, governments no longer need to rely so much on independent third-party information (e.g., credit card companies, banks, and suppliers) to validate a firm's total sales and the sales tax to be remitted. This information can instead be obtained directly from the firms through a device, which becomes necessary to legally operate a business. Audit costs are further reduced overall because tax authorities no longer need to rely on reports from different sources.

Finally, our findings provide evidence of tax enforcement spillover as the fight against sales tax non-remittance generates tax revenues from the payroll tax, labor income tax, and social contributions. To the best of our knowledge, we are the first to document the existence of internal spillover effects of tax enforcement. With respect to other externalities, it appears that the tax enforcement device we examine has a spillover effect on the overall budget of tax agencies. Taking for granted the OECD's estimate that the introduction of SRMs decreases the auditing time of any single restaurant from 70 hours to 3 hours (OECD, 2017), we can conclude that the *tax-tech* device generates benefits that are not assignable to a single entity in the targeted industry.

[36] The machines were free for existing restaurants during the implementation period, and then the costs started to be borne by restaurants themselves after implementation. More precisely, the government of Québec subsidized the purchase of two SRMs on average (at a cost of $1,000 per SRM) for each active restaurant in the province.

[37] Assuming a life expectancy of five years for the SRM device (the IBM warranty is for five years), and assuming that the annual additional revenue that resulted from the SRM remains at $242M for those seven years, the one-time $37M implementation cost generates a clear positive net present value for the tax authorities in the order of $1 billion (using a 5% discount rate).

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Tables

Table 1: Descriptive Statistics

	Restaurants		Bars	
	Québec	RoEC	Québec	RoEC
A. Income Statement (CAD 000's)				
Sales	764	852	481	581
	(1,009)	(1,192)	(563)	(706)
Other Revenues	11	10	29	25
	(43)	(42)	(64)	(60)
Wages	260	241	151	144
	(341)	(358)	(183)	(187)
Other Expenses	495	612	340	458
	(663)	(835)	(389)	(522)
Taxable Income	34	26	29	19
	(74)	(68)	(55)	(55)
Taxes Paid	6	4	5	3
	(14)	(12)	(12)	(10)
B. Balance Sheet (CAD 000's)				
Assets	298	320	259	285
	(459)	(492)	(349)	(453)
Liabilities	232	280	154	247
	(334)	(375)	(244)	(339)
Equity	66	39	104	36
	(268)	(292)	(242)	(300)
C. Other Firm Characteristics				
Number of Employees	33	33	18	23
	(67)	(65)	(23)	(30)
Firm Age	10	10	12	12
	(7)	(7)	(7)	(7)
Nbr of Firms	18,663	33,147	2,615	1,804
Nbr of Observations	95,860	169,704	16,384	9,600

Note: This table reports descriptive statistics for the main variables used in the analysis. Panel A presents items from the firm's income statement (Form T2). Total revenues are separated as sales (net-of-taxes) and other revenues, and total expenses are separated as wages paid and other expenses. Taxable income is the firm's net income for tax purposes, and taxes paid is calculated as the difference between net income before tax treatments and net income after tax treatments. In Panel B, balance sheet items come from the General Index of Financial Information form. The number of employees is calculated as the number of T4 slips reported by the firm. Firm age is measured from the first year the business filed a T2 form.

Table 2: All Specifications DiD

	(1)	(2)	(3)	(4)
A. Sales				
QC × After	46,433 ***	36,664 ***	36,868 ***	0.057 ***
	(9,569)	(6,829)	(6,817)	(0.012)
QC × During	23,609 ***	14,096 ***	14,122 ***	0.024 ***
	(5,720)	(4,638)	(4,636)	(0.008)
R^2	0.0259	0.0259	0.0274	0.0028
B. Other Revenues				
QC × After	2,243 ***	1,326	1,311	-0.037
	(609)	(927)	(927)	(0.081)
QC × During	1,357 ***	676	654	-0.089 *
	(432)	(586)	(586)	(0.051)
R^2	0.0072	0.0072	0.0075	0.0117
C. Wages				
QC × After	23,664 ***	16,669 ***	16,711 ***	0.059 ***
	(3,102)	(2,214)	(2,208)	(0.013)
QC × During	7,454 ***	2,550 *	2,555 *	0.017 *
	(1,834)	(1,425)	(1,424)	(0.009)
R^2	0.062	0.062	0.0633	0.0163
D. Other Expenses				
QC × After	24,150 ***	16,229 ***	16,403 ***	0.033 *
	(6,521)	(4,860)	(4,854)	(0.017)
QC × During	16,025 ***	9,413 ***	9,439 ***	0.023 **
	(3,896)	(3,343)	(3,342)	(0.011)
R^2	0.0134	0.0134	0.0152	0.0057
E. Taxable Income				
QC × After	-2,210 **	692	721	0.057
	(1,024)	(1,044)	(1,044)	(0.056)
QC × During	1,991 ***	243	241	-0.053
	(730)	(705)	(705)	(0.040)
R^2	0.0094	0.0099	0.0103	0.0107
F. Number of Employees				
QC × After	4.00 ***	2.00 ***	2.01 ***	0.07 ***
	(0.32)	(0.29)	(0.29)	(0.01)
QC × During	2.37 ***	0.90 ***	0.90 ***	0.03 ***
	(0.21)	(0.20)	(0.20)	(0.01)
R^2	0.015	0.015	0.017	0.019
Firm FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Province FE	✓	✓	✓	✓
Province x Trend		✓	✓	✓
Region x Trend			✓	✓
Logs				✓

Note: This table shows the results of estimating equation (2) using different specifications. The first three columns are estimated in levels, whereas the last column presents a log specification. We use the panel of active restaurants during years 2004 to 2015. QC is a dummy variable equal to one if the restaurant operates in Québec, and 0 otherwise. After is a dummy variable indicating years after the policy intervention was fully implemented. During is a dummy variable indicating years during which the policy was rolled out. Standard errors corrected for within-account heteroscedasticity are presented in parentheses. ***, ***, and * represent significance at the 1, 5, and 10% levels, respectively.

Table 3: Entries and Exits

	(1)	(2)	(3)
A. Entry			
QC × After	-0.003	-0.008	-0.008
	(0.003)	(0.007)	(0.007)
QC × During	-0.002	0.014 ***	0.014 ***
	(0.003)	(0.005)	(0.005)
R^2	0.0927	0.0929	0.093
B. Exit			
QC × After	-0.009 ***	-0.025 ***	-0.025 ***
	(0.002)	(0.004)	(0.004)
QC × During	-0.010 ***	-0.020 ***	-0.021 ***
	(0.002)	(0.003)	(0.003)
R^2	0.0026	0.0027	0.0028
Firm FE	✓	✓	✓
Year FE	✓	✓	✓
Province FE	✓	✓	✓
Province x Trend		✓	✓
Region x Trend			✓

Note: This table shows the results of estimating equation (2) using different specifications. We estimate linear probability models to include firm fixed effects in the specifications. We use the panel of all restaurants during years 2004 to 2015, and model entries and exits as the first and last years in which the restaurant is active, respectively. QC is a dummy variable equal to one if the restaurant operates in Québec, and 0 otherwise. After is a dummy variable indicating years after the policy intervention was fully implemented. During is a dummy variable indicating years during which the policy was rolled out. Standard errors corrected for within-account heteroscedasticity are presented in parentheses. ***, ***, and * represent significance at the 1, 5, and 10% levels, respectively.

Table 4: Single vs. Multiple Establishments

	Single Establishments		Multiple Establishments	
	(1)	(2)	(3)	(4)
A. Sales				
QC × After	42,107 ***	0.059 ***	-173,488	-0.182 *
	(6,926)	(0.013)	(124,121)	(0.094)
QC × During	14,857 ***	0.024 ***	-139,293	-0.095
	(4,567)	(0.008)	(99,406)	(0.078)
R^2	0.0269	0.003	0.012	0.0081
B. Other Revenues				
QC × After	1,083	-0.064	27,153 *	0.933 *
	(918)	(0.083)	(16,241)	(0.480)
QC × During	551	-0.101 *	11,828	0.579 *
	(582)	(0.052)	(12,409)	(0.342)
R^2	0.0077	0.0119	0.0121	0.0148
C. Wages				
QC × After	18,038 ***	0.060 ***	-36,318	-0.114 *
	(2,237)	(0.013)	(31,104)	(0.062)
QC × During	2,670 *	0.017 *	-32,914	-0.061
	(1,408)	(0.009)	(22,448)	(0.048)
R^2	0.0645	0.0163	0.0289	0.0113
D. Other Costs				
QC × After	19,130 ***	0.036 **	-69,012	-0.136
	(4,912)	(0.017)	(102,782)	(0.128)
QC × During	9,061 ***	0.023 **	-33,148	-0.092
	(3,272)	(0.011)	(84,627)	(0.086)
R^2	0.0142	0.0062	0.0183	0.0121
E. Taxable Income				
QC × After	598	0.057	14,034	-0.059
	(1,025)	(0.057)	(19,737)	(0.279)
QC × During	330	-0.058	3,471	0.074
	(699)	(0.041)	(14,892)	(0.200)
R^2	0.0103	0.0108	0.0285	0.0128
F. Number of Employees				
QC × After	2.08 ***	0.070 ***	-8.80 *	-0.02
	(0.29)	(0.010)	(4.96)	(0.08)
QC × During	0.83 ***	0.033 ***	-3.56	0.02
	(0.20)	(0.007)	(3.51)	(0.05)
R^2	0.017	0.019	0.080	0.055
Firm FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Province FE	✓	✓	✓	✓
Province x Trend	✓	✓	✓	✓
Region x Trend	✓	✓	✓	✓
Logs		✓		✓

Note: This table shows the results of estimating equation (2) using different specifications for single and multiple establishments. The first and third columns are estimated in levels, whereas the second and fourth columns present log specifications. We use the panel of active restaurants during years 2004 to 2015. QC is a dummy variable equal to one if the restaurant operates in Québec, and 0 otherwise. After is a dummy variable indicating years after the policy intervention was fully implemented. During is a dummy variable indicating years during which the policy was rolled out. Standard errors corrected for within-account heteroscedasticity are presented in parentheses. ***, ***, and * represent significance at the 1, 5, and 10% levels, respectively.

Table 5: Size of the Firm

	10th	25th	50th	75th	90th
A. Sales					
QC × After	13,603 **	16,190 *	31,315 *	69,120 *	39,761
	(6,693)	(9,682)	(17,152)	(38,320)	(95,102)
QC × During	5,102	5,992	19,263 **	48,739 **	83,130
	(3,680)	(5,472)	(9,676)	(21,270)	(55,863)
Pseudo-R^2	0.0045	0.0079	0.0133	0.0209	0.043
B. Wages					
QC × After	1,674	6,787 **	12,387 **	23,683 *	33,931
	(1,788)	(2,736)	(5,542)	(14,209)	(32,011)
QC × During	1,603	4,378 ***	9,003 ***	24,346 ***	31,197
	(976)	(1,484)	(3,041)	(7,812)	(19,101)
Pseudo-R^2	0.0072	0.0148	0.0231	0.0317	0.0477
C. Other Costs					
QC × After	3,331	9,030	17,868 *	38,353	32,640
	(4,759)	(6,345)	(10,839)	(26,182)	(66,487)
QC × During	1,699	3,706	14,790 **	16,230	54,180
	(2,541)	(3,554)	(6,223)	(14,696)	(37,230)
Pseudo-R^2	0.0047	0.0069	0.0103	0.0194	0.0415

Note: This table shows the results of estimating equation (2) using quantile regressions. We use the panel of active restaurants during years 2004 to 2015. QC is a dummy variable equal to one if the restaurant operates in Québec, and 0 otherwise. After is a dummy variable indicating years after the policy intervention was fully implemented. During is a dummy variable indicating years during which the policy was rolled out. The regressions control for calendar-year fixed effects, province fixed effects and a province-specific quadratic year trend, economic regions fixed effects and an economic-region-specific quadratic year trend, and a dummy for end-of-fiscal-year month. Standard errors corrected for within-account heteroscedasticity are presented in parentheses. ***, ***, and * represent significance at the 1, 5, and 10% levels, respectively.

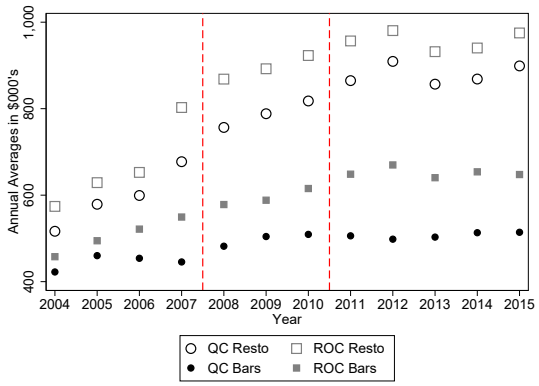
Table 6: All Specifications 3ple Diff

	(1)	(2)	(3)	(4)
A. Sales				
QC × After × Resto	57,280 ***	57,280 ***	57,810 ***	0.095 ***
	(20,226)	(20,226)	(20,212)	(0.035)
QC × During × Resto	20,274	20,274	20,489	0.054 **
	(12,693)	(12,693)	(12,682)	(0.024)
R^2	0.0252	0.0252	0.0265	0.0064
B. Other Revenues				
QC × After × Resto	-941	-941	-949	0.072
	(2,709)	(2,709)	(2,709)	(0.149)
QC × During × Resto	427	427	415	0.054
	(1,649)	(1,649)	(1,649)	(0.098)
R^2	0.0068	0.0068	0.0071	0.0118
C. Wages				
QC × After × Resto	34,486 ***	34,486 ***	34,618 ***	0.103 ***
	(6,177)	(6,177)	(6,177)	(0.037)
QC × During × Resto	11,312 ***	11,312 ***	11,392 ***	0.050 **
	(3,686)	(3,686)	(3,689)	(0.025)
R^2	0.0601	0.0601	0.0613	0.0154
D. Other Expenses				
QC × After × Resto	10,022	10,022	10,429	-0.022
	(14,173)	(14,173)	(14,159)	(0.039)
QC × During × Resto	3,485	3,485	3,572	0.015
	(9,233)	(9,233)	(9,223)	(0.027)
R^2	0.0134	0.0134	0.0149	0.0085
F. Number of Employees				
QC × After × Resto	1.26	1.26	1.28 *	-0.03
	(0.77)	(0.77)	(0.77)	(0.03)
QC × During × Resto	1.26 **	1.26 **	1.28 **	0.01
	(0.52)	(0.52)	(0.52)	(0.02)
R^2	0.016	0.016	0.017	0.020
E. Taxable Income				
QC × After × Resto	6,503 **	6,503 **	6,522 **	0.191
	(2,970)	(2,970)	(2,970)	(0.157)
QC × During × Resto	4,808 **	4,808 **	4,813 **	0.079
	(1,888)	(1,888)	(1,888)	(0.111)
R^2	0.0099	0.0099	0.0103	0.0107
Firm FE	✓	✓	✓	✓
Year x Province FE	✓	✓	✓	✓
Resto x Province FE	✓	✓	✓	✓
Resto x Year FE	✓	✓	✓	✓
Province x Quad Trend		✓	✓	✓
Region x Quad Trend			✓	✓
Logs				✓

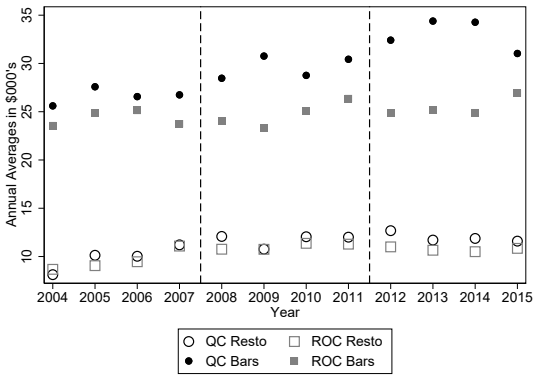
Note: This table shows the results of estimating equation (3) using different specifications. The first three columns are estimated in levels, whereas the last column presents a log specification. We use the panel of active restaurants and bars during years 2004 to 2015. QC is a dummy variable equal to one if the restaurant operates in Québec, and 0 otherwise. After is a dummy variable indicating years after the policy intervention was fully implemented. During is a dummy variable indicating years during which the policy was rolled out. Resto is a dummy variable indicating whether the firm is a restaurant. Standard errors corrected for within-account heteroscedasticity are presented in parentheses. ***, ***, and * represent significance at the 1, 5, and 10% levels, respectively.

Additional Graphs

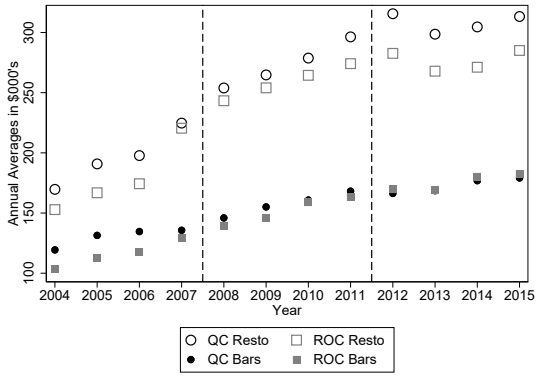
Figure 7: 3ple Averages



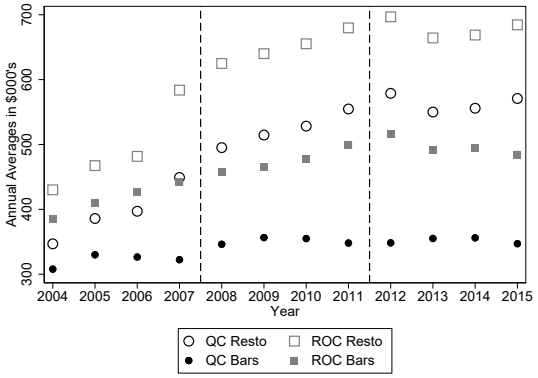
(a) Sales



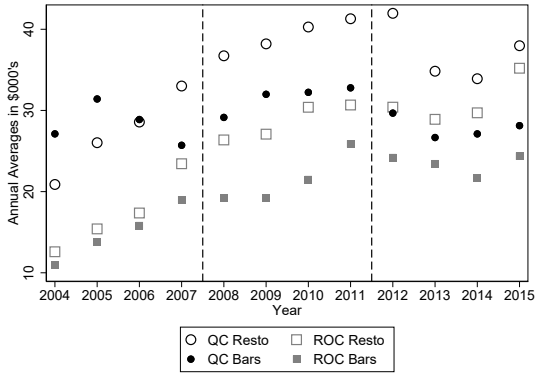
(b) Other Revenues



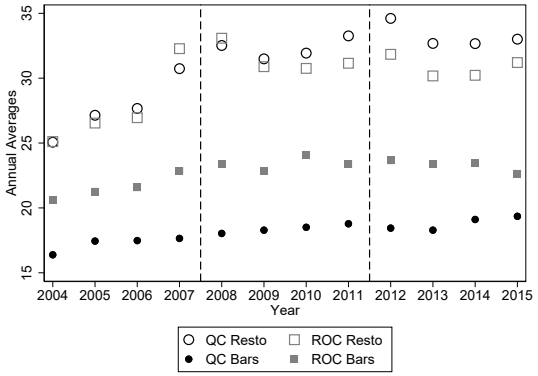
(c) Wages



(d) Other Costs



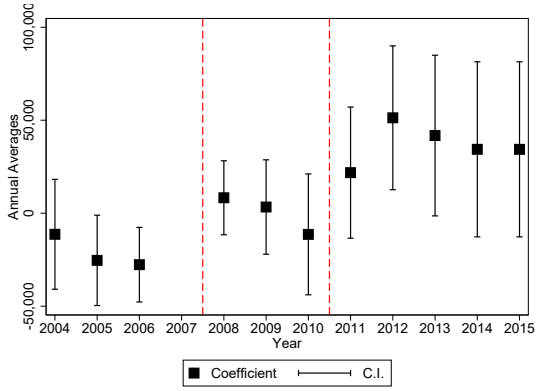
(e) Taxable Income



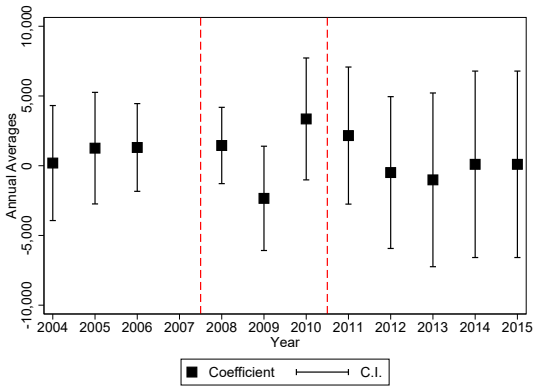
(f) Number of Employees

Note: This figure presents average outcomes for Quebec and RoEC restaurants and bars. We use the panel of active restaurants and bars during years 2004 to 2015.

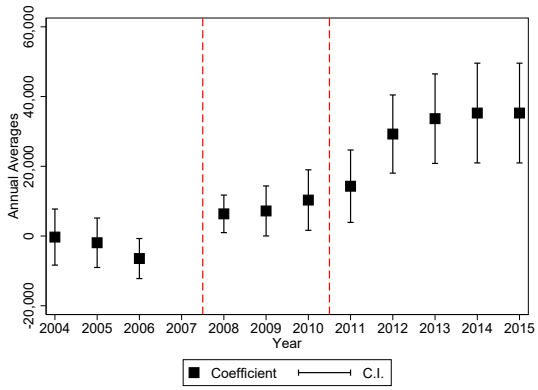
Figure 8: 3ple Coefs



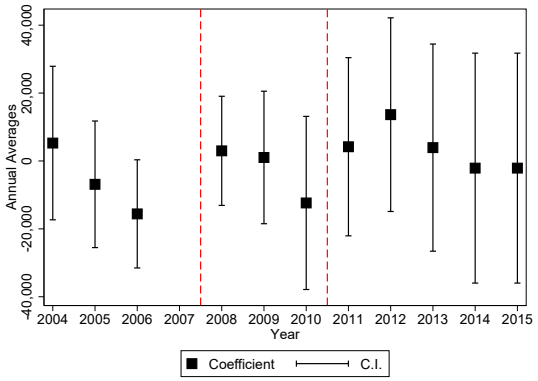
(a) Sales



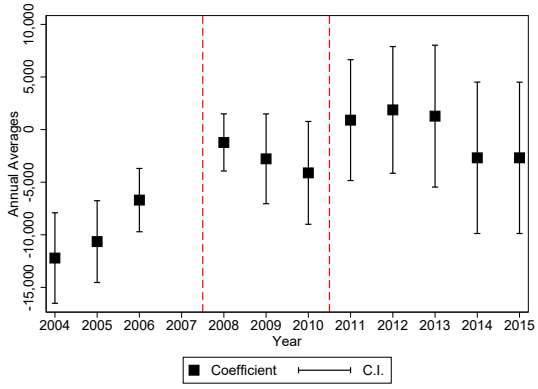
(b) Other Revenues



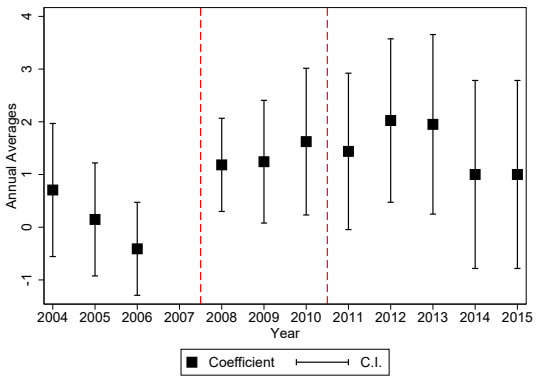
(c) Wages



(d) Other Costs



(e) Taxable Income



(f) Number of Employees

Note: This figure presents the coefficients from estimating equation (3) replacing the during and after dummy variables with calendar-year dummies (right panel). We use the panel of active restaurants and bars during years 2004 to 2015. Confidence intervals are presented using standard errors corrected for within-account heteroscedasticity.

A Data Appendix

A.1 Control Group Justification

In this Appendix, we detail the construction of our sample used in the main analysis. First, the control provinces used in our main analysis have to be chosen. Our choice is guided by the fact that Canadian provinces are affected by different macro-economic shocks; particularly, western Canada is known to be dependent on the oil economy, in contrast to eastern Canada. For this reason, we select only provinces neighboring Québec as the control in our analysis: control provinces are Ontario, New-Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador. To verify the validity of this choice, we start by investigating provincial-level trends in our main outcome variables, province-by-province, and across restaurants and bars in Figure A.1.[38] These trends represent the disaggregated values for the averages of the RoEC presented our main analysis. It can be seen that each province seems to be following a similar trend. To further justify our choice of neighboring provinces, we show in Figure A.2 that, in terms of average sales, western provinces (British Columbia, Alberta, Saskatchewan, and Manitoba) would not be valid control groups.

A.2 Sample Construction

Given our choice of treatment and control groups, we start with the universe of 106,938 establishments in these provinces between 2004 and 2015 that are defined as restaurants and drinking places (i.e., bars), as defined by the firms' NAICS codes: 7225 for full-service restaurants and limited-service eating places, and 7224 for drinking places. This provides a total of 563,835 observations. This corresponds to 33,323 and 64,811 restaurants, and 4,794 and 4,010 bars in Québec and the RoEC, respectively.

We drop 11,173 observation years for firms that operate in multiple provinces or in multiple sectors of activity. This affects a total of 2,562 firms. Because the restaurant industry has a large turnover, a substantial part of our sample has missing variables in some years for the set of outcomes that we seek to analyze. This typically occurs in the last years before a restaurant ultimately

[38] Although included in the averages used in the main analysis, we cannot display the year-by-year averages for Prince Edward Island as the number of observations per year does not satisfy the confidentiality requirements of Statics Canada.

closes down, a time at which it is essentially considered inactive. For this reason, we drop 220,242 observation years with missing data for variables we analyze, which affects a total of 85,534 firms, in some select years. We further drop 40,872 observation years for which the firm is listed as inactive. This affects a total of 20,522 firms in select years. Because we are required to drop a substantial amount of observation years for firms that do not have a full set of variables needed in our analysis, we re-estimate our main model to make sure our results are robust to including these firms. The year-by-year coefficients for the re-estimated DiD model are presented in Figure A.3, and the estimated coefficients for the during and after periods are presented in Table A.1. Because of the many missing observations, we omit the log specification in these results. The results show that our main results are qualitatively unchanged, although an attenuation bias plagues this sample as many firms have missing or zero values for their reported sales.

Finally, we have a total of 56,229 firms: 18,663 and 33,147 restaurants, in addition to 2,615 and 1,804 bars in Québec and the RoEC, respectively. Our final sample is therefore composed of 265,564 and 25,984 firm-year observations for restaurants and bars, respectively.

A.3 Variables

We use Statistics Canada's NALMF, which is an administrative dataset that includes anonymized tax records on nearly all businesses operating in Canada, regardless of whether they are incorporated. The data are at the firm level and provide a full set of annual financial statements. The information provided by the data comes from the Corporate Income Tax Form (T2 Schedule 200) and the General Index of Financial Information, from which are calculated the firm's balance sheet (T2 Schedule 100) and income statement (T2 Schedule 125), and from the Statement of Remuneration Paid (T4). From these, we generate our main variables of interest:

- **Sales** are taken from item 8089 in Schedule 125;
- **Other Revenues** are taken from item 8289 in Schedule 125;
- **Wages** are taken from the sum of all wages and salaries submitted as T4 slips;
- **Other Expenses** are taken from the sum of items 8518 and 9367 in Schedule 125, minus wages (sum of T4 slips);

- **Taxable Income** is taken from item 36 in Schedule 200; and
- **Number of Employees** is taken from the number of different T4 slips.

All items included in Schedule 100 (Balance Sheet), Schedule 125 (Income Statement), Schedule 200 (Corporate Income Tax), and T4 slips (Statements of Remuneration), respectively, are as follows: **1. Schedule 100 - Balance Sheet Information**

- Assets = Total Assets (item 2599): The total of all current, capital, long-term assets and assets held in trust.
- Liabilities = Total Liabilities (item 3499): The total of all current and long-term liabilities.
- Equity = Total Shareholder Equity (item 3620): The sum of all shareholder equity accounts.

2. Schedule 125 - Income Statement Information

- Sales = Total sales of goods (item 8089): Trade sales of goods and services (8000) + Sales of goods and services to related parties (8020) + Interdivisional sales (8030) + Sales from resource properties (8040).
- Other Revenues = Total Revenues (item 8299) - Total sales of goods (item 8089). Sum of all revenues other than the Total sales of goods. Investment revenue (8089) + Interest income (8100) + Commission revenue (8120) + Rental revenue (8140) + Vehicle leasing (8160) + Fishing revenue (8160) + Realized gains/losses on disposal of assets (8210) + NPO amounts received (8220) + Other Revenue (8230).
- Cost of sales = Total cost of sales (item 8518): Sum of all cost of sales. Opening Inventory (8300) + Purchases/cost of materials (8320) + **Direct wages (8340) + Benefits on direct wages (8360)** + Trades and sub-contracts (9360)+ Production costs other than resource (8370) + Resource production costs (8400) + Crown charges (8435) + Other direct costs (8450) + Closing inventory (8500).
- Operating Expenses = Total Operating Expenses (item 9367): Sum of all operating expense amounts. Advertising and promotion (8520) + Amortization of intangible assets (8570) +

Goodwill impairment loss (8571) + Bad debt expense (8590) + Loan losses (8610) + Employee benefits (8620) + Amortization of natural resource assets (8650) + Amortization of tangible assets (8670) + Insurance (8690) + Interest and bank charges (8710) + Interest paid (8740) + Business taxes, licenses, and memberships (8760) + New Brunswick tax on large corporations (8780) + Nova Scotia tax on large corporations (8790) + Office expenses (8810) + Professional fee (8860) + Rental (8910) + Repairs and maintenance (8960) + Other repairs and maintenance (9010) + **Salaries and wages not found in cost of sales (9060)** + Sub-contracts (9110) + Supplies (9130) + Computer-related expenses (9150) + Property taxes (9180) + Travel expenses (9200) + Utilities (9220) + Other expenses (9270)

- Taxes Paid = Net income before tax and extraordinary items (item 9970) - Net Income after tax and extraordinary items (combines many lines): This gives the net amount of taxes paid.
  - Net income before tax and extraordinary items (item 9970): Sum of Net non-farming income (9369) and Net farm income (9899)
  - Net income after tax and extraordinary items: Net income before taxes and extraordinary items (9970) - Extraordinary items (9975) - Legal settlements (9976) + Unrealized gains/losses (9980) - Unusual items (9985) - Current income taxes (9990) - Future income tax provision (9995) + Total other comprehensive income (998)

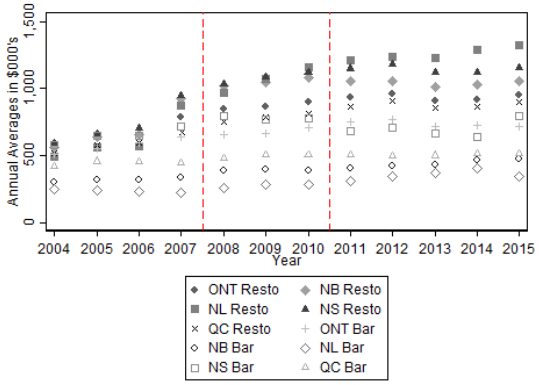
3. Schedule 200 - Corporation Income Tax Return

- Taxable income = Taxable Income (item 360): Calculated by taking next income after deductions (Amount 'C' on the tax form) and adding in special additions (Line 355) .

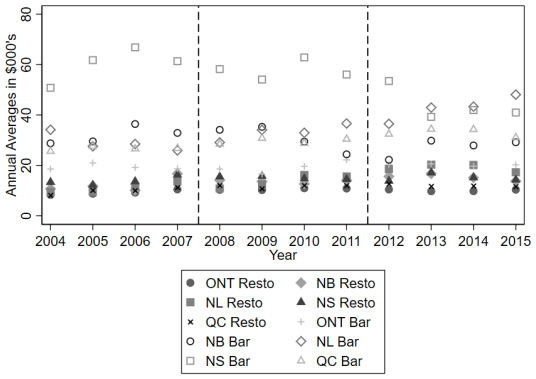
4. T4 - Statements of Remuneration Paid

- Total wages: Sum of all wages and salaries from submitted T4s with valid Social Insurance Numbers
- Number of employees: The number of T4 slips from employees with valid SINs.

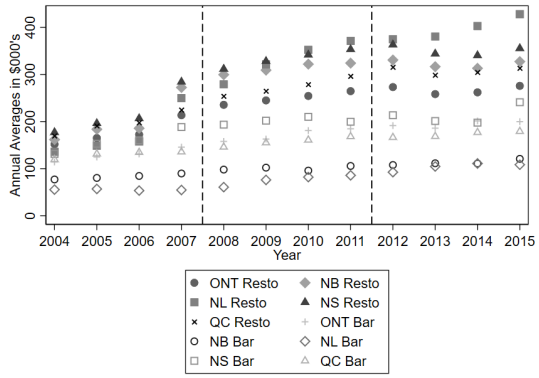
Figure A.1: 3ple Provinces



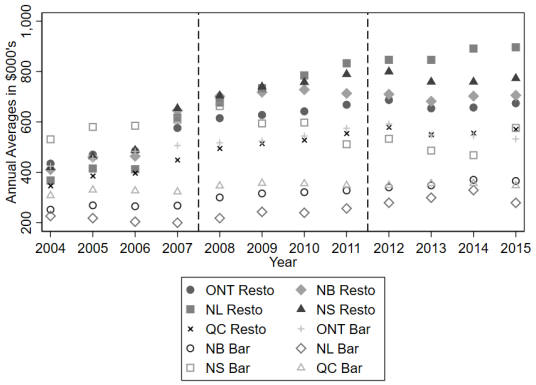
(a) Sales



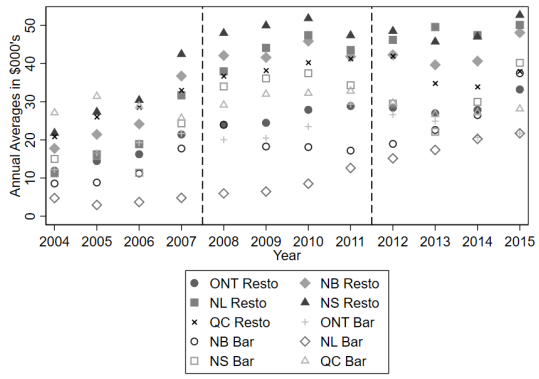
(b) Other Revenues



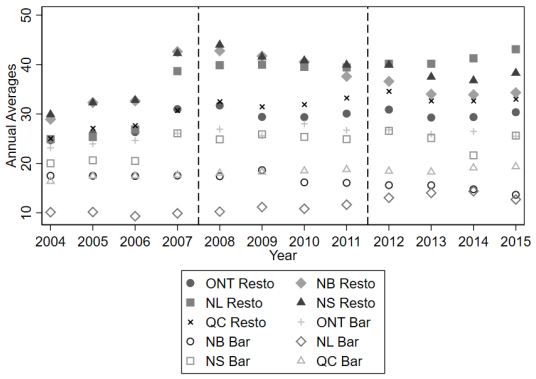
(c) Wages



(d) Other Costs



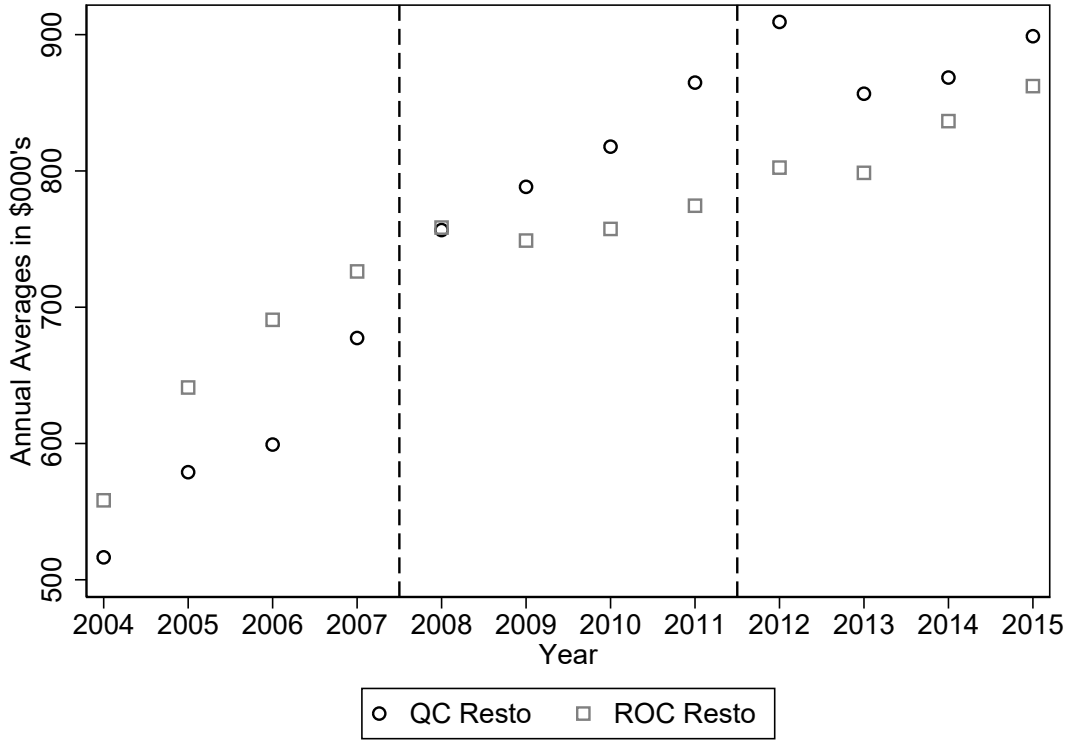
(e) Taxable Income



(f) Number of Employees

Note: This figure presents average outcomes for restaurants and bars in Quebec and each province of the RoEC. We use the panel of active restaurants and bars during years 2004 to 2015. We omit the averages for Prince Edward Island as the number of observations per year does not satisfy the confidentiality requirements of Statics Canada.

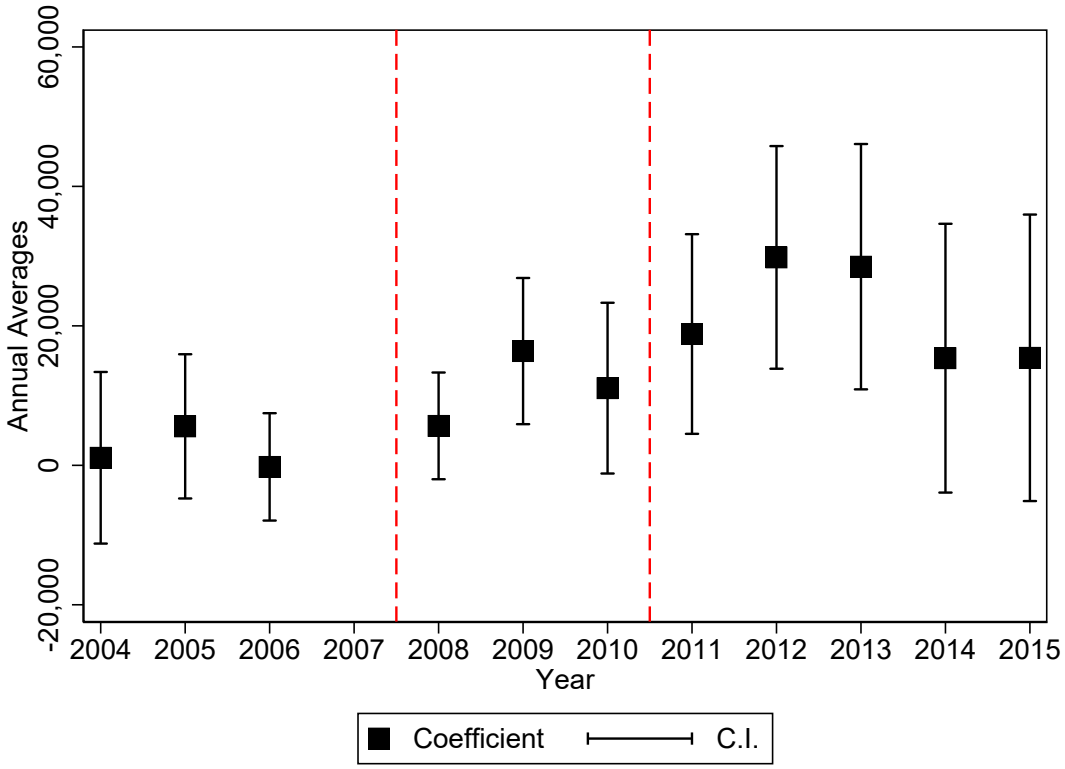
Figure A.2: Wrong Provinces



(a) Sales

Note: This figure presents average outcomes for restaurants and bars in Quebec and provinces of the rest of western Canada, which are excluded from our main analysis. We use the panel of active restaurants and bars during years 2004 to 2015.

Figure A.3: Sales: Full Sample (includes missing variables)



(a) Sales

Note: This figure presents the coefficients from estimating equation (2) replacing the during and after dummy variables with calendar-year dummies (right panel). We use the panel of all restaurants (regardless of whether they are active) during years 2004 to 2015. Confidence intervals are presented using standard errors corrected for within-account heteroscedasticity.

Table A.1: Sales: Full Sample (includes missing variables)

	(1)	(2)	(3)
QC × After	19,681 **	27,753 ***	27,959 ***
	(8,725)	(6,644)	(6,655)
QC × During	10,632 *	9,974 **	9,985 **
	(5,531)	(4,551)	(4,563)
R^2	0.009	0.009	0.010
Firm FE	✓	✓	✓
Year FE	✓	✓	✓
Province FE	✓	✓	✓
Province x Trend		✓	✓
Region x Trend			✓

Note: This table shows the results of estimating equation (2) using different specifications. We use the panel of all restaurants (regardless of whether they are active) during years 2004 to 2015. QC is a dummy variable equal to one if the restaurant operates in Québec, and 0 otherwise. After is a dummy variable indicating years after the policy intervention was fully implemented. During is a dummy variable indicating years during which the policy was rolled out. Standard errors corrected for within-account heteroscedasticity are presented in parentheses. ***, ***, and * represent significance at the 1, 5, and 10% levels, respectively.