The Impact of Corporate Tax Cuts on Wages and Employment: Evidence from Quebec, Canada

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1. Introduction

Small businesses, usually considered as businesses that corporations, partnerships, or sole proprietorships which have a small number of employees or less annual revenues (Wikipedia, 2023), are an important constituent part of an economy. In Canada, small businesses make up 98.1 percent of all businesses, which plays a crucial role in the economy's investment, job creation, and productivity growth (Cui et al., 2021). However, due to a lack of adequate access to financing, small businesses are also more likely to experience financial constraints, which hinder the growth of the economy (Beck et al., 2008). Keeping everything else constant, a lower corporate tax rate can lift financial constraints and ease the financial burden, which gives small business owners more room to expand their businesses and may lead to better outcomes in one or more of employment, wages, investment and total revenue, ultimately contribute to the overall economic growth and human well-being. Moreover, the persistence in wage growth and employment growth plays a major role in economic growth (Seyfried, 2011). The accelerate of economic growth will reflect positively on job creation, technological progress, infrastructure development, and standard of living, which form a virtuous cycle. Therefore, understanding how small businesses react to tax policies and how the economy is affected by tax policies is essential to stimulate economic growth and boost employment for an economy to attain growth.

This paper examines the impact of corporate tax cuts for small businesses on wages and employment at the sector level. We take the corporate tax cut that happened in Quebec, Canada in 2014 as a natural experiment. The policy reduced the corporate tax rate from 8% to 4% for small businesses in the manufacturing sector (Duan and Moon, 2022). The data on employment and wages used in this paper is from publicly available databases on Statistic Canada, and our analysis focuses on the period from 2011 to 2017 since there have been no other crucial policy changes in this period, which allows for a more accurate examination of the impacts attributed solely to the corporate tax cut policy.

We first use the Difference-in-Difference (DID) and then use the Triple Difference approach as the empirical strategy to examine the policy's influences on wages and employment for all genders and workers, controlling for the sector and province. The results show that after the policy implementation, the wages and employment in the manufacturing sector increased in Quebec relative to Ontario. In conclusion, the corporate tax cut policy leads to positive influences on wages and employment in the manufacturing sector in Quebec. The results show the effectiveness of the tax cut policy in promoting employment and contributing positively to economic growth as a whole. Therefore, governments in other provinces may consider decreasing corporate income taxes to small businesses as a way to stimulate the economy.

2. Institutional Background

Corporate income taxes in Canada are levied at the federal level and provincial levels by the Canada Revenue Agency (CRA). The baseline federal tax rate after a tax reduction was 16.5% in 2011 and 15% in 2012. Moreover, Canadian-controlled private corporations (CCPCs) reduce the corporate tax rate on their active business income by using the Small Business Deduction (SBD), which represents a sizable tax reduction of 4% from the baseline federal tax rate for the first $500,000 of their taxable income (Wikipedia, 2022). Ontario and Quebec are two of the biggest provinces in Canada in terms of the number of firms, aggregate revenue, assets, and number of employees. The basic income tax rate in Ontario is 11.5% and the tax rate for small businesses is 4.5%. Quebec has three levels of corporate tax rates: the rate for the first level is 3% to 5% for different sectors, for the second level is 11.5%, and for the third level is 11.5%. In the budget plan for 2014 – 2015, the Quebec provincial government realized the importance of export markets on the growth of Quebec's manufacturing Small-Medium Enterprises (SMEs). To bolster Quebec's economy, a policy which cut the corporate tax rate from 8% to 4% in Quebec for small businesses in the manufacturing and processing sector was announced in 2014. With this 4% decrease in corporate income tax, Quebec's manufacturing SMEs could have a tax rate that is comparable to other provinces of Canada and is even lower than the corporate tax of 4.5% in Ontario (Government of Canada, 2022).

3. Data Sources and Descriptive Statistic

Data on employment and wages are extracted from two publicly available databases on Statistics Canada, a prominent national statistical agency, to conduct empirical analysis (Statistics Canada, 2022a, d). Our data is from the following dataset: "Employee wages by industry, annual" and "Employment and average weekly earnings (including overtime) for all employees by province and territory, monthly, seasonally adjusted". The empirical analysis is conducted based on annual data. To ensure the accuracy and relevance of our annual-focused study, employment data is seasonally adjusted, and since the raw data from Statistics Canada is monthly data, we compute the mean of monthly employment in a year as an estimator of the actual employment in that year. All wages for total employees and average hourly wage are both extracted, and in our analysis wages focus on full-time workers across all age groups and all genders. The paper uses data from 2011 to 2017 for analysis.

Figure 1 in the appendix shows the employment trends over the year in Ontario for construction and manufacturing sectors, Figure 2 shows the employment trends over the year in Quebec for construction and manufacturing sectors, and Figure 3 shows the employment trends over the year in Quebec and Ontario in both construction and manufacturing sectors. Figures 4, 5, and 6 are similar to Figures 1, 2, and 3 but show the wage trends over the year.

4. Empirical Methodology

The Triple Difference model is mainly used to address the research question, which absorbs the bias in sector data, province data, and data on the time relevant to the policy change. The Difference-in-Difference (DID) approach is used for reference. We compare the data in the manufacturing sector in Quebec against the data in the construction sector and in the province of Ontario, as well as the data before versus after the policy change to exploit the impact of the tax cut.

We use Ontario as the control group to Quebec based on the same logic from Duan and Moon's paper (2022): Ontario, as one of the major provinces in Canada, is comparable in terms of demographic properties, financial situations, and industrial structures to Quebec. Most importantly, Ontario experienced no change in tax rates during the period of our examination. The setup of the

estimation strategy allows us to examine the variation after the policy reform in wages and employment for workers in the manufacturing sector in Quebec and Ontario. The construction sector is chosen to be the control sector since the construction sector and manufacturing sector are both under the goods-producing industry. Moreover, the two sectors are the largest sectors in the goods-producing industry, which makes them more similar (Business Faculty from Nova Scotia Community College et al., 2021). The main assumption behind the empirical model is that absent of the tax cut, both the control and treated groups would have trended similarly.

The main assumption behind the empirical model is that absent of the tax cut, both the control and treated groups would have trended similarly. The assumption is validated using the following equation:

$$Y_{spt} = \sum_{\tau=2011}^{2017} \theta_\tau \mathbb{1}(t=\tau) \times M_s \times Q_p + \sum_{\tau=2011}^{2017} \beta_\tau \mathbb{1}(t=\tau) \times M_s + \sum_{\tau=2011}^{2017} \gamma_\tau \mathbb{1}(t=\tau) \times Q_p + \alpha_s + \alpha_p + u_{spt}$$

(1)

Where Y_{spt} is the outcome variables (wages and employment) for sector s in province p and in year t, M_s indicates whether s is in the manufacturing sector, and Q_p indicates whether p is in Quebec. α_s is the fixed effect for the sector, α_p is the fixed effect for the province, and u_{spt} is the error term. Coefficients θ_τ, β_τ, and γ_τ are normalized such that $\theta_{2013} = 0$.

We first use the following Difference-in-Difference (DID) model to estimate the effect of tax cut policy, control only for the sector:

$$Y_{st} = \theta \times Post_t + \beta \times M_s + \gamma \times Post_t \times M_s + \alpha_t + \alpha_s + u_{st} \tag{2}$$

Here Y_{st} is the outcome variable (wages and employment) for sector s and in year t. $Post_t$ indicates whether year t is on or after the reform year (2014). α_t is the year fixed effect and u_{st} is the error term. Considering the complexity of the effect, we subsequently use the Triple Difference method as the primary estimation strategy, which also includes the province as the control. The Triple Difference model is as follows:

$$Y_{spt} = \theta Post_t \times M_s \times Q_p + \beta Post_t \times M_s + \gamma Post_t \times Q_p + \alpha_t + \alpha_p + \alpha_s + u_{spt} \tag{3}$$

Here Y_{spt} is the outcome variable (wages and employment) for sector s in province p and in year t. Other variables are defined similarly as before.

Control sector and control province data demonstrate excellent data quality in general, which makes the data reliable. The analysis assumes that firms do not relocate to other provinces and do not change their sector during the sampled period. The sampled period starts from 2011 since there was a corporate tax cut for Ontario corporations in 2010 which reduced corporate income tax from 5.5% to 4.5% (Government of Ontario, 2022). The policy could have an impact on our analysis, so time series data before 2011 are excluded.

5. Results and Discussions

The results are discussed in reference to Duan and Moon's (2022) paper, which examines the same subject matter but uses different control sectors and control provinces, and analyzes more detailed dependent variables (investment in various products, output, etc.) at the firm level. Figures in the appendix show that parallel trends existed before the tax reform, indicating that the assumption of the empirical model is satisfied (Figure 7 and Figure 8). The results from the Triple Difference model suggest that there's an increase in wages and employment after the reform in the manufacturing sector after the reform in Quebec, but it didn't show a sharp increase in employment when we compare within the manufacturing sector only using the Difference-in-Difference model. This may be due to the effect of the large firm in the manufacturing sector, which affects the total results and may hide the true effect of the policy on small businesses.

Based on the results from the Difference-in-Difference estimations (Table 1), the coefficient of log wage is 0.0715 with a standard error of 0.03. This indicates the wage for full-time workers across all age groups and all genders increased, which suggests a positive effect of tax cuts on wages. However, the result for employment is not significant and therefore hard to interpret.

For the reason discussed above, the Difference-in-Difference approach may contain bias, so we will focus on the Triple Difference approach. Based on the results from triple difference estimations (Table 2), the coefficient of log employment is 0.0889 with a standard error of 0.037, which shows that employment in manufacturing is 8.89% increased after Corporate Tax Cuts was promulgated, and this coefficient is statistically significant after the t-test. It is larger than the reference paper's

outcome which is a 1.75% increase, which could be attributed to the difference in data level. The sector-level data may include many outliers like large firms which not affected by related policies and will overstate the policy's effects on employment.

For wages, from Table 2, the coefficient of the total wage is positive 0.2034 with a standard error of 0.044, and the coefficient of hourly wage is positive 0.0459 with a standard error of 0.042. These coefficients show that the total wage for a week is a 20.34% increase and the hourly wage is a 4.60% increase after the policy was promulgated, the coefficient of total wage is statistically significant but the coefficient of hourly wage is not. Both coefficients are largely larger than the coefficient from the reference paper which is a 2.35% increase after the policy was published.

The main reason that contributed to the discrepancy between the estimation and the reference paper is the data discrepancy. Firstly, our data level is sector data, which is an extremely limited data level to show effective statically significant results and it cannot control variables like large firms to estimate the effect of the policy more precisely. Since there is no available data at the firm level, evaluating sector-level data will lead to an underestimation since sector-level data includes businesses other than small businesses. In order to absorb sector- or province-specific shocks, the reference paper uses administrative employer-employee matched data from tax records to examine the tax effects on firm- and worker-level (Duan and Moon, 2022).

The examination also contains several limitations. Because we do not have firm-level data, using sector-level data overlooks the impact of the tax cut on the firm level since sector-level data includes firm data of big businesses that are not impacted by the tax cut, which leads to an underestimation of our results. Moreover, we assumed that firms do not change their province or sector over time. However, in reality, firms change sector and province, although not a large percentage of firms do. With the tax cut, it is possible that firms in Ontario change their corporate address to Quebec due to the geographical proximity of the two provinces, which creates a spillover effect and causes an underestimation in our results.

Besides, the 2010 corporate tax change for small businesses in Ontario might affect business investment and employment decisions, which can be reflected in the next few years after 2010. This may result in an underestimation of the results. To avoid the impact of the 2018 policy change of limit on the Small Business Deduction. Our analysis is done up to the year 2017 and is hence unable to study the impacts in the long run (Crosbie et al., 2019). Another variation is that federal corporate

taxes decreased by 0.5 percentage points for small businesses in 2016, which might have an influence on our examination.

In conclusion, our results confirmed the positive impact of Corporate Tax Cuts on the manufacturing sector in Quebec, and underscored the potential distortion of policy effects when analyzing data at the sector level, which emphasizes the need for detailed examination in future policy evaluations.

6. Policy Implications and Conclusion

For government implication, our estimation shows that the corporate tax cuts brought positive effects on both wages and employment for all genders and workers. In conclusion, the policy related to corporate tax could effectively increase wages and employment in the manufacturing sector in Quebec. Moreover, since the data level is sector-level data, more detailed data, like firm-level data, are required to produce more precise and specific effects on different groups. All these results show the prominent effect of the new corporate tax policy on the manufacturing sector's wages and employment, which shows the effectiveness of the tax policies from the government on the firms in related sectors. Therefore, governments in other provinces may consider implementing tax-cut policies for small businesses as one way to stimulate the economy.

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Appendix

Employment Trends in Ontario - Construction and Manufacturing Sectors

Employment Trends in Quebec - Construction and Manufacturing Sectors

Employment Trends in Quebec and Ontario in both Construction and Manufacturing Sectors

Figure 4

Wage Trends in Ontario - Construction and Manufacturing Sectors

Figure 5

Wage Trends in Quebec - Construction and Manufacturing Sectors

Figure 6

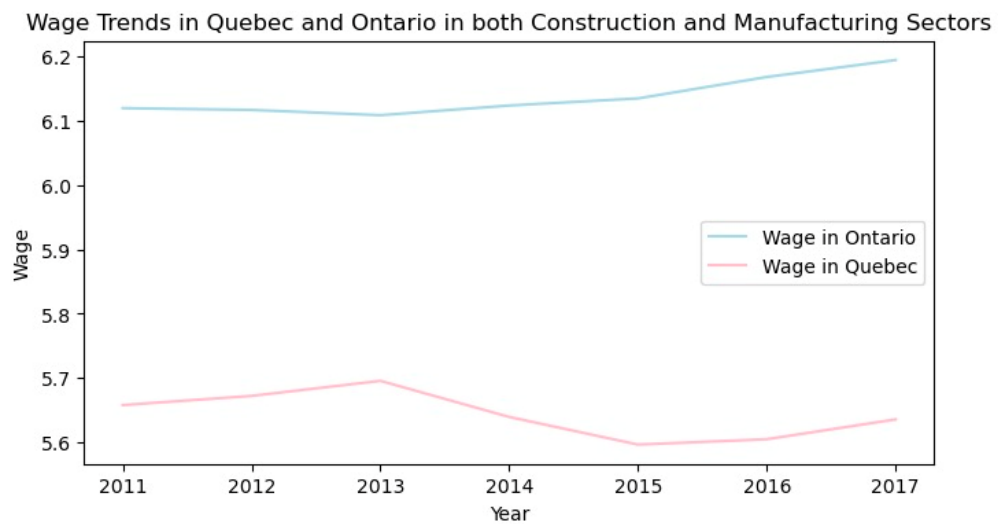Wage Trends in Quebec and Ontario in both Construction and Manufacturing Sectors

Figure 7
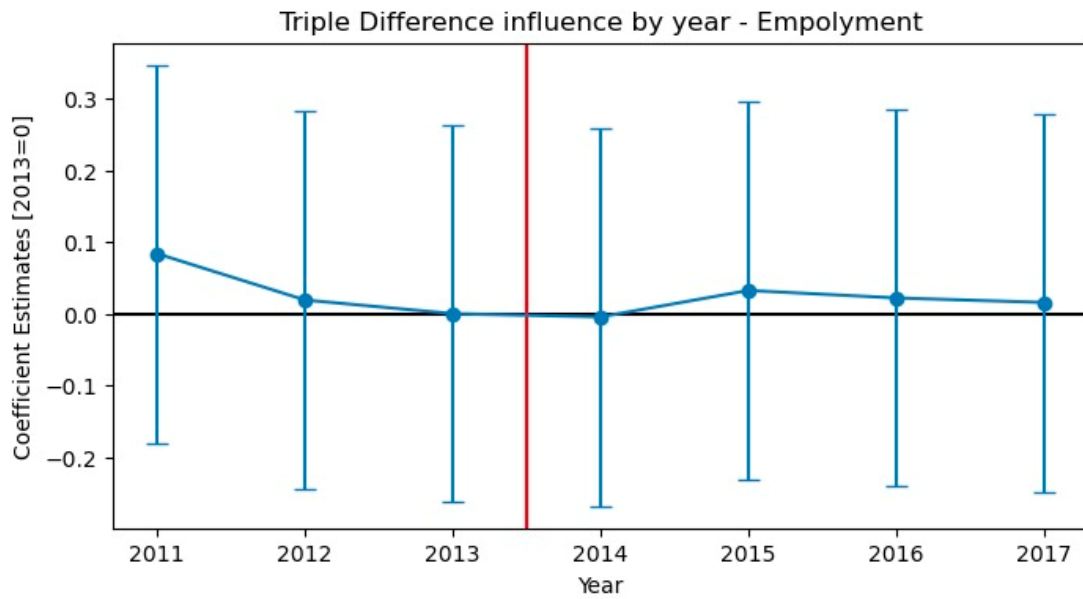

Figure 7 shows the validation of the Triple Difference: Year Fixed Effects on Employment using the coefficient estimates of Equation (1) for log(Employment). Employment data is seasonally adjusted. Error bars represent 95% confidence interval. Coefficients are normalized such that year 2013 is the base year.
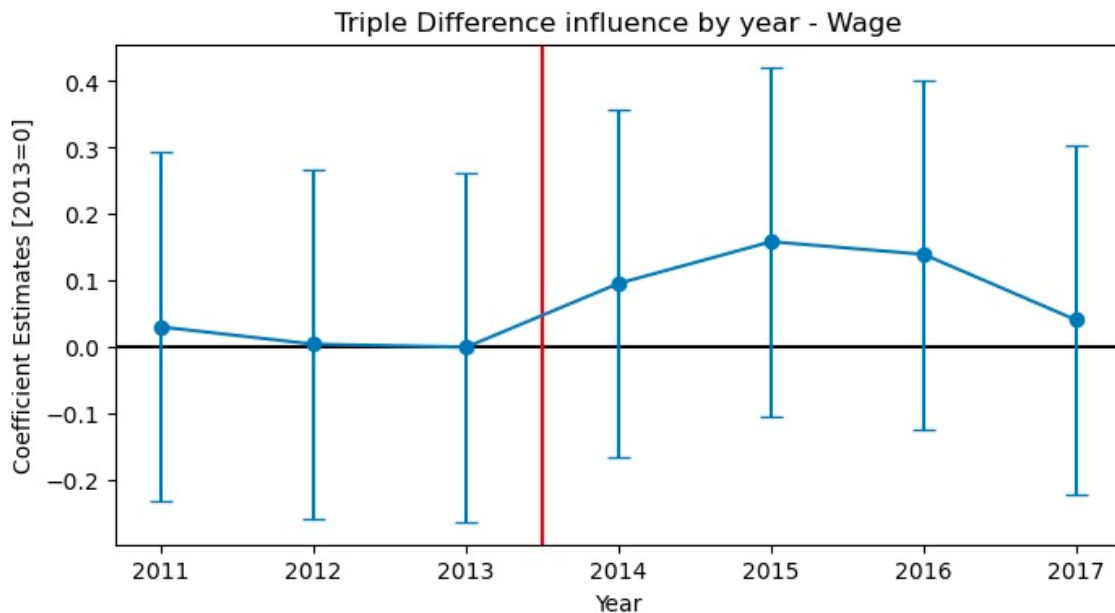
Figure 8

Figure 8 shows the validation of the Triple Difference: Year Fixed Effects on Total Employees, All Wages using the coefficient estimates of Equation (1) for log(Employment). Employment data is seasonally adjusted. Error bars represent 95% confidence interval. Coefficients are normalized such that year 2013 is the base year.

Table 1

Difference-in-Difference on wage and employment

	Log(wage)	log(employment)
Post x Manu	0.0715 ** (0.030)	-0.0035 (0.022)
95% Confidence Interval	[0.005,0.138]	[-0.037,0.030]
Observations	14	14

Table 1 reports the difference-in-difference coefficient estimates on Post $\times$ M in Equation (2) for log(wage) and log(employment). M indicates whether the sector is in manufacturing, and P indicates whether the year is on or after the reform year (2014). Standard errors are in parentheses.
$*p < 0.1$; $** p < 0.05$; $***p < 0.01$.

Table 2

Triple Difference on wage and employment

	log(Wage)	Log(employment)
Post x Manu x Quebec	0.2034 *** (0.044)	0.0888 ** (0.037)
95% Confidence Interval	[0.111,0.295]	[0.012,0.166]
Observations	28	28

Table 2 reports the triple difference coefficient estimates on Post $\times$ M $\times$ Q in Equation (3) for log(wage) and log(employment). M indicates whether the sector is in manufacturing, Q indicates whether the province is in Quebec, and Post indicates whether the year is on or after the reform year (2014). Standard errors are in parentheses. $*p < 0.1$; $** p < 0.05$; $***p < 0.01$.