The Effect of Interprovincial Trade Agreements in Canada

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Research question

Question

What has been the effect of interprovincial trade agreements (ITAs) on trade between Canadian provinces?

We estimate the average effect of previous ITAs by treating provinces and territories as separate trade regions inside a global gravity panel. We follow recent best practices on gravity model specification, and DiD estimation for staggered treatments.

Motivation

- On February 1, 2025 the U.S. administration announced 25% tariffs on Canadian imports.
- Exports to the US fell 16.7% over the year.
- This sparked a renewed interest in easing interprovincial trade barriers.
- Several major regional trade agreements (RTAs) have been signed since 2025.

Policy evidence

Evaluating the historical effect of ITAs, and how they compare to RTAs, can inform future policy efforts.

Main contributions

1. **Nest provincial trade in the global network**: province-to-province and province-to-country flows are used as well as country-to-country flows.
2. **Modern structural gravity models**: employ recent gravity model recommendations as of 2025.
3. **Use staggered-DiD methods**: ETWFE allows treatment effects to vary by cohort and year.
4. **Compare ITAs to RTAs**: ITAs are treated as conceptually analogous to RTAs, but we allow for heterogenous effects between the two.

ITAs under study

Agreement	Provinces	Year	Purpose
Partnership Agreement on Regulation and the Economy	NB, NS	2009	Reduce duplication and harmonize regulations and practices.
Trade and Cooperation Agreement	QC, ON	2009	Remove obstacles to trade, labour mobility, procurement, transportation, and related areas.
New West Partnership Trade Agreement	BC, AB, SK, MB	2010; MB 2017	Mutual recognition or reconciliation of rules affecting trade, investment, and labour mobility.

Source: Beaulieu and Zaman (2019).

Gravity models

Newton

$$F = G\frac{m_1 m_2}{d^2}$$

Trade

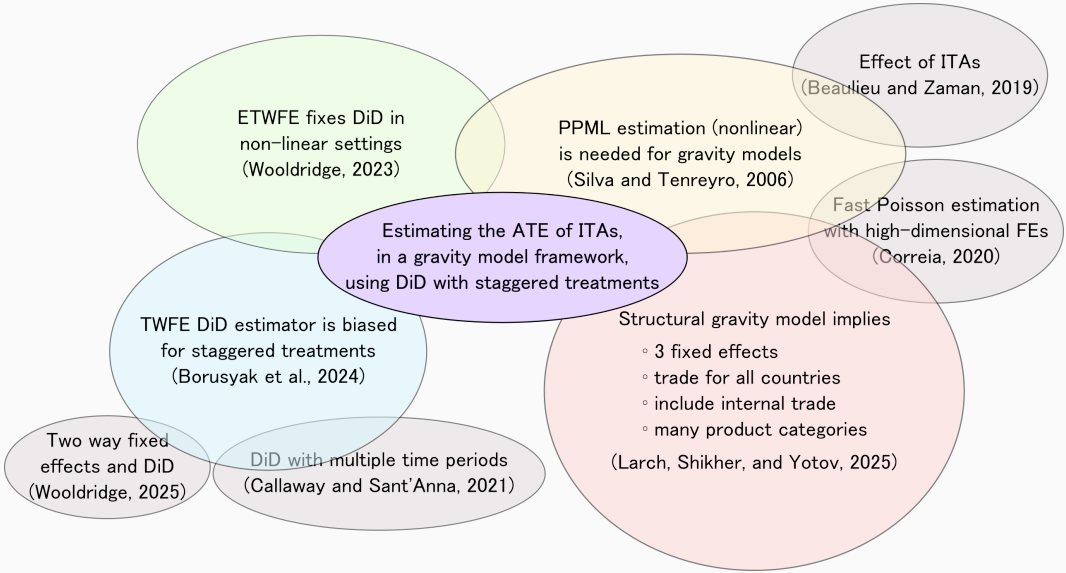
$$Y_{ij} = \beta_0 X_i^{\beta_1} X_j^{\beta_2} D_{ij}^{\beta_3} \times \epsilon_{ij,t}$$

Modern structural gravity:

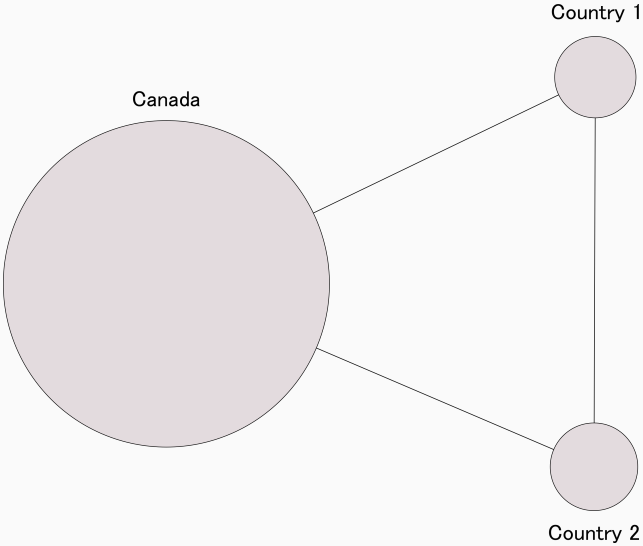
$$X_{ij} = O_i \times D_j \times T_{ij}$$

- O_i: exporter-side factors
- D_j: importer-side factors
- T_{ij}: bilateral trade costs, including RTAs and tariffs

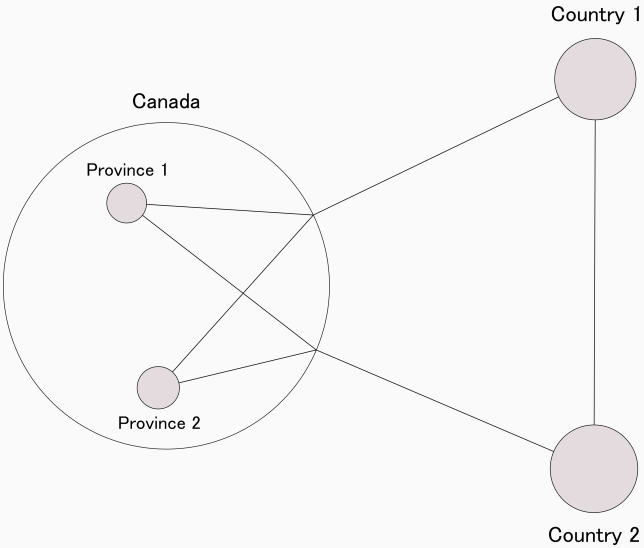
Literature Review



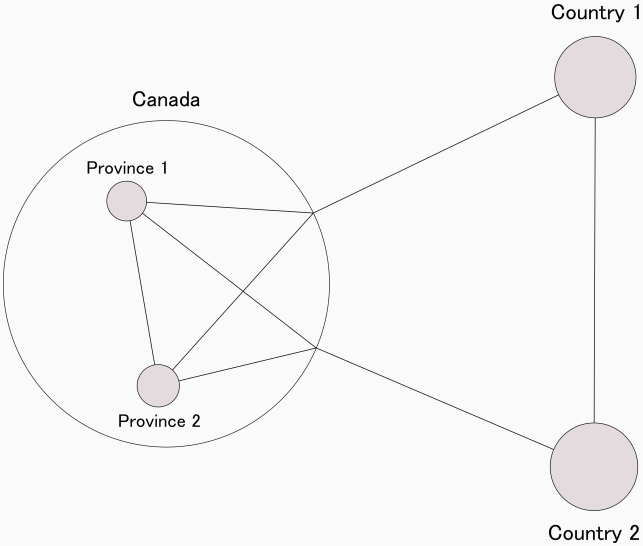
Data: ITPD-E release 3, country-to-country



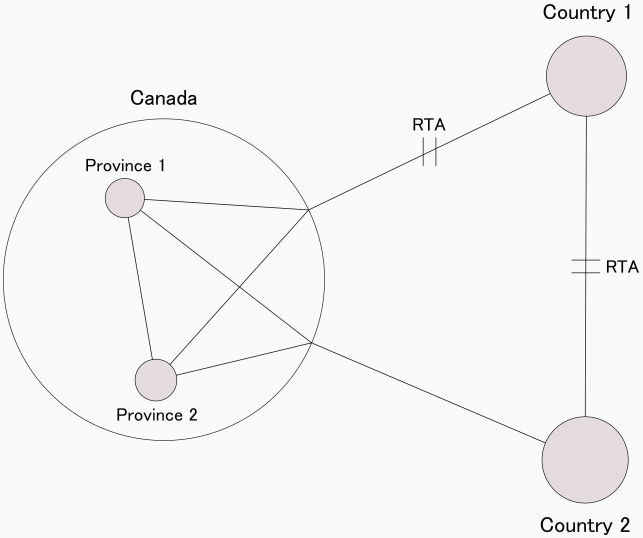
Data: Statcan, province-to-country



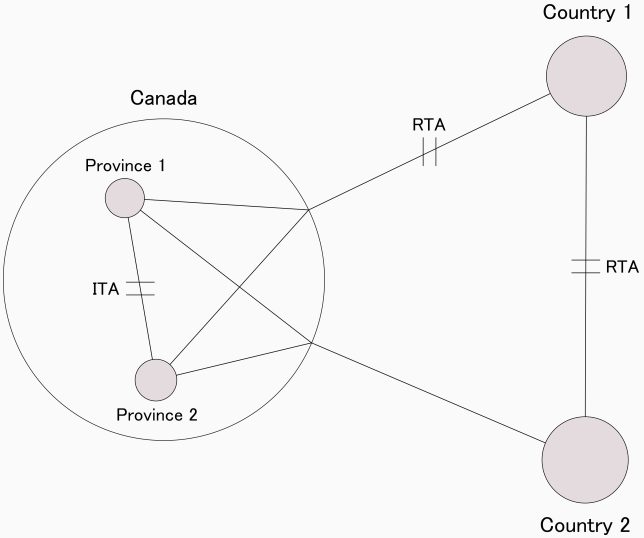
Data: Statcan, province-to-province



Data: Mario Larch RTA database



Data: ITA timing from agreement histories



Final merged data

- 9,914,667 observations
- 1999-2022
- 255 provinces, territories, and countries
- 11 NAPCS categories
- includes internal trade
- 300 Mb uncompressed

Global model - allows for fixed effects

Multilateral resistances

Trade between two places depends not only on their bilateral trade costs, but also on trade costs with everyone else.

- While it's possible to estimate gravity for a single provinces, the variable requirements are heroic
- Estimating only provincial trade would require proxying for trade costs directly
- A global panel lets exporter-year and importer-year fixed effects control for multilateral resistances: $\pi_{i,t}$ and $\chi_{j,t}$

In addition, we can use country-pair fixed effects τ_{ij} to control for time-invariant bilateral trade costs (e.g. distance).

TWFE is not allowed anymore

The standard TWFE DiD estimator, used prior to about 2021, would be:

$$X_{ij,t} = \exp\left[\delta^{TWFE}\mathrm{RTA}_{ij,t} + \mathrm{FE}\right]\epsilon_{ij,t}$$

But trade agreements are adopted at different times.

Problem

With staggered adoption and heterogeneous effects, already-treated pairs can become controls for newly-treated pairs. These "forbidden comparisons" bias TWFE estimates. Wooldridge (2025), Sun and Abraham (2021), Callaway and Sant'Anna (2021).

ETWFE solution: cohort-year treatment effects

Replace the single treatment dummy with a matrix of cohort-year effects:

$$\sum_{g=q}^{T} \sum_{s=g}^{T} \delta_{gs} D_{gs}$$

- g: cohort, defined by the year the agreement begins.
- s: post-treatment year.
- $D_{gs} = 1$ for cohort g in treatment year s.
- δ_{gs}: cohort-year-specific treatment effect.

Estimating equation

The equation we would like to estimate is:

$$X_{ij,t}^{(k)} = \exp\left[\sum_{g=q}^{T}\sum_{s=g}^{T}\delta_{gs}D_{gs} + \sum_{g=q}^{T}\sum_{s=g}^{T}\beta_{gs}D_{gs}\mathrm{ITA}_{gs} + \pi_{i,t}^{(k)} + \chi_{j,t}^{(k)} + \tau_{ij} + \theta_{ii,t}\right]\epsilon_{ij,t}.$$

- δ_{gs}: cohort-time effects of international RTAs.
- β_{gs}: additional effects Canadian ITAs.
- $\pi_{i,t}^{(k)}$ and $\chi_{j,t}^{(k)}$: exporter-sector-year and importer-sector-year fixed effects.
- τ_{ij}: exporter-importer fixed effects.
- $\theta_{ii,t}$: internal-trade-year dummy.

Recover the ATT

ETWFE produces many $\hat{\hat{\delta}}_{gs}$ and $\hat{\beta}_{gs}$ estimates.

The average RTA effect is a weighted average:

$$\text{ATT}^{(RTA)} = \overline{\hat{\delta}} = \sum_{g=q}^{T} \sum_{s=g}^{T} \frac{N_{gs}^{(I)}}{N_D^{(I)}} \hat{\delta}_{gs},$$

The average ITA effect adds the within Canada interaction:

$$\text{ATT}^{(ITA)} = \overline{\hat{\delta}} + \overline{\hat{\beta}} = \sum_{g=q}^{T} \sum_{s=g}^{T} \frac{N_{gs}^{(I)}}{N_D^{(I)}} \hat{\delta}_{gs} + \sum_{g=q}^{T} \sum_{s=g}^{T} \frac{N_{gs}^{(C)}}{N_D^{(C)}} \hat{\beta}_{gs}$$

Computational constraints

Estimating equation is computationally demanding:

- 187,415 fixed effects
- 310 treatment effects
- 9 million observations

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Preliminary estimates use aggregated NAPCS data, and drop internal trade flows.

Preliminary results

Specification	RTA	ITA
TWFE full sample	10.4%	-1.4%
ETWFE full sample	–	–
TWFE aggregated NAPCS	5.9%	-3.3%
ETWFE aggregated NAPCS	10.5%	19.7%
TWFE with internal trade	–	–
ETWFE with internal trade	–	–

Main finding

In the aggregated ETWFE specification, ITAs are estimated to raise interprovincial trade by 19.7%, nearly twice the estimated RTA effect of 10.5%.

Much work to be done

1. Estimate the full ETWFE model on all product categories.
2. Add the internal-trade-year dummy $\theta_{ii,t}$.
3. Clustered standard errors:
   - pair-level
   - exporter, importer, time
   - exporter-time, importer-time, and pair
4. Perform event studies
5. Check parallel trends

Summary

1. We nest Canadian interprovincial trade in the global RTA literature.
2. ETWFE is necessary because ITAs and RTAs are staggered and likely heterogeneous.
3. Preliminary results suggest ITAs may be more effective than RTAs.

Thank you

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