

Estimates and Uncertainty from Modelling the Impacts of the Trans-Pacific Partnership on Canada's Trade Infrastructure (Work-in-Progress)

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BACKGROUND

Changing Trade Patterns

- Globalization of the Canadian economy
 - Fifteen free trade agreements (FTA) are currently enforced.
 - There are fourteen FTA's currently in exploratory discussions or negotiations
 - One of the newest FTAs, the Comprehensive and Progressive Trans-Pacific Partnership (CPTPP), is signed as of 2018 [1].
- COVID-19 presents an unprecedented shock to the global economy
 - For example, in Canada the merchandise exports and imports dipped to -27.8 and -24.1 one-month-percent change respectively in April 2020.
 - Their pre-pandemic range was 5% to -5% [2].
- Both circumstances place new and changing demand on Canada's transportation system.

RESEARCH QUESTIONS

Research Questions



1. What are the impacts of signing the CPTPP on Canada's trade infrastructure?



2. What are the impacts of COVID-19 on these forecasts?



3. How uncertain are the model results?

METHODOLOGY

Model

CGE

- Computable equilibrium model (CGE)
- Forecasts country to country trade-flows (\$) by commodity type

Trade Flow Disaggregation

- Disaggregates country-country trade flows (\$) to province-country trade flows (\$) by commodity type

Value to Quantity Transformation

- Uses value (\$) to weight (kg) ratios to obtain province-country trade flows in kg by commodity type

Mode Share Splits

- Estimates domestic (province-province) mode splits in tonnes by commodity type and mode



Uncertainty Analysis Method

Identify inputs and outputs in the model

Identify the variables related to sources of uncertainty and their respective outputs



Simulation

Repeated simulation using different values for the identified inputs



Estimation of Output Distributions

Use the data generated in the simulation to estimate distributions of outputs



Results/Discussion

Uncertainty measures, other statistical tests, etc.



Sources of Uncertainty in the Model

CGE

- Out of Scope.
- Results provided by Canada West Foundation.

Trade Flow Disaggregation

- Temporal variation introduced in the calculation of country to province shares.
- 2015 data were used for preliminary results.
- There are datasets for the years 2010 to 2015.

Value to Quantity Transformation

- Variation on the amount of aggregation in commodity type to calculate value-weight ratios.
- E.g., 6-digit harmonized system (HS) vs 4-digit HS.

Mode Share Splits

- Temporal variation introduced in the calculation of domestic shares.
- 2011 data were used for preliminary results.
- There are datasets for the years 2011 to 2017.

PRELIMINARY RESULTS

In response to research question #1

Preliminary Results (Research Question #1)

- Exports (units in additional yearly tonnages by 2035)
 - The three most impacted ports of entry by the signing of the CPTPP are:
 - Vancouver – Marine and Rail adding 779,300 tonnes/year.
 - Calgary adding 73,010 tonnes/year.
 - Vancouver (Int. Airport) adding 36,016 tonnes/year.
 - Transported commodities from Ontario to British Columbia increased by 270,716 tonnes/year via rail (highest impact domestically).

Preliminary Results (Research Question #1)

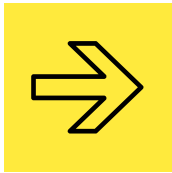
- Imports (units in additional yearly tonnages by 2035)
 - The three most impacted ports of entry by the signing of the CPTPP are:
 - Vancouver – Marine and Rail adding 273,900 tonnes/year.
 - Toronto – Pearson Int. Airport adding 46,590 tonnes/year.
 - Prince Rupert adding 18,954 tonnes/year.
 - Transported commodities from Ontario to British Columbia increased by 70,630 tonnes/year via truck (highest impact domestically).

NEXT STEPS

Next Steps



1. What are the impacts of signing the CPTPP on Canada's trade infrastructure?



2. What are the impacts of COVID-19 on these forecasts?
 - Run the analysis in question 1 for forecasted values from the CGE model that take into account the impacts of COVID-19



3. How uncertain are the model results?
 - Use repeated simulation to generate distributions for the model outputs and analyze their uncertainty

References

- [1] Government of Canada. Trade and investment agreements [Internet]. 2020 [cited 2020 Jul 2]. Available from: <https://www.international.gc.ca/trade-commerce/trade-agreements-accords-commerciaux/agr-acc/index.aspx?lang=eng>
- [2] Statistics Canada. Canadian Economic Dashboard and COVID-19 [Internet]. 2020 [cited 2020 Jul 20]. Available from: <https://www150.statcan.gc.ca/n1/pub/71-607-x/71-607-x2020009-eng.htm>

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