Impact of Corporate Income Tax on Non-Residential Investments in Canada

A Comparative Analysis on Manufacturing and Finance Industries

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Econ 490 Research Outline

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Abstract

"Are corporate income tax cuts truly a catalyst for investment growth, or is their impact overrated? This study investigates the real effects of corporate tax reductions on firms' non-residential investment by analyzing Quebec's 2017 corporate tax cut, using British Columbia as a control group in a quasi-experimental Difference-in-Differences framework. Focusing on manufacturing and finance—industries that differ in their reliance on external versus internal financing—we test the traditional view that tax cuts spur investment against the new view that they have little effect. The study finds significant evidence supporting the traditional view: investment in both the manufacturing and finance sector increased following the tax cut. While there are indications that the financial industry responded less strongly, the evidence is not significant enough to draw definitive conclusions. These findings suggest that the effectiveness of corporate tax policy may depend on industry-specific financial constraints."

1. Introduction

Corporate income tax is often used by policymakers as a tool to influence investment levels and shape the broader economic environment. Many policymakers believe that when corporate income taxes are reduced, firms retain more earnings from their operations and are therefore more likely to reinvest in business expansion through increased investment. An increase in investment plays a crucial role in shaping future economic activity, driving job creation, and enhancing a country's competitiveness in the global market. However, the actual impact of tax cuts on investment remains contested, as it may vary depending on how firms finance their investments and the specific characteristics of different industries.

In 2017, the "Tax Cuts and Jobs Act (TCJA)" reduced the U.S. corporate income tax rate from 35% to 21%, aiming to boost domestic and foreign investment and enhance the global competitiveness of the U.S. economy. Following the reform, there were some positive signs, including an 11% increase in investment and a 0.4% rise in GDP growth in the subsequent year.[1] Yet, this policy did come at a cost and a lot of potential concerns from the modern Economists. First, the 11% increase in investment came at the cost of a 40% reduction in corporate income tax revenue, further worsening the existing budget deficit.[2] As some critics have pointed out, this lost revenue may eventually pressure the government to raise other taxes or implement fiscal adjustments to compensate for the shortfall. Another concern is that there was no substantial growth in GDP or investment levels beyond 2019, as some study suggested that the observed increase in investment could be largely attributed to heightened aggregate demand from higher disposable income due to the tax cuts. The effect may reflect a short-run boost rather than a sustained improvement in economic efficiency.

Thus, the U.S. experience raises important questions about the effectiveness of corporate tax cuts as a tool for promoting long-term economic efficiency. Is corporate tax cut the catalyst of investment, or is their impact overrated in the Canadian economy? While this topic has been extensively studied in the United States and other advanced economies, there remains a noticeable gap in the Canadian literature. This study seeks to address that gap by examining the effectiveness of corporate tax cuts within the Canadian context, using Quebec's 2017 tax cuts as a natural experiment to evaluate their influence on investment behavior across industries.

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[1] Tax Foundation. (2018). *Preliminary details and analysis of the Tax Cuts and Jobs Act*. Retrieved from https://taxfoundation.org/final-tax-cuts-and-jobs-act-details-analysis/

[2] Gale, W. G., Gelfond, H., Krupkin, A., Mazur, M. J., & Toder, E. J. (2018). *Effects of the Tax Cuts and Jobs Act: A preliminary analysis*. Urban-Brookings Tax Policy Center.

2. Literature Review

The effectiveness of corporate income tax in shaping investment levels has been a longstanding and ongoing debate among economists. Two primary perspectives frame this discussion: the traditional view and the new view. The traditional view argues that tax policy significantly influences overall investment levels, whereas the new view contends that corporate income tax has little to no meaningful effect on investment. Academic research to date has found evidence supporting both perspectives, highlighting the complex nature of this problem.

In the paper "The Effect of Corporate Taxes on Investment and Entrepreneurship" (Djankov et al. 2008), the author examine the impact of tax policies in 85 countries and find evidences supporting the traditional view. The paper found higher CIT rates are associated with a lower investment-to-GDP ratio. "A 10 percentage point increase in the effective corporate tax rate is associated with a reduction in the investment-to-GDP ratio by about 2 percentage points." Additionally, the study highlights that high CIT rates can discourage business expansion, as firms may choose to remain small or operate informally to avoid the tax burden. This tendency limits the productivity and innovation but also undermines the tax base and broader economic development. Hence, the author finds evidence that corporate tax policy does significantly affect investment behavior and have a long-run impact.

On the other hand, some scholars, such as Alan J. Auerbach, support the opposite perspective. They argue that corporate income taxes have only a limited effect on investment decisions, particularly in the long run. In his influential paper *"Taxation, Corporate Financial Policy and the Cost of Capital"* (Auerbach, 1982), he presents a model suggesting that, under certain conditions—such as when firms finance investment through retained earnings—corporate taxes may not distort marginal investment decisions. In his model, Auerbach assumes that firms primarily finance new investment using retained earnings (i.e., internal funds), rather than issuing new equity or debt. Secondly, he argues that corporate income taxes do not affect marginal investment decisions, because the tax burden applies equally to both costs and returns. Thus, the cost of capital remains unchanged at the margin. Lastly, Auerbach suggests that firms are more influenced by the long-run returns on investment than by short-term tax policy changes. This implies that the true driver of investment decisions lies in the broader economic environment—such as expected profitability and market opportunities—rather than temporary shifts in corporate tax policy.

In conclusion, the literature reveals mixed views on the impact of corporate income tax on investment. While some studies show strong negative effects, others argue the influence is minimal, particularly in the long run. In the next section of this paper, we develop our research question and hypotheses to empirically test these contrasting perspectives.

3. Research Question and Methodology

3.1 Research Question and Hypothesis

Building on the contrasting perspectives discussed in the literature, this paper aims to investigate the relationship between corporate income tax rates and investment behavior across countries.

- Q1: To what extent does corporate income tax affect investments in Canada?

- Q2: Does this effect vary between manufacturing and finance industries ?

This study focuses on the manufacturing and finance industries as representatives of the traditional and new views on corporate income tax, respectively. Manufacturing firms, with high capital and operational costs, are more sensitive to tax changes that affect their returns and growth potential. In contrast, finance firms rely on intangible assets and internal financing, making them less responsive to tax-induced changes in the cost of capital. The hypotheses for each research question are as follows:

Q1: To what extent does corporate income tax affect investments in Canada?

H_0 : Corporate income tax policies **does not** change investment significantly

H_A : Corporate income tax policies **does** change investment significantly

Q2: Does this effect vary between manufacturing and finance industries ?

H_0 : The tax policy **does not** change investment in two industries differently

H_A : The tax policy **does** change investment in two industries differently

In the next section, we will introduce the relevant data and develop an empirical model to address the research questions and test the proposed hypotheses.

3.2 Data Sources and Key variables

The primary data source for this study is the dataset titled *"Flows and Stocks of Fixed Non-Residential Capital, by Industry and Type of Asset, Canada, Provinces and Territories (x 1,000,000)"*, published by Statistics Canada. This dataset provides annual estimates of investment flows and net capital stock for non-residential assets across Canadian provinces, disaggregated by both industry and asset type. All values are reported in millions of 2017 chained Canadian dollars. The use of real GDP allows us to isolate changes in investment from the effects of inflation. The outcome variable in this study is the change in total non-residential investment within each industry.

By using province and industry type as grouping indicators, along with year, we are able to identify the treatment and control groups, as well as the timing of the policy intervention. This structure enables the Difference-in-Differences model to estimate the causal effect of the policy by comparing changes in investment between treated and untreated groups before and after the intervention.

3.3 Experimental Framework and Treatment Definition

The identification strategy involves selecting two provinces—one that maintained a stable tax rate and another that experienced a tax change during the study period. After a thorough comparison, we picked British Columbia as the control group and Quebec as the treated group. The analysis covers the period from 2009 to 2023. Here are the justification of this set-up

1. **Contrasting CIT policy**: Between 2009 and 2023, British Columbia's corporate income tax rate remained stable, while Quebec gradually reduced its rates. From 2017 to 2023, Quebec's general rate fell slightly from 11.9% to 11.5%. More noticeably, its small business rate dropped significantly from 8%to 3.2% by 2021. These differing approaches make them ideal for comparing provincial tax policies.

2. **Balanced Comparison :** As of 2023, Quebec and British Columbia are significant contributors to Canada's economy, with Quebec accounting for approximately 19.75% of the national GDP and British Columbia for about 13.97%. In real terms Quebec and B.C. contribute similarly to Canada's overall GDP, making them a reasonable and balanced pair for comparing the effects of differing corporate tax policies.

3. **Distance geography:** The significant distance between Quebec and British Columbia makes it harder for firms to reallocate investments across the two provinces, unlike neighboring provinces. This helps prevent spillover effects and supports the SUTVA assumption, which is crucial for interpreting a DiD model causally.

	2009–2016 (Pre-intervention)	2017–2023 (Post-intervention)
British Columbia (Control)	Not treated	Not treated
Quebec (Treated)	Not treated	Treated

Table 3.1: Experimental Design and Treatment Assignment

The treatment is defined as Quebec's phased reduction in corporate income tax rates beginning in 2017, affecting both general and small business rates. British Columbia, having maintained a stable tax policy over the same period, functions as the control group. This binary treatment assignment enables identification of the average treatment effect on the treated using a Difference-in-Differences (DiD) approach under the assumptions of parallel trends and no interference between units (SUTVA).

3.4 Model Specification

DiD Model of non-residential investment for CIT tax-cut (2009-2023)

$$I_{it} = \alpha + \beta_1 \text{Treat}_i + \beta_2 \text{Post}_t + \beta_3 \text{Finance}_i + \theta_1 (\text{Post}_t \times \text{Treat}_i) + \theta_2 (\text{Post}_t \times \text{Treat}_i \times \text{Finance}_i) + \sum_t \delta_t \text{Year}_t + \epsilon_{it}$$

- Treat_i: Binary explanatory variable, 1 if province is in the treatment group.
- Post_i: Binary explanatory variable, 1 if province is in the post tax intervention period.
- Finance_i: Binary explanatory variable, 1 if the observation is in finance industry.
- I_{it}: Non-residential investment at province i at time t.
- α: Constant term, baseline level of I_{it} when all binary variables are zero, untreated group in the pre-policy period, and not in finance.
- β_1: Coefficient for time-invariant differences between the treatment and control groups.
- β_2: Captures time effects common to all provinces once the policy starts.
- β_3: Captures the baseline difference in investment levels between the finance industry and man-ufacture industries, holding time and treatment status constant.
- θ_1: The treatment effect of the tax cut between the control and treatment groups across all industries, before and after the tax cut period.
- θ_2: The additional treatment effect from θ_1 while the observation is in finance industry.
- $\sum_t \delta_t \text{Year}_t$: Every δ_t capture the year-specific shock, the Year_t indicator equals to 1 at year t.

Figure 3.2: DiD Framework for Estimating Provincial Investment Response to CIT Cuts

This model is a Difference-in-Differences (DiD) specification designed to estimate the impact of corporate income tax (CIT) cuts on non-residential investment across Canadian provinces from 2009 to 2023. The treatment variable identifies provinces affected by the tax cut, while the post variable marks the period after the policy was implemented. The inclusion of the finance indicator and its interaction terms allows the model to isolate the tax cut's effect on the finance industry specifically. The model is structured in a way that answers the research question.

The coefficient θ_1 captures the average treatment effect of the tax cut for treated provinces, conditional on time and industry effects. It reflects the difference in investment levels between treated and control provinces before and after the policy, across both finance and non-finance industries. A statistically significant θ_1 would indicate that the tax cut had a meaningful effect on investment in the treated provinces. The coefficient θ_2 captures the additional treatment effect on the finance industry—whether the response to the policy in the finance sector differs from that of other industries. A significant θ_2 implies that finance industries respond differently than the manufacturing industry from the tax cut.

4. Results and Key Findings

4.1 Regression result and DiD graphs

To assess the impact of the corporate tax cut in Quebec, we begin by visually examining the trends in non-residential investment across the treated and controlled provinces. Figure 4.1 displays a clear divergence in investment levels following the implementation of the tax cut in 2017, with Quebec exhibiting a noticeable upward shift in investment relative to British Columbia. The dashed lines represent the pre and post-treatment averages, suggesting an increase in investment in the treated province compared to the control.
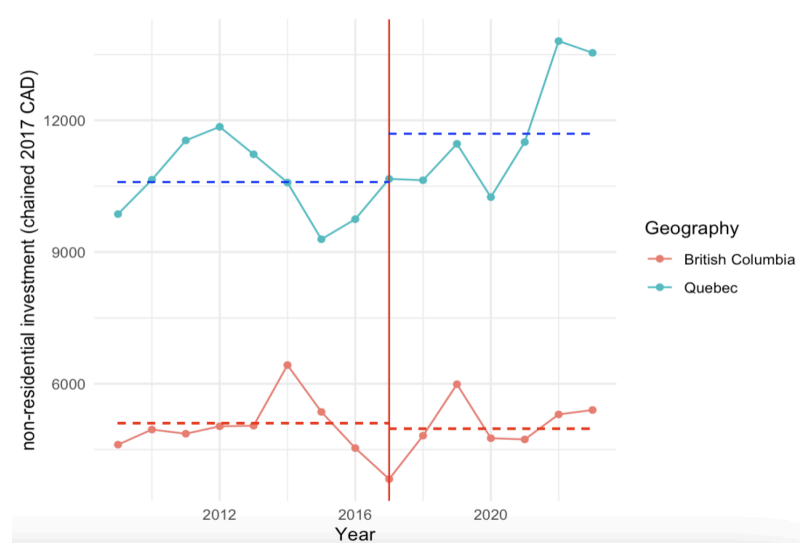

Figure 4.1: Total Non-Residential Investment in the Manufacturing and Finance Industries in Quebec and British Columbia (2009–2023)

Table 4.2 presents the results of three regression specifications estimating the impact of Quebec's corporate income tax cut on non-residential investment, with all units in millions of 2017 CAD in non-residential investment. The basic model includes only treatment and post-policy indicators, while the full model additionally accounts for industry differences through the inclusion of a finance sector indicator and its interactions with year fixed-effect. The DiD effect becomes statistically significant at the 90% level in the full model and at the 95% level when year fixed effects are included, suggesting a robust positive effect of the tax cut on investment in the treated province. The coefficient increases from 614 in the basic DiD to approximately 980 in the fully specified models, indicating a stronger estimated impact after accounting for industry and time variation. The triple interaction term is negative and statistically insignificant, implying that the treatment effect does not differ significantly between the finance and manufacturing sectors. Model fit improves across specifications, with the adjusted R² rising from 0.492 to 0.906, and RMSE dropping substantially, supporting the value of the added controls.

	Basic DiD	Full mod	Full mod with year FE
DiD Effect (Treat × Post)	613.902	980.089+	980.089*
	(0.440)	(0.055)	(0.048)
Triple Interaction		−732.375	−732.375
		(0.305)	(0.288)
Constant	2552.187***	2614.125***	2309.031***
	(<0.001)	(<0.001)	(<0.001)
Num.Obs.	60	60	60
R2	0.518	0.911	0.938
R2 Adj.	0.492	0.899	0.906
F	20.057	75.623	
RMSE	1474.52	635.16	529.99

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Regression Results

Table 4.2 : Regression table and coefficient estimates

From Figure 4.3, following the implementation of the corporate income tax cut in 2017, Quebec experienced a notable divergence in investment trends between the manufacturing and finance sectors. Manufacturing investment showed a consistent upward trajectory, suggesting a strong positive response to the reduced tax burden. At the same time, although we also see a rise of investment in Finance industries, the effect does not seem to be as responsive as the manufacturing industries. This divergence implies that the tax cut had a more substantial impact on the manufacturing sector, likely due to its greater sensitivity to changes in the cost of capital and heavier reliance on physical investment. The post-policy pattern reinforces the theoretical expectation that tax policy effects are more pronounced in capital-intensive industries such as manufacturing. Although the results do not provide strong statistical evidence that the finance sector responded less to the tax cut, this potential industry difference should not be overlooked. The lack of significance may be due to data limitations, and future analyses with more granular or firm-level data may reveal clearer distinctions in investment behavior between sectors. The figure does show a less-responsive rise in investment levels for the finance industry following the policy implementation.

- θ_1: 980.089 (0.045): The treatment effect is significant and positive, suggesting the tax cut do increase investment compare to the change in control group.
- θ_2: -732.37 (0.288) The additional treatment effect is negative but insignificant. Suggesting that relative to the manufacturing industry, the finance industry increase investment less to the manufacturing industry, yet there are not strong enough evidence for this study.
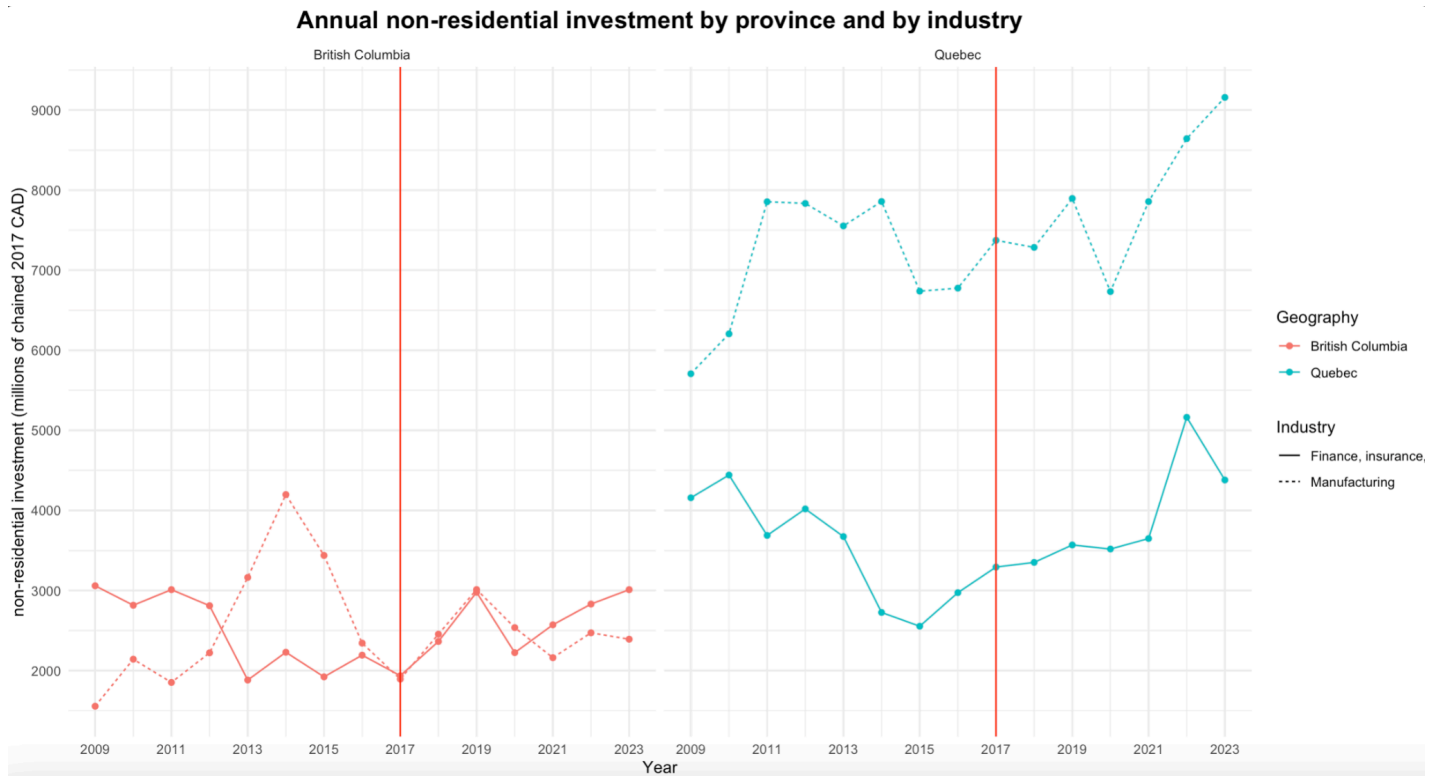
Figure 4.3 Non-residential Investment in British Columbia and Quebec (2009–2023), by Industry

Figure 4.4 reflects the estimated macroeconomic shocks affecting non-residential investment in both Quebec and British Columbia across time. Because the year fixed effects capture common time-specific influences—such as national economic cycles, federal policies, or broader investment trends—these patterns are interpreted as province-independent shocks. The similarity in directional trends across both provinces, particularly around major turning points like 2017 and 2020, underscores the importance of controlling for such macro-level fluctuations when isolating the effect of provincial tax policy.
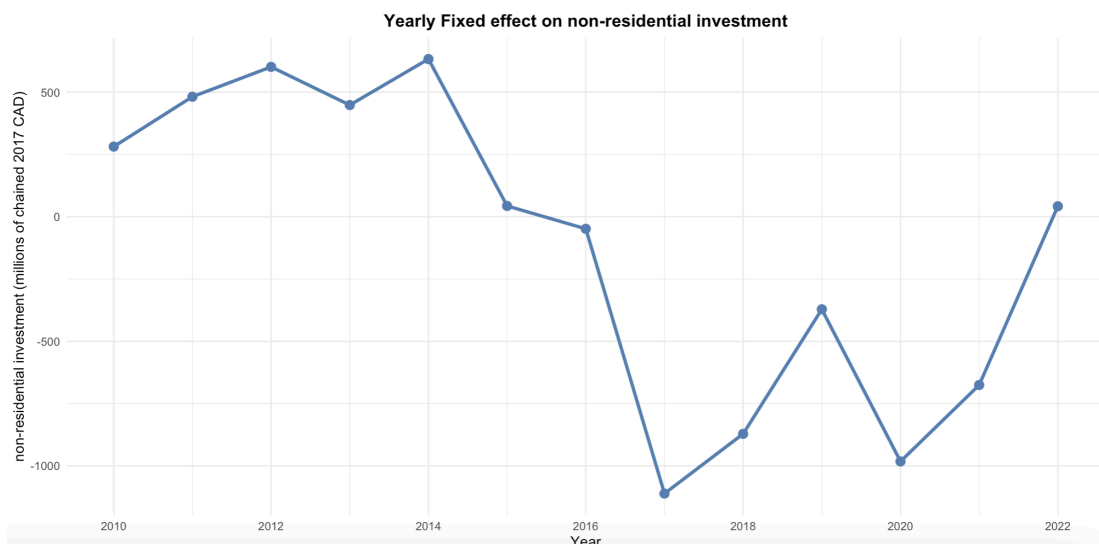

Figure 4.4 Yearly Fixed Effect on Non-Residential Investment

4.2 Causality Conditions and Results of Hypothesis Testing

Hypothesis testing:

Based on the regression results, we find evidence to reject the null hypothesis for our first research question. Specifically, the estimates show an average increase of approximately 980 million CAD in non-residential investment across both industries within the treated group following the tax cut. This result is also known as the average treatment effect on treated in our quasi-experiment.

H_0 : ~~Corporate income tax policies does not change investment significantly~~

H_A : Corporate income tax policies **does** change investment significantly

On the other hand, the study does not find sufficient evidence to reject the null hypothesis for the second research question. Although Figure 4.3 indicates a comparatively smaller post-policy increase in investment within Quebec's finance industry, the regression results suggest that this pattern may be driven by underlying data variation rather than a statistically significant treatment effect.

H_0 : The tax policy **does not** change investment in two industries differently

H_A : ~~The tax policy **does** change investment in two industries differently~~

However, it is important to emphasize the nature of this study. As it relies on aggregated data from Statistics Canada, the statistical power may be constrained by the limited number of time-series observations available. One may have enough evidence to reject null hypothesis if they grant access to quarterly data or firm level panel data within this timeframe.

Causality Interpretation:

Under three key assumptions, the Difference-in-Differences (DiD) model allows for causal interpretation of the treatment effect.

- Parallel Trends: As shown in Figure 4.1, both the treated group (Quebec) and the control group (British Columbia) exhibited similar investment trends prior to the policy implementation, supporting the parallel trends assumption.

- No Spillover Effects: The significant geographic distance between the two provinces reduces the likelihood that firms reallocated investments across borders in response to the policy.

- <u>No Simultaneous Confounding Shocks:</u> There were no major external shocks during the treatment period that would differentially affect Quebec relative to British Columbia. Even if other policies were in place during the treatment period, whether they had a significant impact on investment is a separate question beyond the scope of this study.

Therefore, given that the key assumptions are reasonably satisfied, the treatment effects identified by the DiD model can be interpreted as causal.

5. Conclusion

This study finds that Quebec's 2017 corporate income tax cut led to a significant increase in non-residential investment, particularly in the manufacturing sector. The results support the traditional view that tax cuts can stimulate investment in the economy. While there are signs of potential heterogeneity between industries, the evidence is not statistically strong enough to draw definitive conclusions.

The findings suggest that corporate tax cuts can be an effective policy tool, especially for capital-intensive sectors facing financing constraints. However, the weaker response observed in the finance industry highlights that not all sectors react uniformly to tax incentives, underscoring the importance of targeting policies toward sectors where they are most likely to generate meaningful investment. Policymakers should also consider potential sector-specific responsiveness before designing uniform corporate tax reductions.

6. Limitation and Future Expansion

This study faces two primary limitations. First, verifying the parallel trends assumption at the industry level between Quebec and British Columbia is challenging due to data limitations. While aggregate trends appear similar, sector-specific investment trajectories may differ in subtle ways that are difficult to detect with annual data. Second, the statistical power of the analysis is limited by the relatively small number of time periods and the use of aggregated data, which reduces the precision of estimated treatment effects.

To address these issues, future research could extend the current model by incorporating industry-specific fixed effects interacted with time, allowing for more flexible control of sector-level shocks and trends. Additionally, using quarterly investment data or firm-level panel data would enable a more granular analysis of within-industry variation and improve the ability to formally test for parallel trends across subgroups. These extensions would enhance the robustness and credibility of causal claims.

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Appendices: Output of original R file

```
small_mod <-lm(VALUE ~ Treat + Post + Post*Treat ,
            data = DiD_2_data_wide)

full_mod <- lm(VALUE ~ Treat + Post + Finance + Post*Treat + Post*Treat*Finance ,
            data = DiD_2_data_wide)

full_mod_year_effect <- lm(VALUE ~ Treat + Post + Finance + Post*Treat + Post*Treat*Finance + factor(REF_DATE),
            data = DiD_2_data_wide)

summary(small_mod)
summary(full_mod)
summary(full_mod_year_effect)
```

Coefficients: (1 not defined because of singularities)

	Estimate	Std. Error	t value	Pr(>|t|)	
(Intercept)	2309.03	385.42	5.991	5.33e-07	***
Treat	4451.62	328.69	13.544	2.50e-16	***
Post	675.68	550.35	1.228	0.2269	
Finance	-123.88	328.69	-0.377	0.7083	
factor(REF_DATE)2010	281.50	464.83	0.606	0.5483	
factor(REF_DATE)2011	481.75	464.83	1.036	0.3064	
factor(REF_DATE)2012	601.50	464.83	1.294	0.2033	
factor(REF_DATE)2013	448.25	464.83	0.964	0.3408	
factor(REF_DATE)2014	633.00	464.83	1.362	0.1811	
factor(REF_DATE)2015	43.25	464.83	0.093	0.9263	
factor(REF_DATE)2016	-48.50	464.83	-0.104	0.9174	
factor(REF_DATE)2017	-1111.25	464.83	-2.391	0.0217	*
factor(REF_DATE)2018	-871.50	464.83	-1.875	0.0683	.
factor(REF_DATE)2019	-371.50	464.83	-0.799	0.4290	
factor(REF_DATE)2020	-982.25	464.83	-2.113	0.0410	*
factor(REF_DATE)2021	-675.50	464.83	-1.453	0.1542	
factor(REF_DATE)2022	42.00	464.83	0.090	0.9285	
factor(REF_DATE)2023	NA	NA	NA	NA	
Treat:Post	980.09	481.15	2.037	0.0485	*
Post:Finance	265.73	481.15	0.552	0.5839	
Treat:Finance	-3412.62	464.83	-7.342	7.31e-09	***
Treat:Post:Finance	-732.38	680.45	-1.076	0.2884	