Do fiscal incentives affect innovation? The effects of the Alberta Investor Tax Credit on patents

Daniel Sánchez-Pazmiño

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Simon Fraser University

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1 Introduction

2 Institutional background

3 Empirical Strategy

3.1 Data

I employ a novel administrative dataset from the Canadian Intellectual Property Office, the IP Horizons Patent Researcher Datasets. The dataset identifies patents in Canada from 1860 to 2023, with information on when the application for the patent was filed, granted, the parties involved in the application and other information. Parties can be identified to provinces based on their location, which can be based in Canada or other countries.

With these data, I compute quarterly and monthly patent application counts at the province level from January 2001 to June 2021, based on the application filing date. This period corresponds to the modern Canadian intellectual property institutional background, as reviewed on Section 2. I assign patents to provinces based on where the majority of parties involved in a patent application report their location[1]. I only include 2021 as a partial year since the data present a downward trend for all provinces in late 2021, suggesting patent applications are yet to be updated for the most recent periods of the IP Horizons data. Further, I drop Newfoundland and Labrador, Prince Edward Island, Yukon and Nunavut due to missing observations on most explanatory variables.

The explained variable of interest is the count of patent applications. To allow for heterogeneity in treatment, I separate patents by their International Patent Classification (IPC) section, which defines a broad classification of the technology being patented. The IPC sections are divided into eight categories: A (Human Necessities), B (Performing Operations; Transporting), C (Chemistry; Metallurgy), D (Textiles; Paper), E (Fixed Constructions), F (Mechanical Engineering; Lighting; Heating; Weapons; Blasting), G (Physics) and H (Electricity), as defined by the Canadian Intellectual Property Office (2023). For robustness checks, I also

1. Patent applications without information of party provinces or with an equal number of interested parties from two provinces are dropped from the sample.

consider the number of Canadian parties involved in a patent application as explained variables for robustness checks, separating by the different types of parties, as reviewed in Section 2: all parties, inventors, owners and applicants[2].

For my explanatory variables, I extract province-level data at the monthly frequency from Statistics Canada. These include data from the Labour Force Survey (LFS), such as labour force characteristics, employment wages, among others. Further, I also consider the consumer price index, international merchandise exports and imports, retail, wholesale and manufacturing trade sales, food services receipts, the new housing price index and electric power generation. I also include the number of business insolvencies as reported by Innovation, Science and Economic Development Canada and the number of foreign parties involved in patent applications, which I obtain from the IP Horizons data. I aggregate data at the quarterly level by summing all variables except the consumer and new housing indices, for which I take arithmetic averages. Table 1 presents a summary of the main variables used in the analysis for the province-quarter panel. Table A.4 in Appendix A presents the same for the province-month panel.

3.2 Empirical Strategy

I implement a two-way fixed effects (TWFE) difference-in-differences (DD) design, where I define treatment and control groups based on the first period of eligible expenditures for the AITC intervention, which was April 2016 (Alberta Economic Development and Trade Jan. 3, 2017). The treatment group is Alberta, and the treatment period is composed of all periods after April 2016. The control group is all remaining Canadian provinces considered in my data. Thus, treated observations are those from Alberta after April 2016, where I believe the AITC affected Albertan patent applications. The DD design is implemented in a regression framework with both the quarter and month panels in order to better understand the dynamic effects of the intervention.

The general specification for the DD model is:

2. I do not consider agents as a separate category due to them typically being hired legal professionals, which may not be informative about the innovative capacity of who files for the patent.

Table 1: Descriptive statistics for the province-quarter sample

	Mean	SD	Min	Median	Max
Ln +1 Patent applications	4.261	1.405	1.099	4.107	6.691
Ln Full-time employment	8.026	1.034	6.726	7.831	9.814
Ln Median wage	2.949	0.192	2.523	2.956	3.395
CPI	119.145	12.668	95.400	119.400	148.900
Ln +1 Business insolvencies	4.403	1.396	0.693	4.197	6.957
Ln Intl. exports	15.810	1.139	13.694	15.848	17.804
Ln Intl. imports	15.646	1.198	13.715	15.369	18.372
Ln Retail sales	15.963	1.028	14.424	15.774	17.913
Ln Wholesale sales	15.910	1.292	13.907	15.892	18.490
Ln Manufacturing sales	16.027	1.179	14.398	15.729	18.213
Ln International travellers	12.470	1.779	4.344	12.387	15.929
Ln Arriving vehicles	11.944	3.562	0.000	12.516	15.801
Ln Electric power generation	16.213	0.997	14.344	16.219	17.990
Ln Average actual hours	3.545	0.050	3.311	3.550	3.676
New housing price index	88.064	16.987	42.900	94.250	129.500
Ln Food services receipts	13.737	1.108	12.255	13.575	15.857
Ln Average job tenure	4.636	0.088	4.399	4.653	4.830
Ln +1 Foreign patent parties	3.609	1.918	0.000	3.842	6.671

Notes: All statistics based on a balanced panel of $N = 656$ province-quarter observations from 2001Q1 to 2021Q2. The sample includes all Canadian provinces except Newfoundland and Labrador, Prince Edward Island, Yukon and Nunavut.

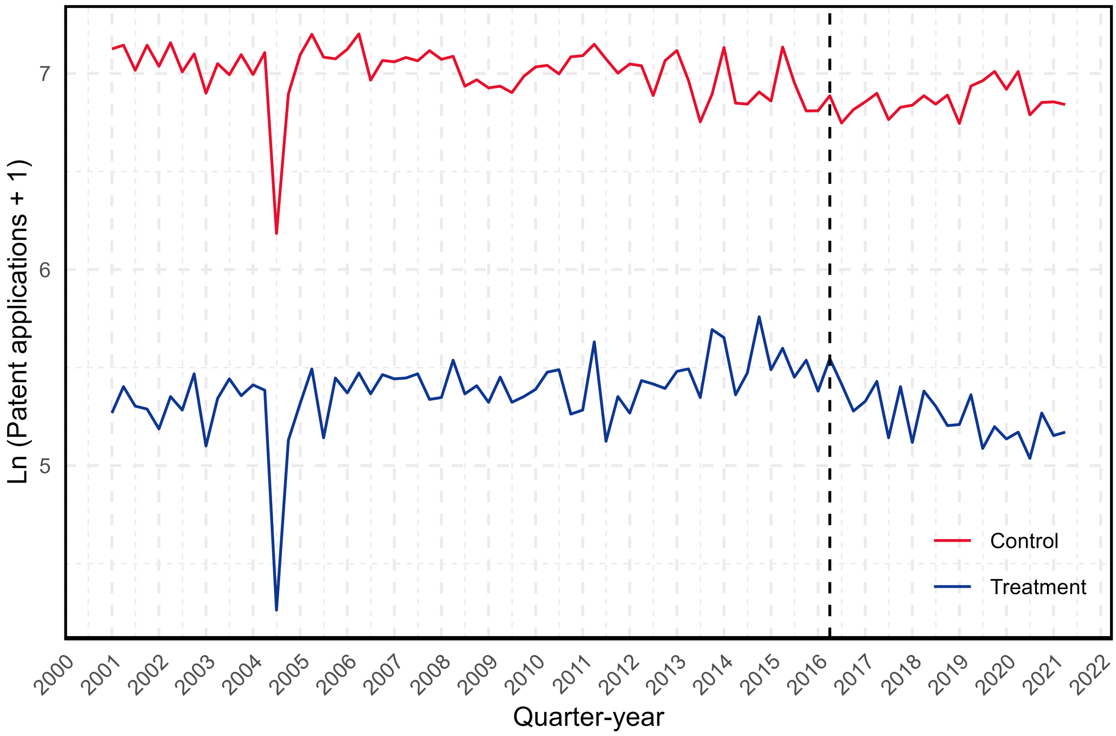
$$\ln(P_{it} + 1) = \theta_i + \theta_t + \beta + T_{it} + \mathbf{x}_{it}^{'}\gamma + u_{it} \tag{1}$$

where P_{it} is the explained variable; in most specifications, P_{it} is the number of patents filed in a province i and period t. θ_i and τ_t are sets of province and period fixed effects. I use a natural logarithm transformation along with the addition of one to correct for provinces with small amounts of patent applications on some periods. T_{it} is a binary variable equal to unity for observations for treated observations and zero otherwise. Hence, the estimated parameter $\hat{\beta}$ is the coefficient of interest, which is my estimate for the average treatment effect of the AITC on the explained variable. $\mathbf{x}_{it}$ is a vector of time and province-varying controls, as described in the previous subsection, and γ is the associated vector of parameters. u_{it} is a stochastic error term which varies between provinces and periods. For my results, I cluster standard errors at the province and period level.

Tables A.5 and A.6 in Appendix A present the difference in means between treated and control provinces for the province-quarter and province-month samples for all considered explained variables. This presents the simplest version of the DD model, where I compare the average number of patent applications between Alberta and the control provinces before and after the AITC intervention. This simple comparison suggests a small or null effect; the regression analysis described above provides a more robust DD estimate.

The key identifying assumption of the DD framework is that, absent of treatment, the trend of the explained variable in Alberta would follow a similar pattern to control provinces. Figure 1 shows the quarterly time series of patent applications between Alberta and control provinces from 2001Q1 to 2021Q2. This visual representation of the trends shows that Alberta's patent applications follow a similar pattern to control provinces before the AITC intervention, however, some deviations are present in the leading months before the intervention.

Figure 1: Quarterly time series of patent applications between Alberta and control provinces



Notes: The figure shows the quarterly time series of patent applications between Alberta and control provinces from 2001Q1 to 2021Q2. The vertical line represents the start of the AITC intervention (first expense eligibility date) in April 2016.

To allay the concern of unobservable factors impacting patent application trends across provinces, I estimate event study regressions following Equation 2 below and provide supporting evidence for causal identification of $\hat{\beta}$.

$$\ln(P_{it} + 1) = \theta_i + \tau_t + \beta_{\mathbb{t}}(t \cdot A_t) + \mathbb{x}_{it}^{'}\gamma + u_{it} \tag{2}$$

$\theta_i, \tau_t, \mathbf{x}_{it}, \gamma$ and u_{it} represent the same as in Equation 1. t is a set of binary variables for each of the periods for which there is data available, with the reference level set to one period before AITC eligibility (March 2016). A_t is a binary variable equal to unity if the observation is mapped to Alberta and zero otherwise. $t \cdot A_t$ is the interaction term between these two variables, and β_t is the associated vector of coefficients, which will show the difference between the treatment and control groups in the explained variable for all t. For these regressions, I show the values of the interaction terms in event study plots, along with their 95% confidence intervals. I cluster standard errors at the province and period level.

Evidence in favour of the identifying assumption will be observed if the interaction terms before April 2016 are not statistically significant. This supports the idea that Alberta had no significant differences in the trend of patent applications to other provinces before the intervention. Thus, I use the event study regressions to provide evidence of the causal identification of the average treatment effect of the AITC on patent applications. Further, I examine the effectiveness of the AITC by looking at post-treatment interaction terms, which should show statistically significant differences if the AITC affected Albertan patent applications.

4 Results

4.1 Patent applications

Table 4.1 presents results the estimation of Equation 1 using patent applications as the explained variable with the province-quarter data. Specification (1) includes a baseline result with no control variables. Specification (2) includes economic controls included to account for factors which may affect the comparability of the treatment and control groups regarding firm activity and overall economic trends which vary across time and provinces. The number of foreign parties in all the province's patent applications is also included, to control for effects that foreign interested parties (particularly U.S.) can have as strategic actors for patent applications. Specification (3) includes additional controls. These are included in the case that the previous controls did not adequately account for differences in trends due to reasons other than economy, or that economic activity is not well captured by standard variables in Specification (2).

The DD estimate for the causal effect of the AITC intervention is the coefficient on Treatment ×Post, showing that the intervention led to an -6.1% to +2.3% change in Albertan patent applications. However, the effect is not statistically distinguishable from zero. Standard errors for this coefficient on all three specifications are small compared to those of the controls, showing that $\hat{\beta}$ is estimated with a fairly good level of precision. This implies that it is the small magnitude of $\hat{\beta}$ which drives the low p-value of the hypothesis test, leading to the preliminary conclusion that the AITC intervention had no effect on innovation in the studied period.

I display the results of the event study regressions in Figure 2. I estimated Equation 2 with the same controls as the specifications in Table 4.1, resulting in panels (1) through (3) plotted in Figure 2. Most importantly these results show that, when controlling for time and province-varying factors, there is not a statistically significant difference between Albertan and control provinces' patent applications before the AITC intervention. This supports the key identifying assumption of the DD design, that the control and treatment groups would have followed the same trend in the absence of the intervention. The baseline model, which does not consider any controls, shows several pre-policy periods where the treatment and control groups diverge, underscoring the importance of including controls in the model. In 2015Q4, there is a positive and significant deviation from the pre-policy trend.

Regarding the effect of the policy itself, results point toward statistical insignificance of the policy effect. While there is a small positive effect in 2016Q4, it is unlikely that this is due to the policy, as the effect is not present in the following quarters. There is no evidence of a negative effect of the policy on patent applications, as preliminarily shown by the time series plot in Figure 1.

4.2 Patents by section

In Table 4.2, I present the results of the estimation of Equation 1, allowing for heterogeneity by IPC patent section and including the controls of Specification (3) in Table 4.1. The results show that the AITC intervention had no statistically significant effect on most of the IPC sections, except sections A and E, corresponding to human necessities and fixed constructions. The effect on section A is positive and significant, while the effect on section E is negative and significant. These two effects are of similar magnitude (between |42.7|% to |53.0|%), suggesting an offseting effect of the policy.

Because I lose precision on the estimates due to the smaller sample size, I am underpowered to detect small effects on the other sections. The event study regressions in Figure provide additional insight into the effect of the policy on patent applications by IPC section.

5 Conclusions

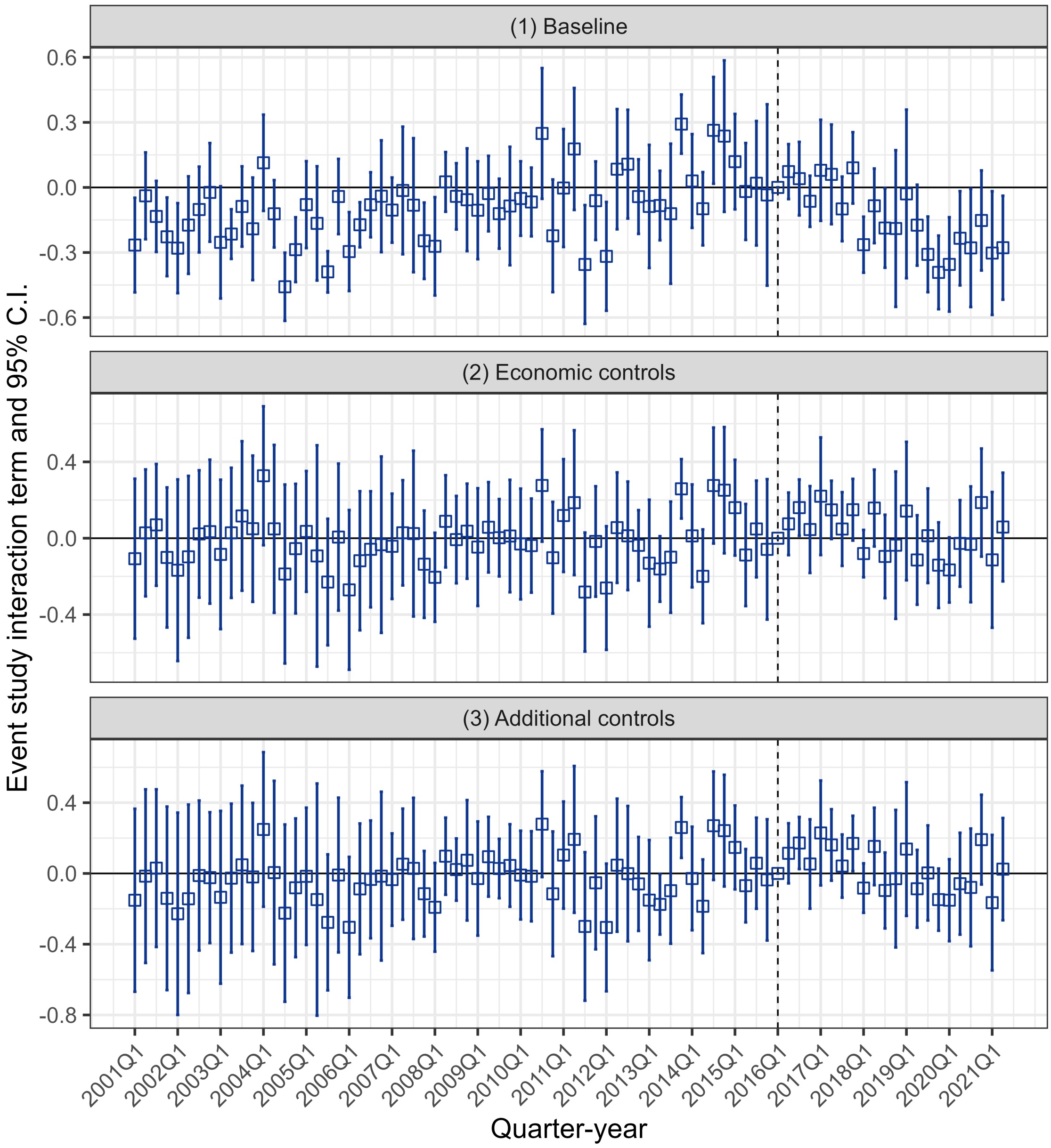
6 Acknowledgements

Table 2: Difference-in-differences specifications for quarterly patent applications

	(1)	(2)	(3)
Treatment x Post	−0.061	0.028	0.023
	(0.043)	(0.065)	(0.074)
Ln Full-time employment		0.825	1.104
		(0.651)	(0.664)
Ln Median wage		1.200**	1.078**
		(0.378)	(0.432)
CPI		−0.015**	−0.007
		(0.005)	(0.008)
Ln +1 Business insolvencies		−0.065**	−0.052*
		(0.027)	(0.023)
Ln Intl. exports		−0.087	−0.089
		(0.093)	(0.119)
Ln Intl. imports		0.018	0.023
		(0.125)	(0.125)
Ln Retail sales		−0.272	0.084
		(0.421)	(0.495)
Ln Wholesale sales		−0.139	−0.222
		(0.164)	(0.150)
Ln Manufacturing sales		0.276	0.216
		(0.150)	(0.140)
Ln +1 Foreign patent parties		0.142***	0.136***
		(0.015)	(0.016)
Ln International travellers			−0.129***
			(0.034)
Ln Arriving vehicles			0.007
			(0.005)
Ln Electric power generation			0.070
			(0.118)
Ln Average actual hours			0.109
			(0.275)
New housing price index			−0.003
			(0.002)
Ln Food services receipts			−0.067
			(0.205)
Ln Average job tenure			−0.448
			(0.372)
Explained variable		ln(Patents + 1)	
N	656	656	656
Adj. R^2	0.975	0.980	0.980
Adj. within R^2	0.000	0.205	0.210
RMSE	0.206	0.182	0.180

Notes: Clustered standard errors at the province and quarter level shown in parentheses. All specifications include fixed effects for provinces and quarters. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Figure 2: Event study of the AITC intervention on quarterly patent applications



Notes: The figure shows the estimated coefficients of the interaction term between period and treatment binary variables in Equation 2 for each quarter. The points represent the point estimate, while the ribbons represent the 95% confidence cluster-robust interval. The vertical line represents the start of the AITC intervention (first expense eligibility date) in April 2016, with the reference level being the quarter before the intervention. Baseline, economic, and additional controls specifications include the controls seen in specifications (1) through (3) in Table 4.1.

Table 3: Difference-in-differences results for quarterly patent applications by IPC section

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment x Post	0.427^{***}	0.366	0.066	0.235	-0.530^{***}	0.167	-0.083	0.209
	(0.071)	(0.195)	(0.171)	(0.132)	(0.045)	(0.106)	(0.187)	(0.135)
Patent section (IPC)	A	B	C	D	E	F	G	H
N	656	656	656	656	656	656	656	656
Adj. R^2	0.913	0.911	0.879	0.353	0.914	0.875	0.910	0.908
Adj. within R^2	0.111	0.056	0.082	0.033	0.061	0.021	0.060	0.063
RMSE	0.324	0.355	0.381	0.356	0.361	0.394	0.395	0.409

Notes: Sections of the IPC are A: Human Necessities, B: Performing Operations; Transporting, C: Chemistry; Metallurgy, D: Textiles; Paper, E: Fixed Constructions, F: Mechanical Engineering; G: Physics, H: Electricity. Patents with multiple sections are not included.
All specifications include controls in Specification (3) of Table 4.1, not shown for brevity and fixed effects for provinces and quarters. Clustered standard errors at the province and quarter level shown in parentheses. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

References

Alberta Economic Development and Trade. Jan. 3, 2017. *Alberta Investor Tax Credit [Fact Sheet].* Alberta Economic Development and Trade, Jan. 3, 2017. Visited on Apr. 14, 2024. https://open.alberta.ca/dataset/70a7a3d9-5b54-40ed-9d0f-4d26f92c2bd9/resource/c2f27300-ab6b-41e2-ad62-d40f702735b8/download/2016-alberta-investor-tax-credit-aitc-fact-sheet.pdf.

Canadian Intellectual Property Office. June 19, 2023. (Patent Researcher Datasets: Bibliographic, Full Text and Administrative Status Data (CSV and TXT) [Data sets with data dictionaries]. IP Horizons; visited on Dec. 15, 2023). June 19, 2023. https://ised-isde.canada.ca/site/canadian-intellectual-property-office/en/canadian-intellectual-property-statistics/patent-data-bibliographic-and-full-text-csv-and-txt.

Innovation, Science and Economic Development Canada. Mar. 30, 2024. (Historic Insolvency Statistics - Monthly (from 1987) [Dataset 746709f1-c729-44a1-ba84-7be5eadd3664]. Version 746709f1-c729-44a1-ba84-7be5eadd3664; visited on Jan. 15, 2024). Mar. 30, 2024. https://doi.org/10.25318/2510001501-eng. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2510001501.

Statistics Canada. Nov. 5, 2008. (Table 25-10-0001-01 Electric Power Statistics, with Data for Years 1950 - 2007 [Data table]). Nov. 5, 2008. https://doi.org/10.25318/2510000101-eng.

———. Feb. 21, 2023. (Table 20-10-0008-01 Retail Trade Sales by Province and Territory, Inactive (x 1,000) [Data table]). Feb. 21, 2023. https://doi.org/10.25318/2010000801-eng.

———. Apr. 2, 2024a. (Table 12-10-0175-01 International Merchandise Trade by Province, Commodity, and Principal Trading Partners (x 1,000) [Data table]). Apr. 2, 2024. https://doi.org/10.25318/2510001501-eng.

———. Apr. 5, 2024b. (Table 14-10-0042-01 Average Usual and Actual Hours Worked in a Reference Week by Type of Work (Full- and Part-Time), Monthly, Unadjusted for Seasonality [Data table]). Apr. 5, 2024. https://doi.org/10.25318/1410004201-eng.

Statistics Canada. Apr. 5, 2024c. (Table 14-10-0050-01 Job Tenure by Type of Work (Full- and Part-Time), Monthly, Unadjusted for Seasonality [Data table]). Apr. 5, 2024. https://doi.org/10.25318/1410005001-eng.

———. Feb. 9, 2024d. (Table 14-10-0063-01 Employee Wages by Industry, Monthly, Unadjusted for Seasonality [Data table]). Feb. 9, 2024. https://doi.org/10.25318/1410006301-eng.

———. Feb. 9, 2024e. (Table 14-10-0287-03 Labour Force Characteristics by Province, Monthly, Seasonally Adjusted [Data table]). Feb. 9, 2024. https://doi.org/10.25318/1410028701-eng.

———. Feb. 15, 2024f. (Table 16-10-0048-01 Manufacturing Sales by Industry and Province, Monthly (Dollars Unless Otherwise Noted) (x 1,000) [Data table]). Feb. 15, 2024. https://doi.org/10.25318/1610004801-eng.

———. Feb. 20, 2024g. (Table 18-10-0004-01 Consumer Price Index, Monthly, Not Seasonally Adjusted [Data table]). Feb. 20, 2024. https://doi.org/10.25318/2010007401-eng.

———. Mar. 21, 2024h. (Table 18-10-0205-01 New Housing Price Index, Monthly [Data table]). Mar. 21, 2024. https://doi.org/10.25318/1810020501-eng.

———. Feb. 16, 2024i. (Table 20-10-0074-01 Wholesale Trade, Sales (x 1,000) [Data table]). Feb. 16, 2024. https://doi.org/10.25318/2010007401-eng.

———. Mar. 25, 2024j. (Table 21-10-0019-01 Monthly Survey of Food Services and Drinking Places (x 1,000) [Data table]). Mar. 25, 2024. https://doi.org/10.25318/2110001901-eng.

———. Apr. 2, 2024k. (Table 25-10-0015-01 Electric Power Generation, Monthly Generation by Type of Electricity [Data table]). Apr. 2, 2024. https://doi.org/10.25318/2510001501-eng.

A Appendix: Descriptive Statistics

Table A.4: Descriptive statistics for the province-month sample

	Mean	SD	Min	Median	Max
Ln +1 Patent applications	3.187	1.400	0.000	3.178	5.714
Ln Full-time employment	6.927	1.034	5.614	6.733	8.722
Ln Median wage	2.945	0.193	2.487	2.956	3.411
CPI	118.994	12.717	93.400	119.000	148.900
Ln +1 Business insolvencies	3.327	1.388	0.000	3.135	5.974
Ln Intl. exports	14.709	1.141	12.585	14.754	16.767
Ln Intl. imports	14.543	1.204	12.453	14.274	17.340
Ln Retail sales	14.864	1.028	13.312	14.691	16.902
Ln Wholesale sales	14.811	1.292	12.762	14.785	17.400
Ln Manufacturing sales	14.928	1.179	13.241	14.689	17.127
Ln International travellers	11.367	1.790	2.944	11.293	14.833
Ln Arriving vehicles	10.784	3.625	0.000	11.436	14.855
Ln Electric power generation	15.112	0.999	13.197	15.088	16.981
Ln Average actual hours	3.514	0.059	3.235	3.517	3.676
New housing price index	87.826	17.020	42.500	94.100	129.500
Ln Food services receipts	12.638	1.107	10.911	12.462	14.766
Ln Average job tenure	4.634	0.089	4.373	4.651	4.847
Ln +1 Foreign patent parties	2.545	1.862	0.000	2.773	5.927

Notes: All statistics based on a balanced panel of N = 1,968 province-monthly observations from January 2001 to June 2021. The sample includes all Canadian provinces except Newfoundland and Labrador, Prince Edward Island, Yukon and Nunavut.

B Appendix: Difference-in-differences models

C Appendix: Event study results

Table A.5: Differences in means between treated and control provinces in province-quarter panel

Treatment		Pre	Post
Control	Ln +1 Patent applications	4.122	4.059
	Ln +1 Interested parties	5.683	5.464
	Ln +1 Inventors	301.511	292.143
	Ln +1 Applicants	158.663	139.122
	Ln +1 Owners	330.344	150.204
	Ln +1 Total population	8.632	8.731
	Ln +1 Section A applications	2.550	2.596
	Ln +1 Section B applications	2.238	2.037
	Ln +1 Section C applications	1.464	1.306
	Ln +1 Section D applications	0.349	0.185
	Ln +1 Section E applications	1.496	1.512
	Ln +1 Section F applications	1.618	1.417
	Ln +1 Section G applications	1.840	1.993
	Ln +1 Section H applications	1.620	1.380
	Ln +1 Multiple section applications	2.879	2.972
Treatment	Ln +1 Patent applications	5.379	5.254
	Ln +1 Interested parties	6.800	6.665
	Ln +1 Inventors	314.787	383.571
	Ln +1 Applicants	219.607	194.810
	Ln +1 Owners	378.721	211.762
	Ln +1 Total population	9.043	9.236
	Ln +1 Section A applications	2.704	2.896
	Ln +1 Section B applications	2.927	3.020
	Ln +1 Section C applications	2.632	2.633
	Ln +1 Section D applications	0.190	0.258
	Ln +1 Section E applications	4.073	3.761
	Ln +1 Section F applications	2.510	2.406
	Ln +1 Section G applications	3.075	2.853
	Ln +1 Section H applications	1.950	1.789
	Ln +1 Multiple section applications	4.100	4.111

Notes: Calculations based on a balanced panel of $N = 656$ province-monthly observations from Q12001 to Q2021. The sample includes all Canadian provinces except Newfoundland and Labrador, Prince Edward Island, Yukon and Nunavut. Treatment group is Alberta, and control group is all remaining provinces. Post-intervention periods are those after April 2016 (Q22016).

Table A.6: Differences in means between treated and control provinces in province-month panel

Treatment		Pre	Post
Control	Ln +1 Patent applications	3.051	2.988
	Ln +1 Interested parties	4.535	4.316
	Ln +1 Inventors	3.603	3.609
	Ln +1 Applicants	3.078	3.013
	Ln +1 Owners	3.633	3.084
	Ln +1 Total population	7.533	7.632
	Ln +1 Section A applications	1.640	1.661
	Ln +1 Section B applications	1.388	1.272
	Ln +1 Section C applications	0.832	0.730
	Ln +1 Section D applications	0.138	0.069
	Ln +1 Section E applications	0.842	0.836
	Ln +1 Section F applications	0.945	0.808
	Ln +1 Section G applications	1.139	1.261
	Ln +1 Section H applications	1.035	0.828
	Ln +1 Multiple section applications	1.923	2.004
Treatment	Ln +1 Patent applications	4.279	4.157
	Ln +1 Interested parties	5.692	5.560
	Ln +1 Inventors	4.607	4.835
	Ln +1 Applicants	4.277	4.172
	Ln +1 Owners	4.799	4.253
	Ln +1 Total population	7.944	8.138
	Ln +1 Section A applications	1.673	1.833
	Ln +1 Section B applications	1.888	1.988
	Ln +1 Section C applications	1.600	1.599
	Ln +1 Section D applications	0.065	0.086
	Ln +1 Section E applications	2.982	2.669
	Ln +1 Section F applications	1.487	1.413
	Ln +1 Section G applications	2.020	1.829
	Ln +1 Section H applications	1.039	0.898
	Ln +1 Multiple section applications	3.009	3.019

Notes: Calculations based on a balanced panel of N = 1,968 province-monthly observations from January 2001 to June 2021. The sample includes all Canadian provinces except Newfoundland and Labrador, Prince Edward Island, Yukon and Nunavut. Treatment group is Alberta, and control group is all remaining provinces. Post-intervention periods are those after April 2016.